

## **PROCEEDINGS**

**1<sup>st</sup> Global Multidisciplinary Academic Meeting, GAM 2014**

*27-30 March, Cape Verde*

## **PROCEEDINGS**

**1<sup>st</sup> Global Multidisciplinary Academic Meeting, GAM 2014**

*27-30 March, Cape Verde*

**European Scientific Institute, ESI (publishing)**

***Impressum***

Bibliographic information published by the National and University Library "St. Kliment Ohridski" in Skopje, Macedonia; detailed bibliographic data are available in the internet at <http://www.nubsk.edu.mk/>;

CIP - 5/6(062)

60(062)

COBISS. MK-ID 96191754

Any brand names and product names mentioned in this book are subject to trademark, brand or patent protection and trademarks or registered trademarks of their respective holders.

The use of brand names, product names, common names, trade names, product descriptions etc. even without a particular marking in this works is in no way to be construed to mean that such names may be regarded as unrestricted in respect of trademark and brand protection legislation and could thus be used by anyone.

**PROCEEDINGS:**

GLOBAL Multidisciplinary Academic Meeting (Cape Verde)

Knowledge transmission by story telling :

Malaria Education of School-Aged Children in the Kwahu-Eastern Region, Ghana /

Global Multidisciplinary Academic Meeting, 27-30 Mart, Cape Verde.

European Scientific Institute, ESI, 2014.. - (600 p.) : ilustr. ; 28 cm

Kocani, Republic of Macedonia

Email: [contact@eujournal.org](mailto:contact@eujournal.org)

Printed in Republic of Macedonia

**ISBN** 978-608-4642-19-0

Copyright © 2014 by the authors, ESI and licensors

All rights reserved. 2014

## **PROCEEDINGS**

**Global Multidisciplinary Academic Meeting, GAM 2014**

*27-30 March, Cape Verde*

# Table of Contents

<b>KNOWLEDGE TRANSMISSION BY STORY TELLING Malaria Education of School-Aged Children in the Kwahu-Eastern Region, Ghana “ANANSI TRICKS MRS. MOSQUITO”</b> .....	1
<i>Edward A. Gotfried</i>	
<b>GENETIC MUSCLE DISEASES: NEW INSIGHT INTO THE BASIS OF THE MYOTONIC DYSTROPHIES</b> .....	8
<i>Bjarne Udd</i>	
<b>FREQUENCY OF LUNG TUMORS IN THE PATHOLOGY DEPARTMENT OF SANATORIO ADVENTISTA DEL PLATA, SMOKING AND TYPES OF ANATOMOPATHOLOGICAL DIAGNOSES</b> .....	16
<i>Gabriel Segundo Urbelz Yanina Glenda Nikolaus Alicia Mabel Tiscornia Lilia Cítera de Sorace</i>	
<b>ANALYSIS OF COMPLICATIONS AFTER LAPAROSCOPIC CHOLECYSTECTOMY</b> .....	24
<i>Olga Tashtemirova Marat Apseyev</i>	
<b>REVIEW OF THE FINDINGS ON THE INITIAL LEVEL OF THE FUTURE DOCTORS’ SUBJECT COMPETENCIES IN MEDICAL DEONTOLOGY IN TERMS OF MOTIVATIONAL COMPONENT</b> .....	29
<i>Olena Holik</i>	
<b>MANGROVES OF KETI-BUNDER, INDUS DELTA: A PRESENT STATUS</b> .....	38
<i>Zafar Farooqui</i>	
<b>WHITE-TAILED EAGLE (AVES: ACCIPITERIFORMES) STATUS IN REPUBLIC OF MOLDOVA</b> .....	49
<i>Vitalie Ajder Igor Roşca Lucian Eugen Bolboacă Laurenţiu Petrencu Emanuel Ştefan Baltag</i>	
<b>BIOTECHNOLOGY FOR ENERGY PRODUCTION: CONSTRUCTION OF A MICROBIAL FUEL CELL USING THE INDUS RIVER SEDIMENT SOIL AND WATER COUPLED WITH THEIR MICROBIAL FLORA</b> .....	55
<i>Muhammad Qasim Hayat Syeda Qudsia</i>	

**THE PH DEPENDENCE OF NATURAL ORGANIC MATTER SORPTION TO NANOPARTICLES AND ITS ABILITY TO STABILIZE NANOPARTICLES IN AQUEOUS SOLUTIONS.....64***Phenny Mwaanga*

Elizabeth R. Carraway

Mark A. Schlautman

**A COMPARATIVE STUDY OF BIODIVERSITY CONSERVATION COPING WITH CLIMATE CHANGE IN CHINA AND CAPE VERDE.....77***Jaelsa Mira Gonçalves Moreira**Dong Shikui***BIOSENSORS FOR FAST DETECTION OF TOXIC COMPOUNDS.....85***Camelia Bala**Lucian-Gabriel Zamfir**Lucian Rotariu***FROM THE PARADIGM OF SEEING TO THE TOUCH PARADIGM: THE BECOMING HAPTIC IN THE CONTEMPORARY ARTISTIC CREATION.....90***Salif Silva***EUROPEAN GROUND SQUIRREL (MAMMALIA: RODENTIA) POPULATION FROM EASTERN ROMANIA: DENSITY, DISTRIBUTION AND THREATS.....94***Emanuel Ștefan Baltag**Gheorghe Zaharia**Lucian Fasolă**Constantin Ion***PORE SIZE AND GEOMETRY OF RESERVOIR ROCKS USED AS KEY FACTOR FOR DRILLING AND COMPLETION FLUID DESIGN OF OIL WELLS.....102***Ali Elsaeh Enbaia**Illiya Amalina Binti Ahmad Ramdzani***EXAMINATION OF THE EIGENVALUES LORENZ CHAOTIC SYSTEM.....114***Ercan Kose**Azize Akcayoglu***STUDY OF BUILDING FIRE EVACUATION AND GEOMETRIC MODELING BASED ON CONTINUOUS MODEL FDS+AVEC.....122***Aristides Lopes da Silva*

**OPTIMUM DISTANCE BETWEEN VORTEX GENERATORS USED IN MODERN THERMAL SYSTEMS.....130***Azize Akcayoglu**Cenap Ozgun**Celal Nazli**Fuat Yilmaz**Ali Pinarbasi***EFFECT OF DIFFERENT SHEAR WALL CONFIGURATIONS ON SEISMIC RESPONSE OF A MOMENT-RESISTING FRAME.....139***Anshul Sud**Raghav Singh Shekhawat**Poonam Dhiman***THE SPECIFICATION OF A MENU-SELECT INTERACTIVE SYSTEM BASED ON CSP THEORY.....146***Arslan Enikeev**Mahfoodh Bilal Ahmed Mohammed***CONCEPT-PROCESS MODEL OF THE 2009 SECONDARY EDUCATION CURRICULUM: ITS EFFECTS ON MATHEMATICS PERFORMANCE.....153***Emerzen L. Echavez***VARIANCE COMPONENTS ESTIMATION IN A K-WAY NESTED RANDOM EFFECT MODELS.....158***Adilson J. M. da Silva***TEACHING MATHEMATICS TO ENGINEERING STUDENTS IN DEVELOPING COUNTRIES.....168***Nabil Moussa***MATHEMATICS AND PHYSICS ESTIMATES OF SLOW CONTROLS.....172***O. Carja**A. I. Lazu***MAKING NATURE'S VALUE VISIBLE: VIDEO ARTISTS AS CITIZEN SCIENTISTS.....177***Sarah Van Borek***GROWTH OF MULTIDISCIPLINARY SCIENCE IN THE PERIPHERY.....187***Kevin O'Connor**Robert Sharp***THE PROBLEMS OF PREPARATION COMPETENT TECHNICAL SPECIALIST IN THE PEPUBLIC OF KAZAKHSTAN.....198***Zhanbirov Zhumazhan Ginayatovich**Kantarbayeva Shyryn Myrzahanovna**Tursymbekova Zakira Zhambylovna**Smagulova Aigerim Sovethanovna*

<b>CULTURAL TOOLS TO ENHANCE LEARNING.....</b>	<b>204</b>
<i>Natalie Senjov-Makohon</i>	
<b>PROBLEM OF EMPIRICAL DISMUTATION IN TEACHING NATURAL SCIENCES.....</b>	<b>211</b>
<i>Dariusz Witowski</i>	
<b>SUSTAINABLE DEVELOPMENT IN ARCHITECTURAL EDUCATION.....</b>	<b>217</b>
<i>Iva Poslusna</i> <i>Hana Urbaskova</i>	
<b>AN INTEGRATIVE DECISION MAKING MODEL UNDER CRISIS: EXAMINING TWO REAL LIFE CRISIS DECISION MAKING CASES.....</b>	<b>222</b>
<i>Dechao Zeng</i> <i>Xiaoyu Zhang</i>	
<b>THE ROLE OF CULTURE, LANGUAGE, AND ETHICS IN GLOBAL BUSINESS.....</b>	<b>231</b>
<i>Michael Ba Banutu-Gomez</i>	
<b>EXPERIMENTAL MACROECONOMICS, A CHALLENGE FOR THE FUTURE?.....</b>	<b>243</b>
<i>Helena Chytilova</i>	
<b>THE IMPACT OF VIOLENCE ON THE MENA REGION BUSINESS AND TRADE.....</b>	<b>252</b>
<i>Akl Kairouz</i> <i>Issam Atala</i>	
<b>IMPACT OF CORPORATE NETWORK COMPETENCES ON THE COMPETITIVENESS OF COMPANIES.....</b>	<b>259</b>
<i>Zoltan Veres</i> <i>Katalin Feher</i> <i>Adel Balogh</i>	
<b>COST STICKINESS IN LATIN AMERICAN OPEN COMPANIES FROM 1997 TO 2012.....</b>	<b>270</b>
<i>Alessandra Vieira Cunha Marques</i> <i>Cassius Klay Silva Santos</i> <i>Francielly Dornelas Correia Lima</i> <i>Patrícia de Souza Costa</i>	
<b>USING SERIOUS GAMES TO RECRUIT, INTEGRATE AND TRAIN YOUR EMPLOYEES:AN EXPLORATORY STUDY OF PRACTICES.....</b>	<b>283</b>
<i>Oihab Allal-Chérif</i>	
<b>FOREIGN AID DECREASE – THREAT FOR MILLENNIUM DEVELOPMENT GOLAS?.....</b>	<b>293</b>
<i>Kludia Lindtnerova</i>	

<b>IS HIERARCHY RELATIVELY FIXED?.....</b>	<b>299</b>
<i>Maoguo Wu</i>	
<b>METHOD AND EPISTEMOLOGY IN MARX’S THEORY OF STATE AND ECONOMY IN THE GRUNDRISSE: REDUCIONISM, SYSTEMS AND COMPLEXITY.....</b>	<b>305</b>
<i>André Folloni</i>	
<b>ECONOMIC ANALYSIS OF OUTDOOR RECREATION.....</b>	<b>311</b>
<i>Jalil Barkhas</i>	
<b>OUTLOOK OF CHINA’S STATE-OWNED ENTERPRISES TRANSFORMATION.....</b>	<b>321</b>
<i>Yi Hu</i>	
<b>HOW TO MEASURE ADEQUACY OF TECHNICAL PROVISIONS IN GENERAL INSURANCE – PRACTICAL PERSPECTIVE.....</b>	<b>325</b>
<i>Peter Zsoldos</i>	
<b>INSTITUTION OF MATRIMONIAL PROPERTY – DOWRY ON THE STAGE OF MODERN EUROPE.....</b>	<b>333</b>
<i>Iveta Nikolajeva</i>	
<b>THE CASE FOR A BALANCED BUDGET CONSTITUTIONAL PROVISION IN GHANA.....</b>	<b>349</b>
<i>Nicholas Amponsah</i>	
<b>INTERNATIONAL LAW ENFORCEMENT COOPERATION.....</b>	<b>355</b>
<i>Korontzis Tryfon</i>	
<b>EMBEDDING HEALTH RESEARCH FINDINGS INTO POLICY MAKING: POLICYMAKERS AND ACADEMICIANS PERSPECTIVE, PALESTINE, 2013.....</b>	<b>368</b>
<i>Yousef Ibrahim Aljeesh</i>	
<i>Mohammed Shoukri Al-Khaldi</i>	
<b>HUMANITARIAN MILITARY INTERVENTION IN KOSOVO AND LIBYA: AN ASSESSMENT ON RELEVANT THEORIES OF INTERNATIONAL RELATIONS.....</b>	<b>381</b>
<i>Sujit Datta</i>	
<b>THEORIZING THE EU CONDITIONALITY POLICY AND ITS APPLICATION IN WEST AFRICAN COUNTRIES. THE CASE OF CAPE VERDE.....</b>	<b>389</b>
<i>Jairzinho Lopes Pereira</i>	
<b>THE CHALLENGES AND DIFFICULTIES OF SINO-US MILITARY DIPLOMACY IN THE AFRICAN CONTINENT.....</b>	<b>404</b>
<i>Ailton Jose F. Barbosa</i>	

**THE 2011 LANDING OF TURKEY ON SOMALIA: THE “STATE TO PEOPLE” ASPECT OF TURKISH FOREIGN POLICY TOWARDS SUB-SAHARAN AFRICA.....412**  
*Volkan İpek*

**THE CHALLENGES OF REGIONAL INTEGRATION IN AFRICA.....429**  
*Jailson E. da G.R. Gomes*

**MIGRATION IN Cape Verde ISLANDS LEGAL AND POLICY FRAMEWORK.....449**  
*Varela, Odair Barros*  
*Barbosa, Carlos Elias*

**THE CAPE VERDEAN SLUM AREAS IN PORTUGAL, INTEGRATION OR SEGREGATION? HOW DOES THE SCHOOL PREPARE THE YOUNG CAPE VERDEAN IMMIGRANT GENERATION TO INTEGRATION IN THE PORTUGUESE SOCIETY?.....467**  
*Martha Lea*

**CHINESE MIGRATION IN KAZAKHSTAN: IMPLICATIONS FOR NATIONAL SECURITY.....482**  
*Svetlana Kozhirova*  
*Bakyt Ospanova*

**THE STRATEGIC MANAGEMENT OF CREATION PROCESS AND OF CHANGE: A THEORETICAL CONTRIBUTE FROM THE PERSPECTIVE OF TOURISM.....487**  
*Bruno Sousa*

**TEENAGERS` PERSONALITY FEATURES IN RELATION WITH AGE, GENDER AND BODY MASS INDEX.....494**  
*Cristina Petrescu*  
*Brigitha Vlaicu*

**PHILOSOPHY OF EDUCATION, VALUES AND UTOPIA IN THE CRITICAL PEDAGOGY OF PAULO FREIRE.....498**  
*Carlos Bellino Sacadura*

**GLOBAL SEXUAL DEVIANCY: LEARNING FROM AMERICA’S MISTAKES.....506**  
*Velasco Daniel*

**CUISINE AS A MARKER OF CULTURAL IDENTITY. A HERMENEUTIC LOOK AT “INDIAN CUISINE”, A SHORT STORY BY TRINIDADIAN-CANADIAN WRITER RAMABAI ESPINET.....521**  
*Mario Vicente Ricalo Borrero*

**FUTURE TRENDS ON THE SPOT IN INTERNATIONAL TOURISM - MODERN YOUTH EDUCATIONAL TOURISM.....526***Diana Foris**Cristina Nicolau**Tiberiu Foris***DISTORTION OF COLOR IMAGES ON FLAT COMPUTER SCREEN DUE TO CHROMOSTEREOPSIS.....533***Maris Ozolinsh**Kristine Muizniece**Gunta Krumina***HOW TO BRIDGE THE GAP BETWEEN THE RESULTS OF PSYCHOLOGICAL RESEARCH AND THE REALITY OF EVERYDAY CLASSROOM LEARNING.....539***Iveta Kovalčíková***EUROPEAN ISOTHERMS MOVE NORTHWARDS BY UP TO 15 KM/YEAR: USING CLIMATE ANALOGUES FOR AWARENESS-RAISING.....547***Martin Beniston***AFRICA VIEWED THROUGH ITS PROVERBS AND LITERATURE.....557***Lic.Ana Cristina Pinheiro Fortes***MIRRORING THE "OTHER": ORIENTALISM, NOMADS AND ETHNOMASQUERADING IN LAWRENCE'S SEVEN PILLARS OF WISDOM.....566***Sara Corrizzato**Giada Goracci***ETHICAL AWARENESS AND FAIRNESS IN LANGUAGE TESTING.....572***Jana Béréšová***RESEARCH UPTAKE: THE VALUE OF EFFECTIVELY COMMUNICATING RESEARCH TO YOUR AUDIENCE.....578***Dori Nguyen***CREATING THE SYSTEM OF PROTECTION OF INTELLECTUAL PROPERTY AT UNIVERSITIES.....590***Jozef Zajac**Vladimir Modrak**Jan Pitel**Pavel Kokula*

**METHODOLOGY FOR THE IDENTIFICATION OF INTERNAL AND EXTERNAL  
COMPETENCY RELATIONS IN THE FIELD OF INTELLECTUAL PROPERTY  
PROTECTION.....597**

*Jozef Zajac*

*Michal Hatala*

*Lubomir Olexa*

*Jan Zajac*

# **KNOWLEDGE TRANSMISSION BY STORY TELLING**

## **Malaria Education of School-Aged Children in the Kwahu-Eastern Region, Ghana**

### **“ANANSI TRICKS MRS. MOSQUITO”**

*Edward A. Gotfried D.O., FACOS*  
Director of the NYIT Center for Global Health

---

#### **Abstract**

We developed an educational tool to teach Ghanaian children the benefit of using malaria bed-nets to increase awareness/prevention of Malaria. Puppets, Comic books, and Videos demonstrated a visual approach constructed upon the ancient Ashanti art of “story telling”, using Anansi the Spider. Traditional or indigenous characters in stories make learning more enjoyable to children, guiding them towards comprehensive understanding. The knowledge achieved serves as a foundation for health education. Through myths and legends, we pass on our visions, values, feelings and memories in a way that is both enjoyable and entertaining. The best stories are those that motivate, inspire and connect – stories that make students feel some emotion and allow them to see themselves in similar situations. Students treasured the book, ANANSI TRICKS MRS. MOSQUITO. Older students read it to their younger siblings; elders in African societies encourage such teaching as transmission of knowledge.

---

**Keywords:** Malaria, education, story telling, anansi

#### **Introduction**

The World Health Organization, (WHO 2012) reports, “Malaria - an entirely preventable and treatable disease - takes the life of an African child every minute”.<sup>1</sup> Malaria accounts for one in five of all childhood deaths in Africa and of the 660,000 annual malarial deaths worldwide, over 75% occur in African children less than 5 years old. Malaria also causes severe morbidity in children, such as anemia, low birth-weight, epilepsy, and neurological problems, which compromise the health and development of millions of children living in malaria endemic areas.<sup>2</sup> The most vulnerable communities in the world continue to lack sufficient access to long-lasting insecticidal nets, (LLINs). In several sub-Saharan African countries, the rapid, widespread implementation of insecticide treated nets, which can prevent malaria by protecting those sleeping under them from the bites of night-flying malaria parasite-carrying mosquitoes, has been accompanied by significant reductions in child deaths. These are real life findings that reflect the results of clinical trials and support continued efforts to scale-up and maintain LLIN coverage in sub-Saharan Africa.<sup>3</sup>

#### **Main Text**

In 2011 The NYIT Center for Global Health began developing an educational tool to teach children in Oworobong, Ghana the benefit of using long lasting insecticide treated malaria bed-nets. We decided on a West African folktale with characters to which children could relate. Our goal was to increase awareness of malaria and it’s prevention in Oworobong Ghana during a three-week-long outreach project designed to provide health care during the summer of 2011. In the end we developed a multidisciplinary project with the NYIT School of Education, and the NYIT College of Osteopathic Medicine. The project involved students

and faculty of the NYIT Center for Global Health performing a play with rod puppets; our puppets were about 2 feet tall and were manipulated by sticks or rods. They were created to be lightweight and durable in the extreme heat and humidity of West Africa. The play was presented at schools during the day, and since there was no electricity it was performed using flashlights and headlamps at night. Students and faculty of the NYIT Center for Global Health performed the puppet play during their 3-week outreach project to Oworobong Ghana. Translation was delivered in Twi, the native language of Ghana, and English because school children are taught in English. Approximately 500 Ghanaian students, 100 at each of 5 village primary school sites located about a 1 to 1<sup>1/2</sup> hour hike from Oworobong, saw these performances. A question and answer session was conducted following each performance of the play. Children demonstrated immediate recall of the signs and symptoms of malaria, the mosquito as the disease vector, and the benefit of prevention by using a bednet. Fifty malaria bed-nets, donated by the manufacturer Best Net<sup>®</sup>, were given to teachers at the schools for further distribution.

In 2012 educational content was reinforced by the development of an illustrated book, created and published by the Publications and Advertising Office at NYIT. As English is the official language of Ghana, the story was written in English with the character names in Twi. Several hundred copies of the book were brought to Oworobong and given to children at the end of each performance of the play. The book ANANSI\*\*TRICKS MRS. MOSQUITO quickly became a “treasure”. Books had never been given to children in Oworobong. Older students read it to their younger siblings and friends. \*\* Based upon the illustration of Gerald McDermott

Sibling teaching is encouraged by elders in African societies, and is seen as transmission of knowledge. It is characterized by the inclusion of traditional games, singing, dancing, use of riddles and storytelling. Some of the songs and stories observed during sibling teaching have moral lessons or values embedded in them. Therefore, along with learning in a pleasurable atmosphere by listening to stories children learn the values that are upheld in their society.<sup>4</sup> Many African societies readily practice sibling teaching and care-giving, part of children’s training for responsibilities they will be expected to perform in the future as adults and parents. Older children then have the skills necessary to teach their younger siblings various concepts or values and young children are likely to pay attention to their older brother or sisters.

The innovative project collaboratively produced at NYIT, which utilizes rod-puppets, graphic comic books, and videos reconstructs this ancient art of “story telling”, or in the Ashanti culture, established in Ghana during the 11th or 12th century Anansesem<sup>5</sup> “Spider tales”, to advance health, well-being and disease prevention.<sup>6</sup> Many Ashanti folktales focus on Anansi the Spider, the popular trickster character of Ashanti folklore, who serves alternately as hero, villain, moral inspiration, and comic relief. His presence in Ashanti folklore appears to be ancient, for he figures not only in humorous tales but also in some that have the character of creation myths. Anansi is responsible for the moon, (or sun), being in the sky. Anansi is also the owner of all stories that are told, and therefore when a man wishes to tell a tale he first acknowledges that it belongs to Anansi.<sup>7,8</sup> Using traditional or indigenous characters in stories makes learning enjoyable to children, and guides them towards a more comprehensive understanding. The knowledge achieved by children in this fashion may serve as a foundation for health education. Storytelling is a fundamental part of human culture. Through myths, folktales and legends we pass on our visions, values, feelings and memories in a way that is enjoyable and entertaining. The best stories are those that motivate, inspire and connect with students – stories that make them feel some emotion and allow them to see themselves in similar situations. “Every mythology has to do with the wisdom of life as related to a specific culture at a specific time”<sup>9</sup> When children are able to “reflect upon and integrate information with what they already know they will remember it better”. “Stories

provide a simple way of combining verbal and visual information. If the story is sufficiently clear or dramatic, it will almost certainly stimulate visual images complementing the story line, providing a vicarious experience that results in a greater likelihood of being remembered.”<sup>14</sup>

“It is crucial to realize that any thinking done about development in Africa without including the arts is redundant thinking”<sup>12</sup>

In this area of Ghana where there is limited infrastructure, minimal resources for the delivery of health care or its evaluation, perhaps research utilizing observational methods might be appropriate.<sup>15</sup> Does utilizing Story-telling as a transmission of knowledge, such as in Anansi Tricks Mrs. Mosquito, result in an increased use of long-lasting insecticidal nets, (LLINs), and in the reduction of Malaria cases in children under the age of 5 in rural Ghana? On our subsequent visits we will evaluate how many books remain as well as how many bed-nets are being utilized, and whether there is a reduction in childhood malaria cases.

Here is a description by a medical student of his participation and experience with the Anansi Play during the summer outreach project of 2012. “At many of the schools we acted out the Anansi play only to be amazed at the interest and interaction shown by the kids simply from cardboard puppets and strings. The plays best night was the first night. After a full day of practicing the puppets (i.e. figuring out how to hold them best without being crooked, ensuring they were up against the white cloth the entire time, making sure the puppets shook as the translators served as their voices and ironing out all other details) we finally debuted the play to a giant audience of locals from around Oworobong. Spotlights consisted of 6-7 headlamps shining brightly from all angles. Each person's puppet slowly became 'their' character over time as we mastered how to put the puppets in and out and how to appropriately 'act' each one. By our 5<sup>th</sup> or 6<sup>th</sup> showing, the play had been done so many times there were very little mistakes. All we needed to find each time was two sticks to hold up the backdrop and a group of engaging children - both of which seemed plentiful. Personally, what made me most proud was that we were actually helping the community's when everyone was opened to questions after the play was over. To see the kids ask about malaria and how it can spread showed me that they were in fact learning from the play and took it to heart. This was one of my primary goals of the entire trip - to promote health and wellbeing in anyway that I can.”<sup>10</sup>

It is clear from this passage that the medical student was participating in his own learning even as he brought lessons to the community in Ghana. The skills acquired by our medical student(s) through the theatrical performance of the Anansi story included “the altruistic joys of teaching and of compassion” and the realization that a simple puppet show and story book could change a child's life. This project provides a wonderful example of “the arts leading the way”,<sup>12</sup> in a form of medical humanities that promotes what A. Kleinman has called the “interpersonal skills of kindness, respect, compassion and communicative competence, are the building blocks of what it means to be a physician”.<sup>11</sup>

Our use of a Ghanaian folktale character, Anansi the Spider, as the protagonist in our created story, allows for the transfer of knowledge to the listener. We created the story to appeal to children primarily and discovered that adults equally enjoyed it. It was constructed to encourage the use of long lasting insecticide treated bed nets in communities where Malaria was prevalent. “Ever since human beings have communicated and socially interacted with each other, stories have played a vital role in exchanging and propagating complex ideas and disclosing knowledge. In every culture, different stories exist and have been used to preserve and pass on knowledge from generation to generation. Stories are in a certain intrinsic sense interesting, because they are an attractive high-priority memory booster. With purpose and a meaning behind it, stories will draw and grasp the attention of any audience and in this sense will outperform any logical argument”.<sup>16</sup>

“Storytelling is one of the oldest forms of communication and is an integral part of most cultures. Stories are familiar and comfortable, which perhaps contributes to their widespread appeal as a potential knowledge transfer strategy. We all can remember the allure of stories as children and how stories were used as a strategy to teach important life lessons. Storytelling—both the telling and the listening—is a hard-wired human instinct (Gardner, 2008).”<sup>17</sup>

“Stories can be shared as a way of simplifying complex issues or capturing the attention of others. It's thought that stories “work” through establishing an emotional connection with the reader and then provoking an emotional response that may facilitate enhanced knowledge retention. A simple anecdote or story may be more powerful in persuading individuals to adopt a particular approach to health care than only the results from rigorous research.”<sup>18</sup> We utilized our Anansi story as a way to teach children, and parents, the benefits of using Insecticide Treated Malaria Bednets. In the long term we must look for “Behavioral changes” that result in more consistent use of bed nets and the reduction of Malaria.

In 2011 The NYIT Center for Global Health began developing an educational tool to teach children in Oworobong, Ghana the benefit of using long lasting insecticide treated malaria bed-nets. We decided on a West African folktale with characters to which children could relate. Our goal was to increase awareness of malaria and it's prevention in Oworobong Ghana during a three-week-long outreach project designed to provide health care during the summer of 2011. In the end we developed a multidisciplinary project with the NYIT School of Education, and the NYIT College of Osteopathic Medicine. The project involved students and faculty of the NYIT Center for Global Health performing a play with rod puppets; our puppets were about 2 feet tall and were manipulated by sticks or rods. They were created to be lightweight and durable in the extreme heat and humidity of West Africa. The play was presented at schools during the day, and since there was no electricity it was performed using flashlights and headlamps at night. Students and faculty of the NYIT Center for Global Health performed the puppet play during their 3-week outreach project to Oworobong Ghana. Translation was delivered in Twi, the native language of Ghana, and English because school children are taught in English. Approximately 500 Ghanaian students, 100 at each of 5 village primary school sites located about a 1 to 1<sup>1/2</sup> hour hike from Oworobong, saw these performances. A question and answer session was conducted following each performance of the play. Children demonstrated immediate recall of the signs and symptoms of malaria, the mosquito as the disease vector, and the benefit of prevention by using a bednet. Fifty malaria bed-nets, donated by the manufacturer Best Net<sup>®</sup>, were given to teachers at the schools for further distribution.

In 2012 educational content was reinforced by the development of an illustrated book, created and published by the Publications and Advertising Office at NYIT. As English is the official language of Ghana, the story was written in English with the character names in Twi. Several hundred copies of the book were brought to Oworobong and given to children at the end of each performance of the play. The book ANANSI\*\*TRICKS MRS. MOSQUITO quickly became a “treasure”. Books had never been given to children in Oworobong. Older students read it to their younger siblings and friends. \*\* Based upon the illustration of Gerald McDermott

Sibling teaching is encouraged by elders in African societies, and is seen as transmission of knowledge. It is characterized by the inclusion of traditional games, singing, dancing, use of riddles and storytelling. Some of the songs and stories observed during sibling teaching have moral lessons or values embedded in them. Therefore, along with learning in a pleasurable atmosphere by listening to stories children learn the values that are upheld in their society.<sup>4</sup> Many African societies readily practice sibling teaching and care-giving, part of children's training for responsibilities they will be expected to perform in the future as adults

and parents. Older children then have the skills necessary to teach their younger siblings various concepts or values and young children are likely to pay attention to their older brother or sisters.

The innovative project collaboratively produced at NYIT, which utilizes rod-puppets, graphic comic books, and videos reconstructs this ancient art of “story telling”, or in the Ashanti culture, established in Ghana during the 11th or 12th century Anansesem<sup>5</sup> “Spider tales”, to advance health, well-being and disease prevention.<sup>6</sup> Many Ashanti folktales focus on Anansi the Spider, the popular trickster character of Ashanti folklore, who serves alternately as hero, villain, moral inspiration, and comic relief. His presence in Ashanti folklore appears to be ancient, for he figures not only in humorous tales but also in some that have the character of creation myths. Anansi is responsible for the moon, (or sun), being in the sky. Anansi is also the owner of all stories that are told, and therefore when a man wishes to tell a tale he first acknowledges that it belongs to Anansi.<sup>7, 8</sup> Using traditional or indigenous characters in stories makes learning enjoyable to children, and guides them towards a more comprehensive understanding. The knowledge achieved by children in this fashion may serve as a foundation for health education. Storytelling is a fundamental part of human culture. Through myths, folktales and legends we pass on our visions, values, feelings and memories in a way that is enjoyable and entertaining. The best stories are those that motivate, inspire and connect with students – stories that make them feel some emotion and allow them to see themselves in similar situations. “Every mythology has to do with the wisdom of life as related to a specific culture at a specific time”<sup>9</sup> When children are able to “reflect upon and integrate information with what they already know they will remember it better”. “Stories provide a simple way of combining verbal and visual information. If the story is sufficiently clear or dramatic, it will almost certainly stimulate visual images complementing the story line, providing a vicarious experience that results in a greater likelihood of being remembered.”<sup>14</sup>

“It is crucial to realize that any thinking done about development in Africa without including the arts is redundant thinking”<sup>12</sup>

In this area of Ghana where there is limited infrastructure, minimal resources for the delivery of health care or its evaluation, perhaps research utilizing observational methods might be appropriate.<sup>15</sup> Does utilizing Story-telling as a transmission of knowledge, such as in Anansi Tricks Mrs. Mosquito, result in an increased use of long-lasting insecticidal nets, (LLINs), and in the reduction of Malaria cases in children under the age of 5 in rural Ghana? On our subsequent visits we will evaluate how many books remain as well as how many bed-nets are being utilized, and whether there is a reduction in childhood malaria cases.

Here is a description by a medical student of his participation and experience with the Anansi Play during the summer outreach project of 2012. “At many of the schools we acted out the Anansi play only to be amazed at the interest and interaction shown by the kids simply from cardboard puppets and strings. The plays best night was the first night. After a full day of practicing the puppets (i.e. figuring out how to hold them best without being crooked, ensuring they were up against the white cloth the entire time, making sure the puppets shook as the translators served as their voices and ironing out all other details) we finally debuted the play to a giant audience of locals from around Oworobong. Spotlights consisted of 6-7 headlamps shining brightly from all angles. Each person's puppet slowly became 'their' character over time as we mastered how to put the puppets in and out and how to appropriately 'act' each one. By our 5<sup>th</sup> or 6<sup>th</sup> showing, the play had been done so many times there were very little mistakes. All we needed to find each time was two sticks to hold up the backdrop and a group of engaging children - both of which seemed plentiful. Personally, what made me most proud was that we were actually helping the community's when everyone was opened to questions after the play was over. To see the kids ask about malaria and how it can spread showed me that they were in fact learning from the play and took it to heart. This was

one of my primary goals of the entire trip - to promote health and wellbeing in anyway that I can.”<sup>10</sup>

It is clear from this passage that the medical student was participating in his own learning even as he brought lessons to the community in Ghana. The skills acquired by our medical student(s) through the theatrical performance of the Anansi story included “the altruistic joys of teaching and of compassion” and the realization that a simple puppet show and story book could change a child’s life. This project provides a wonderful example of “the arts leading the way”,<sup>12</sup> in a form of medical humanities that promotes what A. Kleinman has called the “interpersonal skills of kindness, respect, compassion and communicative competence, are the building blocks of what it means to be a physician”.<sup>11</sup>

“Ever since human beings have communicated and socially interacted with each other, stories have played a vital role in exchanging and propagating complex ideas and disclosing knowledge. In every culture, different stories exist and have been used to preserve and pass on knowledge from generation to generation. Stories are in a certain intrinsic sense interesting, because they are an attractive high-priority memory booster. With purpose and a meaning behind it, stories will draw and grasp the attention of any audience and in this sense will outperform any logical argument”.<sup>16</sup>

“Storytelling is one of the oldest forms of communication and is an integral part of most cultures. Stories are familiar and comfortable, which perhaps contributes to their widespread appeal as a potential knowledge transfer strategy. We all can remember the allure of stories as children and how stories were used as a strategy to teach important life lessons. Storytelling—both the telling and the listening—is a hard-wired human instinct (Gardner, 2008).”<sup>17</sup>

“Stories can be shared as a way of simplifying complex issues or capturing the attention of others. It's thought that stories “work” through establishing an emotional connection with the reader and then provoking an emotional response that may facilitate enhanced knowledge retention. A simple anecdote or story may be more powerful in persuading individuals to adopt a particular approach to health care than only the results from rigorous research.”<sup>18</sup> We utilized our Anansi story as a way to teach children, and parents, the benefits of using Insecticide Treated Malaria Bednets. In the long term we must look for “Behavioral changes” that result in more consistent use of bed nets and the reduction of Malaria.

Article 27.1 of the UN Declaration of Human Rights states:

- (1) Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits.<sup>13</sup>

## Conclusion

Our use of a Ghanaian folktale character, Anansi the Spider, as the protagonist in our created story, allows for the transfer of knowledge to the listener. We created the story to appeal to children primarily and discovered that adults equally enjoyed it. It was constructed to encourage the use of long lasting insecticide treated bed nets in communities where Malaria was prevalent. The use of folktales and indigenous characters to teach with can be easily adapted to any culture and for any desired Knowledge Transfer. Folktales have the ability to educate children, and provide entertainment and communication, as well as being repositories of culture and value.<sup>19</sup>

## References:

World Health Organization Malaria Report 2012 Foreword by Dr. Margaret Chen Director General  
[http://www.who.int/malaria/publications/world\\_malaria\\_report\\_2012/wmr2012\\_foreword.pdf](http://www.who.int/malaria/publications/world_malaria_report_2012/wmr2012_foreword.pdf)

Roll Back Malaria Briefing Document:  
[http://whqlibdoc.who.int/hq/2002/WHO\\_CDS\\_RBM\\_2002.38\\_eng.pdf](http://whqlibdoc.who.int/hq/2002/WHO_CDS_RBM_2002.38_eng.pdf)  
 World Health Organization: World Malaria Report Fact Sheet 2012  
[http://www.who.int/malaria/publications/world\\_malaria\\_report\\_2012/wmr2012\\_factsheet.pdf](http://www.who.int/malaria/publications/world_malaria_report_2012/wmr2012_factsheet.pdf)  
 Handbook of African Educational Theories and Practices: A Generative Teacher Education Curriculum. 2011 by Human Development Resource Centre (HDRC) Bamenda, North West Region (Cameroon) Web: [www.thehdrc.org](http://www.thehdrc.org). Chapter 17: Sibling caregiving and the teaching roles of children.  
 Appiah, Peggy: Anansi Tales  
<http://www.princeton.edu/~achaney/tmve/wiki100k/docs/Anansi.html>  
 Mayrowitz E.L.R.: The Akan of Ghana. Faber & Faber Ltd., London 1958  
 Why Spider is King of Stories: The Message in the Medium of a West African Tale. M. E. Kropp Dakubu, African Languages and Cultures, Vol. 3, No. 1 (1990), pp. 33-56, Published by: Taylor & Francis, Ltd.  
 Perrin, Pat: Anansi and the Box of Stories 2007 <http://redroom.com/member/pat-perrin/writing/anansi-and-the-box-of-stories>  
 Campbell, J., Moyers B. The Power of Myth. Doubleday 1988  
 Rehmani, Ahmad: 2<sup>nd</sup> yr. Medical Student NYITCOM 2012  
 Kleinman, Arthur: The divided self, hidden values, and moral sensibility in medicine. The Lancet Volume 377, Issue 9768, Pages 804 - 805, 5 March 2011  
 Clayton, Gavin: Is there a role for the arts in addressing health inequalities within Sub-Saharan Africa? Submitted to fulfill the requirements of the Clore Leadership Programme with support from the Arts and Humanities Research Council. Canterbury Christ Church University 2009  
 General Assembly of the United Nations, New York (1948) Universal Declaration of Human Rights <http://www.un.org/en/documents/udhr/index.shtml>  
 Swap, W., Leonard, D., Shields M., Abrams L.: Using Mentoring and Storytelling to Transfer Knowledge in the Workplace. Journal of Management Information Systems 18, no. 1 (summer 2001)  
 Farmer, Paul: Clinical trials and global health equity. The Lancet Global Health Volume 1, August 2013  
 Haghirian, P. & Chini, T. (2003) Storytelling: Transferring tacit corporate knowledge in different cultures. Second annual Euram Conference.  
 Shannon D. Scott RN, PhD, Lisa Hartling BScPT, MSc, Terry P. Klassen MD, MSc, FRCPC. The Power of Stories. Nursing for Women's Health Volume 13, Issue 2, pages 109–111, April/May 2009 <http://onlinelibrary.wiley.com/doi/10.1111/j.1751-486X.2009.01401.x/full>  
 Kosko, J., Klassen, T., Bishop, T., & Hartling, L. (2006). Evidence-based medicine and the anecdote: Uneasy bedfellows or ideal couple? Pediatrics & Child Health, 11 (10), 665–668  
 Sharma, Chandra S. Bhutanese Folktales: Common Man's Media with Missions for Society 2007 Journal of Bhutan Studies <http://www.dspace.cam.ac.uk/handle/1810/227026>

# GENETIC MUSCLE DISEASES: NEW INSIGHT INTO THE BASIS OF THE MYOTONIC DYSTROPHIES

***Bjarne Udd, Prof. of Neurology in Neuromuscular Disorders***

Director of the Finnish Neuromuscular Diseases Center,  
Tampere University and University Hospital, Finland

## **Introduction**

Neuromuscular disorders can be divided into 1) myopathies, primary disease of the muscle fiber, 2) myasthenias, diseases caused by defects of the neuromuscular junction and 3) neurogenic muscular atrophies, caused by the defects of the motor nerve. Muscular dystrophies are a heterogeneous group of myopathies. They are genetic disorders caused by muscle fiber degeneration often causing progressive weakness and wasting and they can be further divided into the following

*Myotonic dystrophies – DM1 and DM2*

*Dystrophinopathies - DMD, BMD*

*Facioscapulohumeral - FSHD*

*Limb-girdle – LGMD subtypes*

*Distal muscular dystrophies*

*Congenital dystrophies - CMD*

*Oculofaryngeal - OPM, OPDM*

*Emery-Dreifuss - X-EMD, AD-EMD*

*Other and unclassified muscular dystrophies*

Myotonic dystrophy (Dystrophia myotonica, DM) is the most common inherited muscular dystrophy in adults. Two different types of myotonic dystrophy have been identified. Both myotonic dystrophy type 1 (DM1, Steinert's disease [OMIM #160900]) and type 2 (DM2, [OMIM #602668]) are dominantly inherited disorders caused by repeat expansion mutations. The estimated prevalence of DM1 is 1/8000 (Harper 2001), while in DM2 the prevalence has not been established, but is considered to be even as common as DM1 in many European populations (Udd 2006).

DM1 was described one hundred years ago and the (CTG)<sub>n</sub> trinucleotide repeat expansion mutation in the 3' untranslated region (UTR) of the *DMPK* gene was identified in 1992. The gene is located in chromosome 19q13.3 (Brook; Fu; Mahadevan 1992). The mutation underlying DM2 disease is a (CCTG)<sub>n</sub> tetranucleotide expansion located in the first intron of *ZNF9* gene on chromosome 3q21 (Liquori 2001). The repeat expansion size in DM1 may vary from more than 50 to more than 3000 repeats and there is a gross correlation between repeat length and disease severity. The number of repeats in the expansion mutation causing DM2 varies from 75 to 11000. No correlation in the disease severity and the size of the expansion mutation has been shown in DM2. There is no clear evidence for anticipation in DM2 as there is in DM1, in which successive generations inherit increasing disease severity with decreasing age of onset due to increased size of the repeat expansion (Day 2003). In both DM1 and DM2 the molecular pathomechanism is based on RNA gain-of-function. Transcription of the repeats into mutant (CUG)<sub>DM1</sub>/(CCUG)<sub>DM2</sub>-containing RNAs is both necessary and sufficient to cause disease by formation of ribonuclear foci and interference of the splicing of downstream "effector" genes through *trans*-acting splicing factors, namely muscleblind 1 (MBLN1) (Osborne 2006, Ho 2005) and CUG binding protein 1 (CUGBP1) (Timchenko

2006) . Several 'effector' genes including, *CLCN1* (chloride channel-1), *INSR* (insulin receptor), *TNNT2* (cardiac troponin T), *TNNT3* (skeletal fast troponin T), *ZASP*, *ATP2A1* (*SERCA1*) and *MAPT* (microtubule-associated protein tau) show aberrant splicing in DM1, and in DM2. (Charlet-B N 2002, Mankodi 2002, Muraige 2005, Savkur 2004)

### **DM1 and DM2 mutations**

The DM1 mutation was identified in 1992 as an expanded trinucleotide (CTG)<sub>n</sub> repeat track in the 3' untranslated (UTR) region of the dystrophin protein kinase coding gene (*DMPK*; OMIM \*605377) (Brook; Fu; Mahadevan 1992). In DM1 patients the repeat sizes range from 50 – 4000 (150 – 12,000 bp), whereas normal individuals have 5 – 37 repeats. Repeat lengths 38 – 49 are considered a premutation allele pool, showing decreased stability. The DM1 mutation length predicts the clinical outcome to some extent: classical DM1 100 – 1,000 repeats; congenital >2,000 repeats.

The mutation causing DM2 was identified in 2001 in the first intron of the zinc finger 9 (*ZNF9*) protein coding gene *CNBP* (*ZNF9*; OMIM \*116955) (Liquori 2001). This means that both DM1 and DM2 mutations consist of long uninterrupted repeat tracks, which are thermodynamically less stable than the normal alleles, which show a more complex pattern with interrupting sequences.

### **Symptoms**

Both DM1 and DM2 are progressive multisystemic disorders with both shared and distinct clinical features and pathomechanisms. The core symptoms expressed at various degrees in DM2 include proximal muscle weakness, muscle pain, myotonia, posterior subcapsular iridescent cataracts, tremors, cardiac conduction defects, and endocrinological disturbances such as increased insulin resistance and male hypogonadism. Laboratory findings include elevated creatine kinase (CK), hypo IgG, positive autoimmune serology (Tieleman 2009) and elevated liver enzyme  $\gamma$ -glutamyl transferase (Udd 2003, Day 2003). Many of the clinical manifestations are similar in classical adult onset DM1, although with also clearly distinct features: more severe weakness of distal and facial muscles, including ptosis leading to dysphagia and respiratory deficiency. The congenital DM1 form and the early childhood onset form with mental retardation in DM1 are not observed in DM2 (Harper 2001, Turner 2010).

### **Muscle histopathology in myotonic dystrophies**

Muscle histopathology in DM1 and DM2 share some general common chronic myopathic features, such as high number of central nuclei and fiber size variation which were initially reported to be quite similar (Ricker 1994, Thornton 1994). The muscle pathology is progressive, with end-stage pathology showing severe reduction in fiber number and size accompanied with fatty and connective tissue replacement in the most severely affected muscles (Harper 2001). In DM1, ring fibers and sarcoplasmic masses are more frequent, and type 1 fibers are generally more affected (Harper 2001).

In general, muscle wasting in DM2 is less prominent, and in accordance with this, severe muscle fiber loss is not usually encountered. The biopsies show usually mild to moderate myopathic changes, and more severe fatty replacement and fibrosis, typically starting in the interfascicular space, is observed only in proximal muscles of older patients with considerable muscle weakness. The number of internalized nuclei is greater in type 2 fibers in DM2, and in type 1 fibers in DM1, further reinforcing the observation that the distinct fiber populations are differentially affected in DM1 and DM2 (Bassez 2008, Pisani 2008). Fiber atrophy is seen in most biopsies; small angulated fibers and atrophic nuclear clump fibers, similar to those in neurogenic atrophy, are a frequent finding, (Day 2003, Vihola 2003, Schoser 2004), whereas small group atrophy is less common and fiber type grouping is

not observed (Vihola 2003, Schoser 2004). In addition, there is a number of rather infrequent findings in DM2 muscle, including occasional moth-eaten fibers, rimmed vacuolar and ragged-red fibers (Vihola 2003, Schoser 2004). Necrotic fibers, ring fibers, targetoid fibers, and subsarcolemmal or sarcoplasmic masses are rarely seen in DM2.

However, it was only after using the immunohistochemical method for fiber type differentiation in the muscle sections, that the preferential fiber type 2 atrophy was fully recognized in DM2 (Vihola 2003), even though the possibility of it had been suggested previously (Bassez, G. 2001). Schoser et al. later confirmed the finding with a larger set of samples (Schoser 2004). It should be noted, that there is hypertrophy of both fiber types in DM2 (Vihola 2003), and also atrophy of type 1 fibers occurs in DM2, however, to lesser extent: percentage of atrophic type 1 fibers is lower than that of type 2 fibers (Vihola 2003, Schoser 2004), and practically all very atrophic fibers (< 5µm) are of type 2 in DM2; whereas in DM1, the very atrophic fibers occur later in muscle histopathology, together with other signs of advanced pathology, and typically express both fast and slow myosin isoforms.

No clear correlation has been observed between the pattern of muscle histopathological findings and the clinical muscle phenotype, regarding myotonia, cramps, weakness and myalgia, or the order of onset of symptoms (Schoser 2004). Internalized nuclei and scattered nuclear clump fibers may be prominent even in clinically asymptomatic muscle.

### **Pathomechanisms in myotonic dystrophies**

The main molecular pathomechanism underlying the myotonic dystrophies is dominant RNA gain-of-function (Mankodi 2000, Liquori 2001, Lee 2009). The expansion mutation, (*CCTG*)<sub>n</sub> in DM2 and (*CTG*)<sub>n</sub> in DM1, is transcribed but not translated, and the mutant RNA itself is necessary and sufficient to induce the molecular events leading to clinical symptoms. The mutant repeat RNA species are retained in the nucleus, where they aggregate and sequester RNA-binding proteins, forming the ribonuclear inclusions typical of DM1 and DM2 (Taneja 1995, Liquori 2001). According to the present knowledge, the mutant RNA exerts its toxic effect via disturbing the distribution and function, and hence the equilibrium between the two antagonistic splicing factors, MBNL1 (muscleblind-like 1) and CUGBP1 (CUG-binding protein 1), resulting in aberrant mRNA splicing, translation, and turnover.

The MBNL and CUGBP1 act as antagonist splicing regulators, often/sometimes promoting opposite splicing events in their mutual target genes, and their binding sites are distinct (Ho 2004). Both of them regulate multiple alternative splicing events. The important downstream effect of the dysregulation of these two antagonistic splicing factors is the aberrant splicing in myotonic dystrophies, resulting in inappropriate embryonic splicing pattern, which is considered the main cause of direct symptoms. More than 20? aberrant splicing events have been identified in DMs, summarized in table x. Of these, at least *CLC1* has been linked to myotonia (Charlet-B 2002, Mankodi 2002, Wheeler 2007); insulin receptor (*IR*) to insulin resistance (Savkur 2001); and *cTNT* (cardiac troponin T) to cardiac problems (Philips 1998).

### **The atrophy of type 2 fibers in DM2**

In this thesis work the concept of very atrophic fibers is used referring to the pool of very small fibers with a diameter < 6 µm. They are characteristic for DM2 where they appear very early in the disease course, even in clinically unaffected muscles. Morphologically, they fall into at least three categories: (1) nuclear clump fibers, (2) extremely small fibers (< 6 µm) with very little cytoplasm and none to few nuclei (in the plane of sectioning), and (3) very thin, angulated fibers. Most of these fibers are round and scattered. They seem to represent a unique pool of fibers, because they form a distinct population apart from larger type 2A fibers.

They may be encountered in DM1, but only in later stages of pathology, less numerous compared to DM2 and in DM1 they may also express slow MyHC.

It is not clear if (1) and (2) represent distinct fiber populations. Examination of longitudinal sections suggests that they may represent a single population of fibers, which show differential morphology depending on the number of nuclei trapped inside the slim fibers at the section site.

The nuclear clump fibers in DM2 are morphologically indistinguishable from those seen in neurogenic atrophy, where they form as an end product of denervation atrophy in the absence of re-innervation. However, no primary neurogenic involvement has been shown in myotonic dystrophies, which is supported by the lack of fiber type grouping.

### **Protein expression in very atrophic fibers**

We carried out further studies on protein expression in DM2 and DM1 muscles to identify possible differences between them, which could lead to better understanding of their differential muscle and fiber type involvement. In addition, due to the presence of nuclear clump fibers in myotonic dystrophies, similar to neurogenic atrophy, we also included a group of patients with various neurogenic disorders.

Altogether, we characterized the expression of 14 proteins, which are involved in muscle contraction and Ca<sup>2+</sup> handling, regeneration, denervation, and apoptosis, by immunohistochemistry. A subset of the proteins show preferential expression in type 2 fibers as described below. Myosin heavy chain (MyHC)-encoding genes (*MYH1,2, -3, -7 and -8*) are differentially regulated in fast and slow fibers, and during muscle development. The expression of MyHC-IIa isoforms in the highly atrophic fibers of DM2 was confirmed with three different monoclonal antibodies raised against fast type myosin heavy chains. As a new finding, we showed that the population of very small fibers in DM1 co-expressed myosins fast IIa and beta/slow, in contrast to DM2, where they expressed only type IIa. In neurogenic atrophies, virtually all small atrophic fibers expressed MyHC-IIa, showing moderate to high co-expression of MyHC-beta/slow. The MyHC-pn is widely used as a regeneration marker (Dubowitz 2007). There was high expression of the MyHC-pn isoform in very atrophic fibers in all groups. Since the majority of very atrophic fibers in progressive neurogenic atrophy without any regeneration activity express MyHC-pn, this may be turned on and expressed also by other mechanisms than regeneration. MyHC-emb positive fibers were absent in most biopsies, showing expression in a few DM fibers only in the biopsies with advanced muscle pathology. This observation is congruent with its reported expression mostly in small basophilic regenerating fibers having survived severe injury such as with muscular dystrophies and other necrotic myopathies (Dubowitz 2007). A similar finding was observed with the transcription factor myogenin (*MYOG*), and the intermediate filament protein vimentin (*VIM*), which appear early during myogenesis and serve as regeneration markers in muscular dystrophies (Dubowitz 2007, Olive 1997).

Neural cell adhesion molecule (NCAM-1) has distinct roles in myogenesis, synaptogenesis, and synaptic maintenance (Covault 1986). It is transiently re-expressed after denervation and during re-innervation, decreasing progressively as regeneration proceeds (Winter 1999). Hence, it has been a candidate marker for recently occurred denervation atrophy. Interestingly, we found that one third of the atrophic fibers in DM2 abundantly expressed NCAM-1, outnumbering the small fibers in DM1, and even more intriguingly, the severely atrophic fibers in neurogenic atrophies. In fact, the pattern of NCAM-1 expression was different in the latter group, showing positive signal more frequently in intermediate-large fibers, which was not encountered in any specimens in myotonic dystrophies. The usage of NCAM expression as a marker of neurogenic atrophies thus seems to be very limited.

Because we were preoccupied with the question why the highly atrophic type 2 fibers persist in the DM2 muscle, we investigated the expression of the oncoprotein BCL2 (*BCL2*)

in the muscle biopsies. Apoptosis is required during normal tissue remodeling, development and regeneration. BCL2 inhibits cells from entering apoptosis, but it also has a distinct effect on cell cycle (Cory 2003). Apoptosis is not generally involved in muscular dystrophies as a pathomechanism (Dubowitz 2007). In order to verify this we used an Ab raised against activated Caspase-3 (*CASP3*), a cysteine protease playing a key role in executing apoptosis in many cell types, and a commonly used marker for apoptosis (viite). To our surprise, the majority of the very atrophic fibers in DM2 expressed BCL2. In contrast, in DM1 BCL2 immunoreactivity was present in only one biopsy, in which approximately 5% of the very small fibers were positive. In neurogenic atrophies, BCL2 positive fibers were moderately common, albeit with a lot of dispersion among the samples (range 1-100% positive cells). Caspase-3 was not detected in DM2 biopsies, supporting the prevailing concept of apoptosis not playing a major role. However, the combined high BCL2 expression and absent Caspase-3 could offer a partial explanation to the persistence of the very atrophic, non-functional type IIa fibers in DM2: the anti-apoptotic BCL2 might prevent the cells from entering apoptosis. Another interesting finding in DM2 was revealed when serial sections, stained for MHCpn and BCL2, were examined. Mutually exclusive expression of these markers was often observed. We do not have a specific explanation to this finding at the moment.

We observed reduced sarcolemmal labeling of dystrophin and neuronal nitric oxide synthase (nNOS) in the very atrophic fibers in DM2. However, these findings, although not reported with DM2 before, are likely not specific, as several sarcolemmal proteins are reported to show low immunoreactivity in MyH-pn positive, small atrophic fibers (Dubowitz 2007). We also studied two proteins preferentially expressed in, but not restricted to fast type 2 fibers: the fast skeletal muscle troponin T (fTnT/*TNNT3*), a sarcomeric thin filament component, and the  $\text{Ca}^{2+}$  ATPase SERCA1 (*ATP2A1*), both of which are involved in regulation of muscle contraction (Wu 1994, Brandl 1986). SERCA1 was expressed in majority of the atrophic fibers in all groups, whereas fTnT showed moderate to high expression in atrophic fibers in DM2 and DM1, and high expression in neurogenic atrophies. Unfortunately, even though not strictly following the fast-slow fiber distribution, neither of these proteins were differentially expressed in very atrophic and regular type 2 fibers, thus giving no further insight into the question why a subpopulation of type IIa fibers are subject to severe atrophy in DM2.

It should be noted that the neurogenic atrophies was the most heterogeneous group, relative to MyHC-pn, NCAM-1 and BCL2 expression in the very small, atrophic fibers, showing more dispersion in results and greater standard deviation values. This is understandable because of their divergent etiologies.

### Satellite cells

Defective myoblast-myotube differentiation in cultures from satellite cells have been reported with DM1. Similar findings have not been observed in DM2. However, repeatedly in our DM2 cell cultures myoblast proliferation after 4-5 passages has been limited even if differentiation seemed to be normal.

Pax7 is expressed in quiescent skeletal muscle satellite cells, and considered an appropriate protein marker (Relaix 2005). The number of satellite cells has been reported to decline with age (Sajko 2004). As a separate experiment, we assessed the number of skeletal muscle satellite cells in DM2 (n=4), DM1 (n=5), neurogenic atrophy (n=4), and healthy control (n=1), approximately 200 fibers were included per biopsy, counting all fibers in randomly selected fields. The number of Pax7 positive cells in satellite cell position was proportioned to the total number of fibers; the results are indicated as the number of Pax7+ cells (in satellite cell position) per 100 muscle fibers counted:

DM2	DM1	NA	C
25	20	20	7

NA, neurogenic atrophy; C, healthy control

There were other Pax7+ cells present in the interstitial space of the biopsies examined, which likely represent a distinct pool of progenitor cells and these were not included in the numbers of satellite cells. The results indicate that the number of spindle-shaped, Pax7+ positive cells in satellite cell position was increased in all diases groups, compared to control biopsy. We observed the highest number of Pax7+ cells in DM2. The reported proportion of satellite cells in human muscle normally varies between 3-6% of all muscle fiber nuclei (Sajko 2004), which is in accordance with our control muscle. The number of satellite cells is affected by age and muscle type. The increase of satellite cells in DM2, DM1 and neurogenic atrophy is probably caused by basic attempts to regenerate in response to muscle injury. The results are congruent with previous reports of DM2 and DM1 indicating unaffected satellite cell proliferation (Furling 2001, Pelletier 2009).

## Conclusion

Defective control of gene expression which leads to abnormalities in a large number of proteins expressed in the muscle fibers is one component of the molecular pathology underlying the myotonic dystrophies. To a major extent these abnormalities are based on abnormal splicing events due to malfunction of MBLN1. According to the global impact of the primary mutations on RNA-metabolism also other machineries in the muscle cell such as translation and turnover handling are affected. Considering these large scale molecular changes, any therapy towards a limited sector of abnormal gene and protein expression may not be very successful, and approaches to directly eliminate the mutant transcripts generated by the primary repeat expansion mutations should be the target in the search for curative treatment.

## References:

- Bassez G, Chapoy E, Bastuji-Garin S, Radvanyi-Hoffman H, Authier FJ, Pellissier JF, Eymard B, Gherardi RK. Type 2 myotonic dystrophy can be predicted by the combination of type 2 muscle fiber central nucleation and scattered atrophy. *J Neuropathol Exp Neurol* 2008; 67(4): 319-25.
- Brandl CJ, Green NM, Korczak B, MacLennan DH. Two Ca<sup>2+</sup> ATPase genes: Homologies and mechanistic implications of deduced amino acid sequences. *Cell* 1986; 44(4): 597-607.
- Charlet-B N, Savkur RS, Singh G, Philips AV, Grice EA, Cooper TA. Loss of the muscle-specific chloride channel in type 1 myotonic dystrophy due to misregulated alternative splicing. *Mol Cell* 2002; 10(1): 45-53.
- Cory S, Huang DC, Adams JM. The bcl-2 family: Roles in cell survival and oncogenesis. *Oncogene* 2003; 22(53): 8590-607.
- Covault J, Sanes JR. Distribution of N-CAM in synaptic and extrasynaptic portions of developing and adult skeletal muscle. *J Cell Biol* 1986; 102(3): 716-30.
- Day JW, Ricker K, Jacobsen JF, Rasmussen LJ, Dick KA, Kress W, Schneider C, Koch MC, Beilman GJ, Harrison AR, Dalton JC, Ranum LP. Myotonic dystrophy type 2: Molecular, diagnostic and clinical spectrum. *Neurology* 2003; 60(4): 657-64.
- Dubowitz V, Sewry CA. *Muscle biopsy - A practical approach*. Saunders Elsevier 2007, UK.
- Fu YH, Pizzuti A, Fenwick RG, Jr, King J, Rajnarayan S, Dunne PW, Dubel J, Nasser GA, Ashizawa T, de Jong P. An unstable triplet repeat in a gene related to myotonic muscular dystrophy. *Science* 1992; 255(5049): 1256-8.

- Furling D, Lemieux D, Taneja K, Puymirat J. Decreased levels of myotonic dystrophy protein kinase (DMPK) and delayed differentiation in human myotonic dystrophy myoblasts. *Neuromuscul Disord* 2001; 11(8): 728-35.
- Harper PS. *Myotonic dystrophy*. Saunders 2001, London.
- Ho TH, Bundman D, Armstrong DL, Cooper TA. Transgenic mice expressing CUG-BP1 reproduce splicing mis-regulation observed in myotonic dystrophy. *Hum Mol Genet* 2005; 14(11): 1539-47.
- Lee JE, Cooper TA. Pathogenic mechanisms of myotonic dystrophy. *Biochem Soc Trans* 2009; 37(Pt 6): 1281-6.
- Liquori CL, Ricker K, Moseley ML, Jacobsen JF, Kress W, Naylor SL, Day JW, Ranum LP. Myotonic dystrophy type 2 caused by a CCTG expansion in intron 1 of ZNF9. *Science* 2001; 293(5531): 864-7.
- Mahadevan M, Tsilfidis C, Sabourin L, Shutler G, Amemiya C, Jansen G, Neville C, Narang M, Barcelo J, O'Hoy K. Myotonic dystrophy mutation: An unstable CTG repeat in the 3' untranslated region of the gene. *Science* 1992; 255(5049): 1253-5.
- Mankodi A, Takahashi MP, Jiang H, Beck CL, Bowers WJ, Moxley RT, Cannon SC, Thornton CA. Expanded CUG repeats trigger aberrant splicing of ClC-1 chloride channel pre-mRNA and hyperexcitability of skeletal muscle in myotonic dystrophy. *Mol Cell* 2002; 10(1): 35-44.
- Mankodi A, Logigian E, Callahan L, McClain C, White R, Henderson D, Krym M, Thornton CA. Myotonic dystrophy in transgenic mice expressing an expanded CUG repeat. *Science* 2000; 289(5485): 1769-73.
- Maurage CA, Udd B, Ruchoux MM, Vermersch P, Kalimo H, Krahe R, Delacourte A, Sergeant N. Similar brain tau pathology in DM2/PROMM and DM1/Steinert disease. *Neurology* 2005; 65(10): 1636-8.
- Olive M, Martinez-Matos JA, Pirretas P, Povedano M, Navarro C, Ferrer I. Expression of myogenic regulatory factors (MRFs) in human neuromuscular disorders. *Neuropathol Appl Neurobiol* 1997; 23(6): 475-82.
- Osborne RJ, Lin X, Welle S, Sobczak K, O'Rourke JR, Swanson MS, Thornton CA. Transcriptional and post-transcriptional impact of toxic RNA in myotonic dystrophy. *Hum Mol Genet* 2009; 18(8): 1471-81.
- Pelletier R, Hamel F, Beaulieu D, Patry L, Haineault C, Tarnopolsky M, Schoser B, Puymirat J. Absence of a differentiation defect in muscle satellite cells from DM2 patients. *Neurobiol Dis* 2009; 36(1): 181-90.
- Philips AV, Timchenko LT, Cooper TA. Disruption of splicing regulated by a CUG-binding protein in myotonic dystrophy. *Science* 1998; 280(5364): 737-41.
- Pisani V, Panico MB, Terracciano C, Bonifazi E, Meola G, Novelli G, Bernardi G, Angelini C, Massa R. Preferential central nucleation of type 2 myofibers is an invariable feature of myotonic dystrophy type 2. *Muscle Nerve* 2008; 38(5): 1405-11.
- Relaix F, Rocancourt D, Mansouri A, Buckingham M. A Pax3/Pax7-dependent population of skeletal muscle progenitor cells. *Nature* 2005; 435(7044): 948-53.
- Ricker K, Koch MC, Lehmann-Horn F, Pongratz D, Otto M, Heine R, Moxley RT, 3rd. Proximal myotonic myopathy: A new dominant disorder with myotonia, muscle weakness, and cataracts. *Neurology* 1994; 44(8): 1448-52.
- Sajko S, Kubinova L, Cvetko E, Kreft M, Wernig A, Erzen I. Frequency of M-cadherin-stained satellite cells declines in human muscles during aging. *J Histochem Cytochem* 2004; 52(2): 179-85.
- Savkur RS, Philips AV, Cooper TA. Aberrant regulation of insulin receptor alternative splicing is associated with insulin resistance in myotonic dystrophy. *Nat Genet* 2001; 29(1): 40-7.

- Savkur RS, Philips AV, Cooper TA, Dalton JC, Moseley ML, Ranum LP, Day JW. Insulin receptor splicing alteration in myotonic dystrophy type 2. *Am J Hum Genet* 2004; 74(6): 1309-13.
- Schoser BG, Schneider-Gold C, Kress W, Goebel HH, Reilich P, Koch MC, Pongratz DE, Toyka KV, Lochmuller H, Ricker K. Muscle pathology in 57 patients with myotonic dystrophy type 2. *Muscle Nerve* 2004; 29(2): 275-81.
- Taneja KL, McCurrach M, Schalling M, Housman D, Singer RH. Foci of trinucleotide repeat transcripts in nuclei of myotonic dystrophy cells and tissues. *J Cell Biol* 1995; 128(6): 995-1002.
- Thornton CA, Griggs RC, Moxley RT, 3rd. Myotonic dystrophy with no trinucleotide repeat expansion. *Ann Neurol* 1994; 35(3): 269-72.
- Tieleman AA, den Broeder AA, van de Logt AE, van Engelen BG. Strong association between myotonic dystrophy type 2 and autoimmune diseases. *J Neurol Neurosurg Psychiatry* 2009; 80(11): 1293-5.
- Timchenko LT, Salisbury E, Wang GL, Nguyen H, Albrecht JH, Hershey JW, Timchenko NA. Age-specific CUGBP1-eIF2 complex increases translation of CCAAT/enhancer-binding protein beta in old liver. *J Biol Chem* 2006; 281(43): 32806-19.
- Turner C, Hilton-Jones D. The myotonic dystrophies: Diagnosis and management. *J Neurol Neurosurg Psychiatry* 2010; 81(4): 358-67.
- Udd B, Meola G, Krahe R, Thornton C, Ranum L, Day J, Bassez G, Ricker K. Report of the 115th ENMC workshop: DM2/PROMM and other myotonic dystrophies. 3rd workshop, 14-16 February 2003, Naarden, the Netherlands. *Neuromuscul Disord* 2003; 13(7-8): 589-96.
- Udd B, Meola G, Krahe R, Thornton C, Ranum LP, Bassez G, Kress W, Schoser B, Moxley R. 140th ENMC international workshop: Myotonic dystrophy DM2/PROMM and other myotonic dystrophies with guidelines on management. *Neuromuscul Disord* 2006; 16(6): 403-13.
- Vihola A, Bassez G, Meola G, Zhang S, Haapasalo H, Paetau A, Mancinelli E, Rouche A, Hogrel JY, Laforet P, Maissonobe T, Pellissier JF, Krahe R, Eymard B, Udd B. Histopathological differences of myotonic dystrophy type 1 (DM1) and PROMM/DM2. *Neurology* 2003; 60(11): 1854-7.
- Wheeler TM, Lueck JD, Swanson MS, Dirksen RT, Thornton CA. Correction of CIC-1 splicing eliminates chloride channelopathy and myotonia in mouse models of myotonic dystrophy. *J Clin Invest* 2007; 117(12): 3952-7.
- Winter A, Bornemann A. NCAM, vimentin and neonatal myosin heavy chain expression in human muscle diseases. *Neuropathol Appl Neurobiol* 1999; 25(5): 417-24.
- Wu QL, Jha PK, Raychowdhury MK, Du Y, Leavis PC, Sarkar S. Isolation and characterization of human fast skeletal beta troponin T cDNA: Comparative sequence analysis of isoforms and insight into the evolution of members of a multigene family. *DNA Cell Biol* 1994; 13(3): 217-33.

# **FREQUENCY OF LUNG TUMORS IN THE PATHOLOGY DEPARTMENT OF SANATORIO ADVENTISTA DEL PLATA, SMOKING AND TYPES OF ANATOMOPATHOLOGICAL DIAGNOSES**

*Gabriel Segundo Urbelz*

*Yanina Glenda Nikolaus*

*Alicia Mabel Tiscornia*

*Lilia Cútera de Sorace*

Universidad Adentista del Plata, San Martín, 3103, Entre Ríos, Argentina

---

## **Abstract**

**Objectives:** To evaluate the frequency of lung cancer in the Pathology department of Sanatorio Adventista del Plata (SAP PD) Libertador San Martín, Entre Ríos, Argentina during the years 1966-2010. Determine in both genders the smoking as relating it to different histological types. Verify increased adenocarcinoma. Locate the frequency of lung cancer compared to other cancers in the SAP PD.

**Methods:** A descriptive, retrospective study. It included 383 men and 72 women diagnosed with lung cancer, from 35 to 86 years of age, between 1966 and 2010 in the SAP PD. File Data pathology were compared with the medical records of every patient, assessing smoking. It was appealed to techniques used in immunohistochemistry. Data were processed using Excel.

**Results:** Lung cancer is prevalent in the male sex ratio of 5.3:1. Thirty six percent of male cases were squamous cell carcinoma and 54% of cases involving women were adenocarcinomas. 90% were severe smokers and 93% smoked for over 20 years. Until the decade of the 80's squamous cell carcinoma was the most frequent in the SAP PD, however, adenocarcinoma incidence increased, reaching 40% in the last decade. Of all cancers, lung cancer, does not exceed 5%, with the most frequent being skin cancer.

**Conclusions:** Lung cancer is more common in men smokers. Adenocarcinoma rise is observed. The incidence of lung cancer in the SAP PD decreased in the last decade.

---

**Keywords:** Lung tumors, smoking, histology, gender

## **Introduction**

Major causes of lung cancer and cancer in general, include carcinogens such as cigarette smoke, Ionizing Radiation and viral infections. Exposure to these agents cause cumulative changes over DNA cells, genetic alterations accumulate progressively transforming epithelium that lines the bronchi of the lung. As there is more extensive damage, lung cancer develops. (10)

Lung cancer (LC) mainly the type of non-small cell (NSCLC) is the second most frequent type of cancer, if men and women are considered together. Most cases are diagnosed between 55 and 75 years, with a peak incidence between 65 and 70 years. It is a serious public health problem: it is the leading cause of cancer death for both sexes in the U.S. (160,000 deaths estimated in 1999) (1).

The most important factor in the development of these neoplasms is associated with the habit of cigarette smoking. The fact is supported by several observations that proved changes in the death rate from lung cancer that evolve in parallel with the prevalence of

smoking, the risk of developing LC is 11 to 17 times higher in women and men, respectively, compared between smokers and non-smokers, there is a dose-response with the number of cigarettes smoked per day relationship; suppression of using tobacco leads to a significant, although slow and gradual decrease in risk. (2, 3) has also reported that carcinogens are the link between nicotine addiction and lung cancer (3), requires metabolic activation to exert their effects, and substrate are detoxifying metabolic reactions. The balance between activation and detoxification varies markedly for each individual, and affects the cancer risk in relation to the expression of critical genes such as tumor suppressor gene p53 and K-ras oncogene.

In turn, the incidence of adenocarcinoma has increased significantly in the past two decades, and today is the most common form of lung cancer in women (4,5) and also in many studies in men (6,7). However, the basis of changes in the incidence in women and the predominant histological type, has not been elucidated (6,7). One possible factor is the increased consumption of tobacco in women, but this only highlights the lack of knowledge about why women tend to have a higher incidence of adenocarcinoma, as the histologic types associated with smoking are squamous cell carcinoma and small cell carcinoma being the most important risk factor remain to be smoking (4, 8). Furthermore studies show that adenocarcinoma has increased, equaled and even surpassed the incidence of squamous cell carcinoma that occupied the first place. (9)

**Objectives:** To assess the frequency of lung cancers in the Pathology department of Sanatorio Adventista del Plata, Libertador San Martin, Entre Rios, Argentina, during the years 1966-2010. Determine the smoking habit in every case of lung cancer as compared to men and women. Establish a relationship between smoking and histological types of tumors detected. Verify the increased frequency of adenocarcinoma versus squamous cell carcinoma. Find the frequency of lung cancer in relation to all registered cancers in the SAP PD cancers.

## **Main Text**

### **Method**

Observational, descriptive and retrospective study. It included 383 men and 72 women diagnosed with lung cancer, ranging in age from 35 to 86, between 1966 and 2010, identified retrospectively in the SAP PD. Those extrapulmonary metastases were also added, with high evidence (smoking, histology and immunohistochemistry identification) corresponding to primary lung cancer. Exclusion criteria were patients with lung metastases, no conclusive evidence of primary lung tumor.

Reports obtained from the files of the SAP PD were compared with the medical records of every patient, assessing the different variables related to smoking (number of cigarettes smoked daily, years of smoking, time elapsed since cessation, family history, etc..) Where that was not possible to reach an accurate diagnosis, immunohistochemical techniques were applied for typing.

Data were processed using Microsoft Excel to statistically assess measures of central tendency and data categorization.

Among the limiting factors include the lack of medical records from the early years of the research, as well as the omission or lack of measurable record of substance abuse in medical records.

**Results**

Table 1

*Total number of cases according to gender*

# men	383
# women	72
# of cases	455

Given the data seen in table 1, shows that the proportion of lung cancer in men was 84.18% while that for women was the 15.82%, which gives a ratio of 5.3:1. The average age of the patients was 62 years, showing a dispersion of 51 (86 years for senior, 35 minor). Regarding the origin of patients recorded in medical records, of 131 cases, 89 % were from the province of Entre Ríos, 6% from Santa Fe and 4.5% from other places.

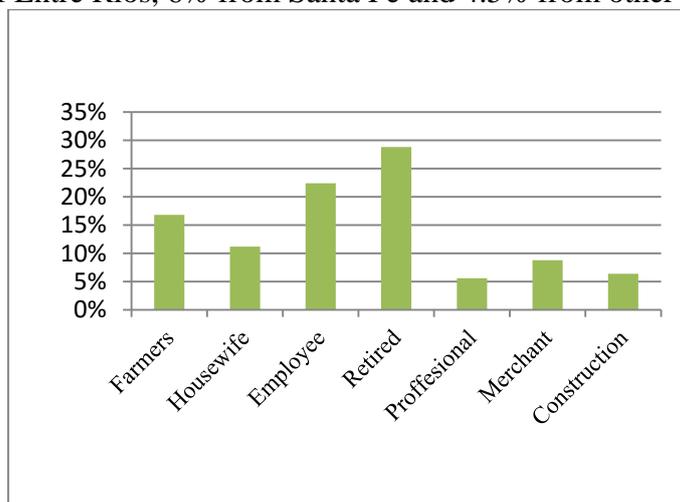


Figure 1. Occupation

As shown in Figure 1, most of observed patients were retired at the time of diagnosis, without mentioning the activity previously carried out in their medical records. Notably, within occupations, 17% of patients who performed agricultural activities, had a diagnosis of squamous cell carcinoma, which translated to 38% of the cases.

Table 2

<i>Farmers</i>	Number of cases
Squamous cell	8
Adenocarcinoma	5
Small cell	5
Large cell	3
Total	21

Shown in table 2 these farmer patients that perform related tasks, have higher prevalence of squamous cell carcinoma, a total of 9 smokers and 12 non-smokers.

Table 3

*Frequency according to WHO classification of lung cancer*

	N ° cases	Percentage
<b>Non small cell</b>		
Squamous cell	140	30.7%
Adenocarcinoma	128	28.1%
Large cell	69	15.1%
<b>Small cell</b>		
Small cell	88	19.3%
<b>Other</b>		
Undifferentiated	18	4.1%
Adenosquamous	7	1.5%
Carcinoid	4	0.9%
Sarcoma	1	0.2%
Total	455	1

When viewed, the total number of cases, in table 3, obtained between the years 1966 to 2010, one could say that squamous cell carcinoma has been most frequent in the sum of the period studied. However it is the object of this research to evaluate the tendency in the evolution of the time.

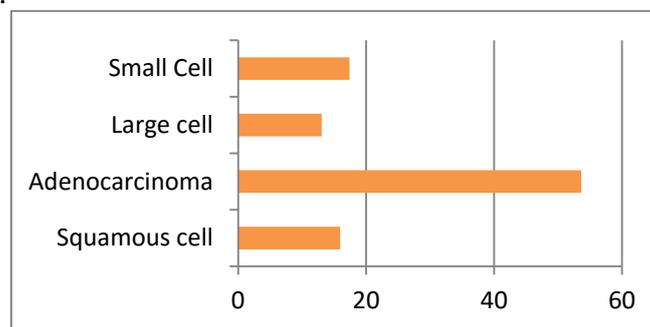


Figure 2. Lineage more prevalent in women since 1966 to 2010  
Note: values expressed in percentages

The prevalence of tumors of the lung depending on its lineage, distributed according to gender can be seen in figures 2 and 3. In the case of women it is observed that adenocarcinoma is the most frequent and the squamous cells to the male gender.

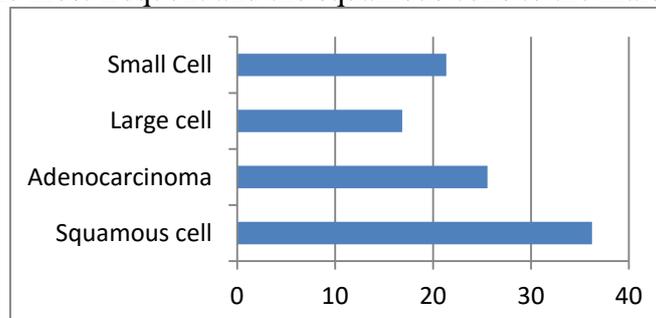


Figure 3. Lineage more prevalent in men from 1966 to 2010  
Note : values expressed in percentages

Table 4  
*Smoking*

Daily amount	N ° cases
Smoker severe (> 16 cig.)	56
Smoker moderately (5-15)	5
Smoker mild (< 5 cig.)	1
<b>Years of smoking</b>	
Smoke less than 20 years	3
Smoke for over 20 years	40
<b>Years of smoking cessation</b>	
Ex. smoker less than 5 years ago	10
Ex. smoker between 5 - 10 years	4
Ex. smoker more than 10 years	10
<b>Other</b>	
Not smoker	13
Unreported	43
Records not found	322

In table 4, there are variables to consider in the patient that smokes. These are; daily amount smoked, years of smoking and time of quitting smoking. The majority of patients, is cataloged within the range of active smoker and severe, smoking 16 cigarettes a day for more than 20 years.

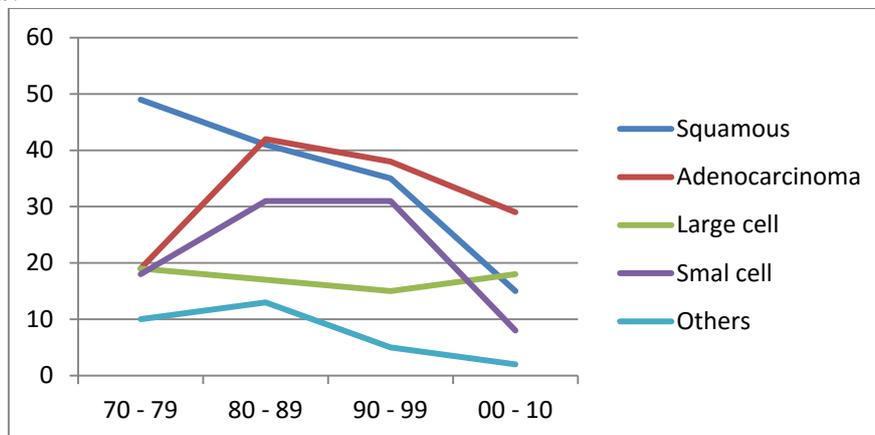


Figure 4. Evolution over time of the lung cancer in the SAP PD

Figure 4 shows the evolution in time of the different lineage of Lung Tumors, noting a marked rise of adenocarcinoma in the 80's, and a marked drop in the squamous carcinoma throughout the decades especially in the 90's. Large-cell is the most steady remaining in time, while small cell tumor presents a marked decline accompanying Squamous. Also a clear descent of all Lung Tumors, can be seen, by the end of 2010.

Table 5

*Location of carcinoma of lung in relation to the rest of carcinomas.*

Type of Cancer of the 90'	N ° cases	Percentage
Skin	1250	22
Mama	612	11
Colon	581	10
Prostate	551	10
Bladder	537	10
Cervix	289	5
Straight	226	4
Stomach	203	4
Kidney	168	3
Ovary	142	3
Thyroid	137	2
Lung	124	2
Endometrium	105	2
Lymphoma	103	2
Other	552	10

As shown in table 5, skin carcinoma is with a wide difference, the most frequent in the SAP PD, followed by carcinoma of breast and colon, placing the carcinoma of lung in twelfth place.

Table 6

*Location of carcinoma of lung in relation to the rest of the carcinomas*

Type of Cancer of the 70'	N ° cases	Percentage
Skin	451	21
Prostate	259	12
Bladder	208	10
Mama	199	9
Colon	130	6
Stomach	115	5
Lung	105	5
Other	721	33

In table 6 lung cancer ranks seventh in frequency in relation to the rest of carcinomas.

## Conclusion

As can be seen in the results, lung cancer is much more common in men than in women and its main risk factor is the use of tobacco. The majority of patients who enter the smoking habit, do so in severe range (more than 16 cigarettes per day) and for more than 20 years, significantly increasing the risk of contracting lung cancer. According to Jean Charles Soria, "The use of tobacco in women has risen sharply. This is a worldwide phenomenon, searched through the strategies of the tobacco industry, since women, as usual, when they do something, they do it big. Unfortunately, they become prey of cigarette smoking. The second problem that we have is that tobacco use begins increasingly at a younger age. Men used

*to begin to smoke at the age of military service and now women begin smoking in adolescence, even at a school age. This is something very serious, because the risk of lung cancer from smoking doesn't relate to the amount smoked as much as the length of time being a smoker. People are not aware of this fact, it is more dangerous to smoke five cigarettes a day for five years, than smoking five packs of cigarettes for one year. Cancer risk is much higher when a duration of consumption is more than 20 years, and this now makes women less than 40 years of age, younger, with children, with a diagnosis of lung cancer ..*

In the present study, histological changes are seen in recent decades. It follows the abrupt descent of squamous cell carcinoma, and the marked rise of adenocarcinoma, confirming other studies. However the incidence of the lung cancer in general at the SAP PD has dropped significantly in the last decade.

Add Jean Charles Soria *There is a new phenomenon that is increasing and that increase is seen around the world although it is stronger in Asian countries, which is a gene mutation: EGFR (Epidermal Growth Factor Receptor). This is one of the main reasons for cancer in non-smokers, what Americans call "undeserved cancer" (cancer not deserved), because the person never smoked, but has cancer. It is a cancer whose precise origin is unknown, but is linked to a mutation in a gene, which currently represents 10% of all lung cancers. In Asian countries, gets to represent 30% of the cases. In Argentina, where there is a European genetic background, we are at 10%. "*

Currently in the world they are reviewing classical lung cancer classifications, inserting the molecular aspects of each tumor in particular. In this way, you can identify specific mutations in each case, and guide the therapeutic targets.

Statistical increase from other types of cancer, may be due to a true increase in incidence, as well as better diagnostic methods incorporated into the SAP.

Although indirectly, since it was not part of the objectives of this research, can be seen to skin cancer in all the decades it has been the most frequent in SAP PD, which can be explained by the ethnicity of the majority of the patients coming to the service, as well as by exposure to the Sun to which they experience on a daily basis through rural work. Such data may be relevant, to implement plans for the prevention and early diagnosis of skin cancer.

It would be very useful having a digitized database in SAP, which systematically would record the risk factors and family history of each patient, as a starting point for new statistical research. In this way, although for reasons of physical space, old medical records should be discarded, data essential for medical institutions that values its own statistics, should be preserved. Of course, more important will be the necessary awareness in each doctor, to collaborate in the accurate and comprehensive record of such data of their patients.

## **Thanks**

Thanks especially to the pathology and medical records departments of the Sanatorio Adventista del Plata, whom have invested their time and their willingness to make this work be carried out, as well as the Department of science and technology of the Universidad Adventista del Plata, which has contributed to the financing of the project. Thanks to Dr. Ronaldo Gnass for his contribution at the beginning of this research.

## **References:**

- Shaw GL. (1999). Additional clues to lung cancer risk. *Cancer Investigation*, 17, 661-662.
- Huber MH, Lippman SM. (1993). Non-small cell lung cancer. *Medical Oncology. A comprehensive review*. PRR.,(pp.127-146). Huntington, New York.
- Hecht S. Tobacco (1999). smoke carcinogens and lung cancer. *J. Natl.Cancer Inst.*; 91, 194-1210.
- Taioli E, Wynder the. (1994). Re: endocrine factors and adenocarcinoma of the lung in women. *J Natl Cancer Inst.*;86, 869-70.

- Zang EA, Wynder the. (1996). Differences in lung cancer risk between men and women: examination of the evidence. *J. Natl. Cancer Inst.* 88, 183-192.
- El-Torky M., et to the. (1990). Significant Changes in the Distribution of Histologic Types of Lung Cancer. *Cancer. American Cancer Society.* (Vol. 65, pp. 2361).
- Medina-Morales, f. et al. (2002). Characteristics of lung cancer in a tertiary hospital. *Pneumology and thorax surgery.* (Vol. 6, 2:27-30).
- Ellis L, Fox J, Peake MD, Coleman MP. (2010). Lung cancer in young women remains rare. *Lung Cancer.* 67 (1): 124-5.
- Paris C, Clement-Duchêne C, Vignaud JM, Gislard A, Stoufflet a., Bertrand O, Thiberville L, Grosdidier G, Martinet and Bénichou J, Hainaut P. (2010) Relationships between lung adenocarcinoma and gender, age, smoking and occupational risk factors: A case - study case. *Lung Cancer.* May; 68 (2): 146-53. EPUB 2009 Jul 7.
- Cotran, Ramzi, Vinay Kumar and Tucker Collins. (2010). *Structural and functional pathology.* Mexico. (8th ed.). Mc Graw Hill-American.
- Sternberg, Stephen S. *Diagnostic Surgical Pathology* (1999). China. 3rd ed. Vol. I. Lippincott Williams & Wilkins.
- Colby, Thomas v, Michael N. Koss and William D. Travis. (1994). *Atlas of Tumor Pathology. Of the Lower Respiratory Tumors.* Fascicle 13. Third Series. Advisory Board. Washington.
- Rosai, Juan. Ackerman's. (2011). *Surgical Pathology* (10th ed. Vol. I). St. Louis Missouri: Mosby.

# ANALYSIS OF COMPLICATIONS AFTER LAPAROSCOPIC CHOLECYSTECTOMY

*Olga Tashtemirova,*  
*Marat Apseyev,*  
Semey State Medical University, RK

---

## Abstract

The detailed analysis of 561 operations performed laparoscopic cholecystectomy (LCE) and their complications. Concluded that during this period LCE became the operation of patients' choice with a benign gall bladder diseases, and the key to a successful implementation of LCE are good technical equipment of operating room, highly professional preparation of surgeons performing laparoscopic surgery, a meticulous preoperative examination of patients, strict adherence to the rules of performing laparoscopic surgery and attentive postoperative supervision of patients.

---

**Keywords:** Laparoscopic cholecystectomy, intraoperative complications, postoperative complications

## Introduction

In recent years is observed a steady upward tendency in the number of patients with cholelithiasis. According to the statistical researches of the last years every fifth woman and every tenth man are suffering from cholelithiasis.

In the past 20 years, laparoscopic cholecystectomy becomes the gold standard of the treatment of calculous cholecystitis. Operation became available not only in leading clinics, but in regional hospitals also <sup>2, 3</sup>. Widespread introduction of laparoscopic surgery is predetermined by their obvious advantages over laparotomic interventions and primarily related to minimizing injury of the abdominal wall and early rehabilitation of patients. At the same time, the number of complications after laparoscopic surgery remains a significant <sup>4</sup>.

Although the total number of complications and mortality in the LCE is considerably less, than in open surgery. To dangerous complications arising directly during the intervention, most authors include the extrahepatic bile ducts injury, damage of abdominal organs, massive bleeding in the zone of operation. Among complications of postoperative period most commonly found biliary peritonitis, bleeding, and abdominal abscesses <sup>5, 6, 7</sup>. At emergence of intraoperative complications make transition to open operation. The investigations conducted by Lee H.K. (2005) defined that conversion at a laparoscopic LCE averages 6,2%.

The development of postoperative hernias in patients in locations of trocar wounds occurs in 0,1-0,3 % of patients. Complications such as migration clips or gallstones to the peritoneal cavity were not known in open surgery. Frequency of other complications of LCE does not exceed 1:1000 operations <sup>8</sup>.

Among the lethal complications due to surgical intervention, there are bilious peritonitis, a necrosis of the liver right lobe as a result of damage and ligation of a hepatic artery, injury of an aorta, destructive pancreatitis. Thus, lethality varies from 0 to 0,1%.(Choi J.Y. et al., 2006)

Problems of prevention, diagnosis and treatment of complications during LCE are far from a final decision.

Careful study of the features of LCE detection of complications and hazards of the operation would increase the safety and effectiveness of this intervention through the development of a complex of preventive measures.

In connection with the above stated, we studied the frequency of complications in LCE.

**Materials and methods**

There was conducted a retrospective analysis of 731 medical records of hospitalized patients, who were operated on for calculous cholecystitis in various forms of its manifestations in the surgical department of the Regional hospital named G. Sultanov in Pavlodar city. During the period from 2008 – 2012 yeas LCE performed on 561 (76,7 %) operations , the traditional cholecystectomy performed 170 (23,3 %) operations.

Among patients who underwent LCE majority were patients most of working age from 20 to 60 years - 459 (81,8 %) people, older than 60 years were 102 ( 18,2%) patient. 156 men were operated ( 27,8 %) , women - 405 (72,2 %).

In the anamnesis at 54 (9,6%) patients there were various operations on abdominal organs and small pelvis, and also other parts of body. Before LCE 76 patients had undergo more than one operation. Painful attacks the day before or on admission were in 56,4% of cases. The average duration of a disease was equal to  $5,3 \pm 0,4$  years.

**Method of treatment**

All operations are carried out under the endotracheal anesthesia. Operating team consisted of a surgeon, assistant and scrub nurse. Nasogastric tube, urinary catheter and the lower limb bandage or elastic bandages was mandatory.

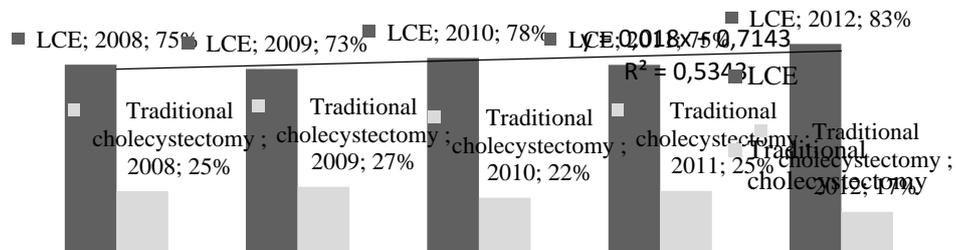
The operation was performed with a stand and a set of tools the company «Karl Storz». LCE was performed according to standard procedures: the imposition of a pneumoperitoneum, the introduction of trocars, revision abdominal cholecystectomy and removal of the gallbladder from the abdomen. Virtually all operations used atraumatic clamps, thus avoiding unnecessary injury of organs and tissues, and as a result of them - hemorrhage and perforation.

At 100 % of the operated patients the operation was ended by drainage of sub hepatic space. Drain was removed on second day in the absence of active discharge (serous fluid, bile) from the abdominal cavity.

Duration of surgery was ranged from 25 to 185 minutes, depending on the nature of the morphological changes of organs and tissues, on average 40-60 minutes.

Research methods. In work used clinical, laboratory, radiological investigation, statistical methods of research.

Results of research. During the investigation there was established, that within five years there is a tendency to prevalence of laparoscopic cholecystectomy over traditional cholecystectomy performed by open way. (picture 1).



Picture 1- Correlation between LCE and traditional cholecystectomy for 2008-2012 period

The presented chart (Figure 1) shows that percentage of LCE remains high annually and the average traditional cholecystectomy performed only to 23% of patients.

In preoperative period revealed the following concomitant diseases in patients undergoing LCE: arterial hypertension, ischemic heart disease, obesity I- IV degree, bronchial asthma, and cirrhosis, umbilical hernia. Data are presented in table 1.

Table 1- Concomitant diseases in patients undergoing LCE

№	Concomitant disease	Quantity of patients n=561	%
1	Arterial hypertension	404	72
2	Ischemic heart disease	353	63
3	Obesity I- IV degree	107	19
4	Bronchial asthma	39	7
5	Cirrhosis	19	3,4
6	Umbilical hernia	24	4,3

According to table 1, the arterial hypertension more often was revealed (72%), coronary heart disease (63%) is on the second place, and obesity of different degree (19%), in 7% (39 people) cases - COPD. The associated diseases complicated technically performance of LCE such as cirrhosis and umbilical hernia made 3,4% (19 people) case and 4,3% (4,3 persons) case respectively.

LCE performed 93 (16.6%) patients with chronic calculous cholecystitis, and 468 (83.4 %) patients with acute calculous cholecystitis.

In 557 (99,3 %) patients carrying LCE was successful , and in 4 ( 0,7 %) cases, the observations made on the conversion of traditional cholecystectomy . The reasons for the transition to laparotomy were: severe scar- inflammatory changes in the neck of the gallbladder in three cases and in one case, severe bleeding from the gallbladder bed.

Intraabdominal complications in the early postoperative period after LCE diagnosed in 9 (1,6%) patients. Bile in sub hepatic space was observed in one patient, which resolved conservatively, two patients on the second day after surgery to drain tube has been actively secretes bile. However peritoneal out phenomenon, bile leakage stopped at 5 second night drainage deleted 7 - eighth day, respectively. In the future recovery. One patient formed billiary fistula, fistula closed in a month alone, two patients developed acute pancreatitis, which in the conservative treatment was arrested. One patient developed postoperative billiary peritonitis. Patient underwent relaparotomy, sanitation and drainage of the abdominal cavity, eliminate sources of bile leakage - suturing the gallbladder bed. The patient was discharged out with recovery. Nausea and vomiting after LCE observed in 8,9% (50 people) patients, pain in the shoulders (frenikus - symptom) – 11,9% (67 people) patients. The characteristic of complications is presented in the table 2.

Table 2 – Characteristic of complications after LCE

№	Type of complication	Quantity of cases n	%
1	Biloma in subhepatic space	1	0,2
2	Choleresis through drainage tube	2	0,4
3	Biliary fistula	1	0,2
4	Acute pancreatitis	2	0,4
5	Biliary peritonitis	1	0,2
6	Nausea and vomiting	50	8,9
7	Pain in the shoulders (phrenicus - symptom)	67	11,9

In connection with the small injury, applied the anterior abdominal wall, the postoperative period in patients after LCE flowed easier than after a similar traditional surgery performed by laparotomy. Already in the first days after the intervention of pain moderately disturbed patients, reducing the dosage of narcotic analgesics , or opt out of their use. The use of antibiotics is solved individually. On the second day the patient starts walking, bowel function was restored on the third day after surgery. General condition of patients allowed to

discharged them for 3-4 days after the LCE, however, often patients out on 5-6-th day, given that some of the complications can appear in the later period.

Discussion. As a result of our study confirmed once again that the operations LCE become the patients' choice procedure with cholelithiasis. Implementation merged into clinical practice of such concomitant diseases like heart diseases, enuresis, chronic ischemic heart disease, arterial hypertension (AH) (II B, heart rhythm disorders, hormone-dependent bronchial asthma (BA), obesity and extreme extent possible to successfully perform in such diseases and conditions<sup>9,10</sup>.

Transfer from laparoscopic to open cholecystectomy in the above cases, as well as V.S. Savelyev, S.I. Emelyanov<sup>11, 12</sup>, is not a complication of surgery. Traditional cholecystectomy should be considered as the most appropriate in this situation type of operating.

Cholecystectomy by open way at sudden disrepair in work of the laparoscopic video equipment which isn't giving in to immediate elimination, and existence of the great technical difficulties connected with formation of dense infiltrate and rough cicatricial adhesions in a hepatoduodenal zone, provides prevention of serious complications.

Blunders runtime LCE help avoid the following measures : careful consideration of all risk factors (renounced adhesions , infiltration of gall bladder, etc.); timely operation cholelithiasis; optimal intraoperative gall bladder and bile ducts , conducting operations in a planned manner; accounting anomalies gall bladder , ducts and blood vessels , increasing the qualification of the surgeon ; clear vision elements gall bladder and duct during surgery , and should not be stopped at the gate of the liver bleeding in a blinded fashion . Injury prevention and gall blader duct during surgery is more promising than their treatment effects<sup>13,14</sup> .

Use of complex measures for prevention of complications developed by us at LCE allowed to reduce the average duration of in-patient treatment from 10,5 to 4,5 days.

## Conclusion

Thus, intraoperative complications LCE are not inevitable character. Observing technique of surgical interventions, most of them can be avoided or eliminate them without resorting to laparotomy. We see prospects for reducing these complications more careful preoperative evaluation of patients, particularly the elderly, with a long history, severe concomitant diseases and complications of gallstone disease in antibiotic prophylaxis, as well as dynamic control in the postoperative period.

## References:

- Lazebnik L.B., Kopaneva M.I., Yezhov T.B. (2004) The need for medical care after surgery on the stomach and gall bladder (review of the literature and own data), Therapeutic Archives, 2004; T. 2, 83-87.
- Sedov V.M. (2002) Complications of laparoscopic surgery and their prevention , St. Petersburg. St. Petersburg, Medical Publishing, 2002; 180.
- Sheth K.R. (2007) Operative management of cholecystitis and cholelithiasis // Shackelford's surgery of the alimentary tract. — 6<sup>th</sup> edition. — Philadelphia: WB Saunders, 2007; 1471-1481.
- Agapov M.A., Gorski V.A., Hovhannisyan E.R. (2007) Causes of hernia formation after laparoscopic cholecystectomy. Scientific - practical conference. Krasnoyarsk, 2007.
- Bernard H.R., Hartmann T.W. (1993) Complications after cholecystostomy// Am. J. Surg., 1993; Vol. 165; 533-535.
- Clavien P.A., Sanabria J.R., Mentha G., et al. (1992) Recent resultsof elective open cholecystectomy in North American and Europeancenter // Ann. Surg.,1992; 618-626.
- Ganey J.B., Johnson P.A., Prillman P.E., et al. (1986) Cholecystectomy: Clinical experience with a large series // Am. J. Surg.,1986; Vol. 151;352-357.

- Lien H.H. (2007) System approach to prevent common bile duct injury and enhance performance of laparoscopic cholecystectomy // *Surg. Laparosc. Endosc. Percutan Tech.*, 2007; Vol. 17(3); 164-170.
- Carroll B.J., Chandra M., Phillips E.H, Margulies D.R. (1993) Laparoscopic cholecystectomy in critically ill cardiac patients. *Ann Surg.* 1993; 59: 12: 783-785.
- Amelin M.A. (2005) Laparoscopic cholecystectomy in patients with obesity grade 3-4: Author. dis., Cand. medical sciences 2005; 24.
- Savelyev V.M., Sazhin V.P., Sazhina L.S. (1994) Complications and their prevention in endoscopic operations // *Intern. Symp. "Laparoscopic Surgery": Abstracts of M, 1994*; 54-55.
- Saveliev V.S. 50 lectures on surgery. (2004) *M* 2004; 366-372
- Langrehr J.M., Schmidt S.C., Raakow R. et al. (2002) Bile duct injuries after laparoscopic and conventional cholecystectomy: operative repair and long-term outcome. Abstract book. 10 International Congress European Association for Endoscopic Surgery. Lisboa 2002; 155.

# **REVIEW OF THE FINDINGS ON THE INITIAL LEVEL OF THE FUTURE DOCTORS' SUBJECT COMPETENCIES IN MEDICAL DEONTOLOGY IN TERMS OF MOTIVATIONAL COMPONENT**

*Olena Holik*

Department of Foreign Languages  
National O.Bohomolets Medical University Ukraine

---

## **Abstract**

Our research is dedicated to the problem of the development of the future doctors' subject competencies in Medical deontology by means of Cooperative learning structures. In this article we are going to review the findings on the initial level of the future doctors' subject competencies in Medical deontology in terms of the motivational component within the framework of the experimental part of the investigation. Our main task is to reveal the gaps in the motivational component of the future doctors' subject competencies in Medical deontology and to suggest Cooperative learning as a technique to improve the deontological education. The initial level of the development of the future doctors' subject competencies in Medical deontology has been evaluated by us in terms of three components – motivational, cognitive and behavioral the essence of which is represented in criteria and the latter are reflected in indicators. In this article we will review the findings on the motivational component. The initial level of the development of the motivational component of the competencies in Medical deontology has been determined in terms of the professional needs and interests of the medical students, the indicators of which include awareness of a career choice, type of motivation to study at the higher medical educational establishment (“professional” motives, motives of “personal prestige”, “pragmatic” and “educational” motives, external factors), prevailing personality orientation (humanistic, professional, social, business, and antisocial), motivation for communication, self-improvement and self-development motivation, recognition of the practical significance of the academic course “Deontology in medicine”, an interest in ethical and deontological education.

---

**Keywords:** Medical deontology, subject competencies, motivational component, personality orientation, motivation for communication, self-perfection, self-development.

## **Introduction**

Nowadays a majority of the requirements connected with the medical duties performance are considered from the deontological perspective. This statement is confirmed by the investigation on the public expectations carried out by the scientists from MacGill University in 2008 (Table 1).

*Table 1. Expectations; society and doctors.*

<b>Society ← Doctors</b>
1. Healer's role.
2. Guaranteed competency.
3. Access to high quality health services
4. Altruistic approach to professional duties.
5. Morality, honesty, integrity, ethical behavior.
6. Loyal and trustful relationships.
7. Responsibility/transparency.
8. Respect autonomy of the patient.
9. Source of the objective information.
10. Healthy lifestyle promotion and prevention of the diseases.

Source: Richard L. Gruess, Sylvia R. Gruess. *Expectations and Obligations: Professionalism and Medicine's Social Contract with Society. Perspectives in Biology and Medicine, Volume 51, Number 4 (autumn 2008) by the John Hopkins University Press.* <http://assets.muhc.ca/PDF/Cruess/Paper-Social-Contract.pdf>

Deontological education must become a priority in any medical curriculum. The faculty members must ensure a comprehensive development of a personality of a future doctor. The review of the professional and scientific literature allows us to define Medical deontology as professional ethics of medical specialists that deals with the issue of the professional conduct of the medical personnel, the morality of which is predetermined by moral, ethical and legal duties to satisfy the needs of the patients, colleagues and society. Deontology originates from moral or ethical theories according to which our actions and activities must be controlled and estimated in terms of our public and professional duties (Edward N. Zalta, 2007). Medical deontology serves as a fundamental basis for the formation and development of the medical culture and plays an important role in the socialization of a future doctor. The faculty must take into account the importance of the Medical deontology for successful career growth and provide continuous deontological education for the medical students.

Our research is dedicated to the problem of the development of the future doctors' subject competencies in Medical deontology by means of Cooperative learning structures. In this article we are going to review the findings on the initial level of the future doctors' competencies in Medical deontology in terms of motivational component within the framework of the experimental part of the investigation. Our main task is to diagnose the gaps in the motivational component of the future doctors' subject competencies in Medical deontology and to suggest Cooperative learning (Kagan, 1994) as a technique to improve the deontological education.

### **Main Text**

The initial level of the development of the future doctors' subject competencies in Medical deontology has been evaluated by us in terms of three components – motivational, cognitive and behavioral the essence of which is represented in criteria and the latter are reflected in indicators. In this article we will review the findings on the motivational component. Under a criterion we will understand key signs, parameters of that or other component of readiness that enable us to estimate the degree of its development. Empiric indicators are quantitative or qualitative indexes with the help of which the research can be carried out. We generalize criteria, indicators and techniques implemented by us in the present research of the motivational component of the basic deontological education in the table (Table 2).

Table 2. Evaluation of the level of the development of the future doctors' subject competencies in Medical deontology in terms of the motivational component.

Component	Criterion	Indicator	Technique
Motivational	Professional needs and interests of the medical students.	Awareness of a career choice. Type of motivation to study at the higher educational medical establishment. Prevailing personality orientation. Motivation for communication. Motivation for self-perfection and self-development. Recognition of the practical significance of the academic course "Deontology in medicine". Interest in ethical and deontological education and self-education.	Questionnaire "Professional needs and interests of the medical students" (author's questionnaire).

On persuasion of the most psychologists and teachers the motivational sphere of any personality can be determined by considering a personality orientation. A concept "personality orientation" was introduced by a well-known scientist S.L.Rubinstein. He asserted that needs, interests, inclinations, tastes, tendencies and attitudes as well as a personal outlook and personal beliefs are psychological forms in which the personality orientation is reflected and character is demonstrated. Moreover, we find out the essence of the personality orientation in the real attitude of a person to other people and through them to himself, his professional activities and to the things of the objective world. Interpersonal relations predetermine the personality development (Rubinshtein, 2002).

Ilyin in his work "Motivation and motives" emphasizes that almost all psychologists define the personality orientation as a combination or system of the motivational formations and phenomena (Ilyin, 2002).

The actions of any person are coordinated by activities and aims. Only a stable prevailing of a necessity or interest, which together appear to serve as long-term motivational attitudes, can form the main lifeline. Frequently, such are social attitudes associated with interpersonal and public relations, and personal attitude toward professional activities (Ilyin, 2002).

The motivation stipulated by a sense of duty is regulated by an individual himself and does not depend on his condition. His attitude can be sooner described as "I must..." than "I wish ...". Ilyin states that a sense of duty actually gives a special psychological value to motivation and human behavior as well as bears evidence of the social maturity (Ilyin, 2002).

Therefore, the initial level of the development of the motivational component of the subject competencies in Medical deontology has been determined in terms of the professional needs and interests of the medical students, the indicators of which include awareness of a career choice, type of motivation to study at the higher medical educational establishment ("professional" motives, motives of "personal prestige", "pragmatic" and "educational" motives, external factors), prevailing personality orientation (humanistic, professional, social, business, and antisocial), motivation for communication, self-improvement and self-development motivation, recognition of the practical significance of the academic course "Deontology in medicine", an interest in ethical and deontological education.

Consequently, the level of the development of the future doctors' subject competencies in Medical deontology during the period dedicated to the basic deontological education has been determined by us according to the medical students' achievement of certain levels of the development of the relevant components, namely: high, middle, and low. We suggest the description of the indicated levels.

### **Motivational component**

#### **High level**

1. High level of awareness of a career choice.
2. Domination of "professional" and "educational" motives to study at the higher medical educational establishment.
3. Domination of the humanistic and social personality orientation that is demonstrated in readiness to help others, altruistic behavior, and highly moral attitude of a doctor to any individual.
4. Continuous self-perfection and self-development, especially, of the professional and personal qualities.
5. Recognition of the practical significance of the academic course "Deontology in medicine".
6. Stable interest in ethical and deontological education and acknowledgment of the necessity to make it available to the students during the whole period of medical studies.
7. Constant readiness to contact and interact with people, to be a group member, herewith having a great necessity in affiliation, that is, establishment of trust-based relationships and mutual understanding during communication.

#### **Middle level**

1. Middle level of awareness of a career choice.
2. Domination of external factors as motives to study at the higher medical educational establishment.
3. Domination of professional and business personality orientation.
4. Incontinuous self-perfection and self-development, especially, of the professional and personal qualities.
5. Recognition of the practical significance of the academic course "Deontology in medicine", but there exists uncertainty if a medical student has got an interest in ethical and deontological education and acknowledges a necessity to make it available to the students during the whole period of medical studies.
6. Variable readiness to contact and interact with people, to work in the group, herewith a necessity in affiliation is not enough, that is, establishment of trust-based relationships and mutual understanding during communication is not a top priority for a medical student.

#### **Low level**

1. Low level of awareness of a career choice.
2. Domination of "pragmatic" motives and motives of "personal prestige" to study at the higher medical educational establishment.
3. Domination of antisocial personality orientation.
4. A lack of self-perfection and self-development, especially, of the professional and personal qualities.
5. A medical student does not recognize the practical significance of the academic course "Deontology in medicine", a lack of interest in ethical and deontological education as well as acknowledgment of the necessity to make it available to the students during the whole period of medical studies.

6. A lack of readiness to contact and interact with people, to work in the group, herewith a necessity in affiliation is low, that is establishment of trust-based relationships and mutual understanding during communication is completely neglected by a medical student.

We have diagnosed the level of the motivational component of the subject competencies in Medical deontology by means of the author's questionnaire "Professional needs and interests of a medical student".

On the basis of the analysis of the groups of subject competencies in Medical deontology and content-analysis of the psychological, pedagogical and professional literature carried out within the framework of the preparatory stage of this research we have developed a questionnaire with the purpose of determination of the initial level of the development of the future doctors' motivational component of the subject competencies in Medical deontology. The choice of questionnaire survey as a diagnostic technique was predetermined by such its advantages: possibility of involvement of a great number of people, a time-saving procedure requiring not so much efforts for its preparation and realization, fast processing of the results, absence of influence on the respondents.

For avoidance of the subjectivism, that is getting socially approved answers from the respondents, some questions have been varied and specified.

The questionnaire "Professional needs and interests of a medical student" has been created with the purpose of establishment of the level of the development of the motivational component of the subject competencies in Medical deontology. It is designed for the individual work and contains 14 questions: 11 closed questions and 3 opened ones answering to which the students have a chance to express their opinion. The closed questions include a choice of a certain answer from the given list or such answers are offered as "yes, no (mark why)", "excellent, well, satisfactorily, do not understand", "excellent, well, satisfactorily, do not like to work in a team", "high, middle, low". It should be noted that questionnaire survey is anonymous. Therefore, a probability of truthful answers is high enough. The questionnaire makes the students realize what must be changed in their behavior, outlook, beliefs, strategies and attitudes, and also draws their attention to the importance of analysis of their achievements. In addition, by means of the questionnaire we have found out the level of awareness of importance of the deontological education by future doctors during their studies at the higher medical educational establishment.

Our research has covered 322 second-year students, getting their education in «Medicine» (specialties 7.110101 "Medical training", 7.110104 "Pediatrics", 7.110105 "Medico-psychological training" at the National medical university named after O.O. Bohomolets). The analysis of the findings has been carried out in accordance with the marked in Table 1 indicators.

The diagnostics of the level of *awareness of a career choice* took place by the analysis of the answers to the question "When did you decide to choose the profession of a doctor?" 36% of the respondents answered that during two final years of their studies at the secondary school, 35% decided to enter a higher medical educational establishment before completion of the ninth year of the secondary studies. Taking into account the fact that 18% of the respondents have been dreaming of the medical profession since their childhood, and that their choice has been done consciously during their studies either at the Ukrainian medical lyceum of the National Medical University or during their studies at other higher educational establishments or after getting experience in some hospital, the faculty members must make all efforts to ensure that the students which constitute the aforementioned 36% and 35% will realize that their choice is perfect and they are moving in the right direction. 11% of the medical students who chose the medical profession upon finishing the secondary school can be considered that group of risk, which have decided on the professional career spontaneously

without realizing their choice. Consequently, 18 % of the respondents have a high level of awareness of the choice of the medical profession, 71% - middle, and 11% - low.

*The type of motivation to study at the higher medical educational establishment* has been determined by the analysis of the answers of the respondents to the question “What factors influenced on the choice of the medical profession?” Most students marked a few factors, that is, only a combination of certain circumstances or conditions is that driving force which induces future applicants to enter the medical universities. 25% of the respondents have chosen the medical profession in order to acquire knowledge and skills in medicine and work for the benefit of our society. 12,5% have made a decision to become a doctor after illness or life accident, when it was necessary to deliver first emergency aid. 8% of the respondents relate their choice to the experience in some medical activities. Therefore, “professional” and “educational” motives make 45,5% of all respondents. The parents influenced on the choice of 16% of the respondents. Practically identical is frequency of such answers as “example of the familiar doctor” (9%), “school subject” (9%), “a book, an article, a film, a TV-program” (7%). The findings of the questionnaire survey demonstrate that such factors as “relatives or friends”, “dynasty”, “a teacher” do not have a considerable influence on the applicant’s choice of the medical profession. In fact, 42% explain the choice of the medical profession by the influence of the indicated earlier external factors. This percent must be taken into account, so as the external motivation is unsteady and means that at any time a student can acknowledge the fallaciousness of the choice, as soon as influence of the external factors will diminish. Therefore, the task of the faculty members is to develop the internal motivation of this group of students, that is, “professional” and “educational” motives must go out on a foreground. The expected financial reward or “pragmatic” motives make insignificant 0,7%, and motives of “personal prestige” – 0,3%.

*Prevailing personality orientation* has been determined by us as follows: it has been suggested to the students to define 5 professionally-oriented ethical qualities which above all things must be formed and developed by a medical student during his studies. After questionnaire processing we have got 5 professionally-oriented ethical qualities, which, in opinion of the second-year students, have the most essential value for the professional activity of any doctor: responsibility – 84%, attentiveness – 57%, willingness to help – 45%, readiness to self-perfection and self-education – 40%, good organization – 34%. If to analyze the list of the afore-mentioned qualities, from one side, all of them are positive, but, on the other side, directed not at a person, in our case a patient, and community, but only at the professional activity. These qualities determine *the professional orientation of a person*. The questionnaire survey has revealed that humanism (23%) and readiness to self-sacrifice (13%) are not considered by the medical students as top professional qualities, which a future doctor must foster in himself, although these moral and ethical qualities are the criterion of any doctor’s attitude to the world and have an effect on *a humanistic personality orientation*. Most students have neglected professionally-oriented ethical qualities which represent an attitude of a doctor to a patient (tactfulness – 20%, sympathy – 18%, respect – 12%, honesty –12%), in other words, his *social orientation*. Taking into account modern tendencies in the development of the health service, it is discouraging that only 3% of the students see a doctor initiative, and 5% consider that he must nurture in himself the leadership qualities. 0,6% of the respondents consider business attitude as a positive professionally-oriented ethical quality of a future doctor. However, a majority of students attribute it to the negative qualities. We, on the contrary, would like to emphasize that such point of view is wrong taking into account the realities of the modern life, when a concept «entrepreneurship» acquires a new value. In the dictionary the word “entrepreneurial” appears as a synonym to “enterprising” or “zealous”, accordingly meaning a “practical shrewdness, ability to carry the ball, initiative”. The organizational and leadership skills determine a *business orientation of a personality*. The findings of the questionnaire survey allow us to conclude that students realize negativity of

such qualities as ability to manipulate ideas and other people, self-interest, aloofness, inflexibility, arrogance, technicism, obstinacy, which all together predetermine *an antisocial orientation of a personality*. Only 3% of the respondents included such qualities to top five professionally-oriented ethical qualities.

The level of *motivation for communication* has been found out by the estimation of the level of willingness of the medical students to contact and cooperate with people. 68% of the respondents are continuously ready to contact and interact with people, 23% of the medical students have variable readiness to contact and cooperate with people, and in 9% such readiness is absent. 75% of the respondents successfully work in a team (to this category we have included answers “excellent” (16%) and “well” (57%), and also 2% of those who mark that they like to cooperate with others if they trust their team members). 16% of the medical students can not succeed during teamwork, 9% dislike to cooperate with others. Consequently, the level of motivation for communication has been determined by us as an average index including willingness to contact and cooperate. 71% of the respondents have a high level of motivation for communication, 20% - middle, and 9% - low.

*The recognition of the practical significance of the academic course “Deontology in medicine”* has been determined due to the analysis of the students’ answers to the question “Have you chosen the elective course “Deontology in medicine?” and by means of the task in which the respondents have been asked to define the practical significance of this course. A high awareness of the practical significance of the academic course “Deontology in medicine” is confirmed by the fact that 83% of the students who have not been offered the indicated course as it does not cover all the academic groups, 64% regret it. And out of 17% of the future doctors who are lucky to have completed this elective course, absolutely all have stressed its importance. Therefore, 81% of the respondents consider that the elective course “Deontology in medicine” has high practical value, 16% - middle, and 3% - low.

The interest in the ethical and deontological education and self-education has been established as follows: we asked the students to estimate, as far as well they understand the value of ethical education and self-education of a personality of a future doctor. The results are consoling enough, because 25% of the respondents “excellently” and 61% “well” realize the outstanding value of spiritual growth of a future doctor, importance of the high duty performance in the society. But 14% of the future doctors insufficiently or fully misunderstand the role of ethical education and self-education of a personality that is impermissible for such sort of a profession. It means that a great necessity and interest in ethical and deontological education and self-education exists in 25% of the students, the middle index of such necessity and interest – in 61%, and low – in 14%. In addition, from the list of the compulsory preclinical academic courses of the second year curriculum, the students have marked all without an exception disciplines. It means that, in their opinion, every teacher must pay his attention to the issues of the general ethical and deontological education of the future doctors during planning and organization of the teaching process. But there are academic courses which have been mentioned by the students more frequently, among them: “Care of patients” (84%), “Bases of psychology and pedagogy” (69%), “Philosophy” (44%), “General surgery” (38%), “Foreign languages (professionally-oriented)” (38%).

In order to determine the degree of maturity and evaluate perspectives of the second-year students in the future, in other words, their *aspiration to professional and personal self-perfection and self-development*, we asked the students to describe their greatest achievements and explain their significance for their personal development. 19% of the respondents have not got, in their opinion, any achievements. Such results testify to the personal immaturity and indifference of a certain part of the medical students. These percents make the group of the students with a low level of readiness to professional self-perfection and self-development. The achievement, which 57% of the respondents is proud of, is an admission to the National

medical university named after O.O.Bohomolets. That did not even lose the actuality during the second-year course of studies. That testifies to the insufficient orientation of the students' activities on self-perfection and self-development. Among other achievements success in studies and professional activity has been more frequently mentioned making 20% and in science, sport, music and art accounting for 4%. These latter 24% of the respondents will make part with a high level of readiness to self-perfection and self-development.

The information on the initial level of the future doctors' development of the motivational component of the subject competencies in Medical deontology is presented in Table 3.

Table 3. The initial level of the development of the motivational component of the subject competencies in Medical deontology.

Criterion	Indicator	Results			
Professional needs and interests of the medical students	Type of motivation to study at the medical university	Professional and educational motives	External factors	Pragmatic motives	Motives of the personal prestige
		45,5%	42%	0,7%	0,3%
The level of motivational component		High	Middle	Low	

Criterion	Indicator	Results				
Professional needs and interests of the medical students	Prevailing personality orientation	Humanistic: humanism	Social: tactfulness	Professional: responsibility-	Business: initiative –	Antisocial:
		– 23% readiness to self-sacrifice- 13%	- 20% sympathy - 18% respect- 12% honesty - 12%	84% attentiveness – 57% readiness to help– 45% self-perfection and self-education – 40% good organization – 34%	3% leadership - 5% entrepreneurship– 0,6%	3%
The level of motivational component		High	Middle	Middle	Low	Low

Criterion	Indicator	Results		
Professional needs and interests of the medical students	Level of awareness of a career choice	High	Middle	Low
	Motivation for communication	18%	71%	11%
	Motivation for self-perfection and self-development	High	Middle	Low
	Recognition of the practical significance of the	High	Middle	Low
		71%	20%	9%
		24%	57%	19%

	<i>academic course "Deontology in medicine"</i>	<b>81%</b>	<b>16%</b>	<b>3%</b>
	<i>Interest in ethical and deontological education and self-education</i>	High  <b>25%</b>	Middle  <b>61%</b>	Low  <b>14%</b>
<b>The level of motivational component</b>		<b>High</b>	<b>Middle</b>	<b>Low</b>

## Conclusion

The review of the findings on the initial development of the future doctors' subject competencies in Medical deontology in terms of the motivational component demonstrates that almost equal number of the students has a high and middle level of their motivation to study medicine; a majority of them have a middle level of the motivational component in terms of prevailing personality orientation, a middle level of awareness of a career choice, a high motivation for communication, a middle level of motivation for self-perfection and self-development, a high level of recognition of the practical significance of the academic course "Deontology in medicine", and a middle level of interest in ethical and deontological education and self-education. Therefore, we suggest implementing Cooperative learning structures into the teaching process. This will help the faculty members to ensure that the students with a middle level of their motivation to study medicine and middle level of awareness of a career choice will realize that their decision is perfect and they are moving in the right direction and those with a high level will not be disappointed. Cooperative learning will help to change a personality orientation of a medical student and make it more humanistic and socially oriented. This technique will maintain the medical students' readiness to communicate and cooperate by developing their communication and teamwork skills; will encourage their moral and ethical self-perfection, self-development and self-education. In our further research we will determine the extent of the improvement of the level of the future doctors' subject competencies in Medical deontology in terms of the motivational component resulting from the introduction of Cooperative learning structures into the teaching process.

## References:

- Richard L. Gruess, Sylvia R. Gruess. Expectations and Obligations: Professionalism and Medicine's Social Contract with Society. Perspectives in Biology and Medicine, Volume 51, Number 4 (autumn 2008) by the John Hopkins University Press: 579-598  
<http://assets.muhc.ca/PDF/Cruess/Paper-Social-Contract.pdf>  
Stanford Encyclopedia of Philosophy. Edward N. Zalta World Wide Web URL:  
<http://plato.stanford.edu/> Publisher: The Metaphysics Research Lab Center for the Study of Language and Information Stanford University Stanford, CA 94305-4115 International Standard Serial Number: ISSN 1095-5054 <http://plato.stanford.edu/entries/ethics-deontological/> First published Wed Nov 21, 2007; substantive revision Wed Dec 12, 2012.  
S. Kagan. Cooperative Learning, Resources for Teachers, 1994.  
S. Rubinstein. Osnovy obshchey psihologii. Seriya: Mastera psihologii: Piter, 2002: 781.  
E. Ilyin. Motivatsiya i motivy. Seriya: Mastera psihologii: SPb.: Piter, 2002: 512.

# MANGROVES OF KETI-BUNDER, INDUS DELTA: A PRESENT STATUS

*Zafar Farooqui*

Center of Excellence in Marine Biology, University of Karachi  
Government Degree Boys College, KMC-Store, Nishtar Road, Karachi

---

## Abstract

The paper is the part of recent thesis submitted to Institute of Karachi. The topic of thesis is ‘*studies on mangrove ecosystem with respect to biodiversity, productivity and nutrients dynamics*’. In this paper we present the present status of Indus delta mangroves with respect to the present studies done by the author. The present research article constitutes a report of litter production and decomposition rates of *Avicennia marina* and *Rhizophora mucronata* leaves from Hajambro creek, Indus delta located near active Indus river mouth and compared. The total litter production was 4.78 tonnes ha<sup>-1</sup> year<sup>-1</sup>. Extrapolating the data for the whole mangrove covered area in the Indus delta; the figure comes to about 1.2 x 10<sup>6</sup> tone y<sup>-1</sup>. The percent contribution of different components of the litter varies, with leaf-litter being the most dominant component (about 50 %) of the total litter biomass. The rate of decomposition was species specific, *A. marina* leaves decomposed faster (p<0.001) than the *R. mucronata*. The time in days required for the loss of the initial dry mass (t50) was 49.55 days for the *A. marina* and 44.43 days in case of *R. mucronata*. The initial loss may represent the leaching of dissolved organic matter. The results showed that the breakdown of the leaf litter is species dependent.

---

**Keywords:** Mangrove, indus delta, productivity, biodiversity, litter production, decomposition rates, *avicennia marina*, *rhizophora mucronata*

## Introduction

### Research in Pakistan

Mangroves of the Pakistan have received limited attention and studies have been limited to only accessible areas, mostly near Karachi. The preliminary assessment of family *Aviceniaceae* was assessed by Jafri (1966). Pakistan had many as eight mangroves species (Saifullah, 1982, Saifullah et al 1994, Siddiqui et al. 2008), but at least four species (*Brugeria conjugata*, *Ceriops roxburghianna* and *Sonneratia casiolaris*) appear to have been extinct from Pakistan due to changes in the environmental conditions. Today only four species (*Avicennia marina*, *Aegiceros corniculatum*, *Rhizophora mucronata*, *Ceriops tagal*) occur naturally, of which the *A. marina* is the most dominant species (Siddiqui et al.2008) covering 90% of mangrove-covered forest areas.

Mangroves of Baluchistan are sporadic and confined only in few pockets at Miani Hor, Kalmat Khor, and Jiwani (Gawatar Bay) (Siddiqui et al. 2008). Preliminary survey of the forest structure of Baluchistan (Makran) coast has been reported (Saifullah and Rasool, 1993, Rasool and Saifullah, 1996, WWF Report 1995).

The ecological studies, such as, on the distribution and abundance of mangroves (Mirza, 1983) and litter production and decomposition (Siddiqui and Qasim 1986) was started in 1980s. Mirza (1983) showed using remote sensing data that 2.6 million hectare is covered by mangroves in the Indus delta. Latter on Mirza (1988) also conducted remote sensing studies on mangroves of Indus Delta to give an overall picture of total distribution of

mangroves covered areas. Pioneering work on litter production and decomposition in mangroves at Karachi backwaters has been done by Siddiqui (1986), Siddiqui and Qasim (1986 & 1988). Biochemical composition of mangroves foliage (Qasim et al, 1986) and inorganic constituents of mangroves leaves (Ilyas et al, 1989) have been reported. Benthic metabolism and sulphate reduction in mangrove soil in Pakistan has been studied (Ahmed, S.I et al, 1993). In addition, two recent studies (Shafeeq, 2006 and Farooq, 2006) have studied in detail litter production and decomposition, nutrient release in the mangrove environment (Sandspit) and its ecology and also on the biogeochemical processes in the mangrove sediments.

A number of studies are available on the identification and distribution of fauna and flora in mangrove environment in Pakistan. These reports include studies on bacteria and Cyanobacteria (Nuzhat, et al, 1995; Siddiqui et al 2000); algae (Saifullah and Rasool, 1988, Saifullah and Taj, 1995), phytoplankton (Harrison, et al, 1995); zooplankton (Huda and Ahmad, 1988); mollusk, such as telescopium (Barkati and Tirmizi, 1988), clam (); crabs ....; Avifauna (Karim, 1988); fishes of mangroves area (Ahmad, 1988). A report on antibacterial activities of *Avicennia* (Atiq-ur-Rehman, et al. 1995) and mangrove oil (Nuzhat, et al, 1995) showed the importance of mangrove in the pharmaceutical industry.

### **Mangroves forests of Indus delta**

The Indus delta, stretching from Karachi to the south-east to Sir Creek near Indian border, is comprised of 17 major creeks, numerous minor creeks, and extensive areas of mudflats and mangroves forests () is considered as seventh largest delta supplied by eighth largest drainage area in the world (Wells and Coleman, 1984). Indus River has shifted its course from Gharo-Phitti creek system to current location in the Khobar creek. The former have now become abandoned tidal creeks with full strength seawater. Salinity of the active Indus delta (Khobar creek) remains high during most of the dry period when downstream discharge is mostly obstructed by the dams and dikes uphill. Salinity in the delta reduces only in the flood condition (i.e. July – September).

The Indus River delta is ranked fifth largest semi-arid mangrove area in the world (Siddiqui et al 2008, Senadaker ). Existing estimates show that 97% mangroves covered (approximately 0.26 million hectare) in Pakistan in the delta region (Mirza et al 1988). Only three species (*Avicennia marina*, *Aegiceros corniculatum*, *Rhizophora mucronata*) are currently present, of which the *A. marina* (salt tolerant species) is the most dominant species. *Rhizophora* species has been extinct and efforts are being made to rehabilitate this species in the Indus delta. *Rhizophora*, however occurs as natural forest in mangrove forests along Balochistan coast.

Mangroves forest along the Sindh coastal areas have been reported to have undergone tremendous stress and destructions owing to the climatic as well as the anthropogenic changes during recent past and hence the mangrove covered area decreased drastically ( Farooqui *et al*, 2012).

As mentioned above, Indus delta mangroves have been ignored largely due to inaccessibility, despite the fact that these forests have undergone extensive deforestation. Grazing by the camels and significant reduction of the downstream discharge of freshwater appeared to be the major factors in this regard. Following the restrictions imposed by the Sindh Forest Department on camel grazing, in the past few years, in the areas around Ket-Bunder emergence of new natural forests along with the planted species of mangroves (*A. marina* and *R. mucronata*) are quite evident (Siddiqui et al. 2008). If the deforestation, both grazing and cutting of trees, can be controlled and reduced sufficiently, a very drastic natural regeneration of mangroves can be achieved (Siddiqui et al. 2008).

Reduction in freshwater has been considered as the factor impacting mangroves. Runoff from Indus River has been reduced over past few decades and now only during flood

seasons (summer) some water in the Indus delta finds its way down the Kotri-Barrage into the creeks near Ket-Bunder (Penatt J.C 1993), at this time salinity in creeks which usually remains between 40 and 42 ppt, reduced to 15 ppt in Hajambro creek near Ket-Bunder, or even lower (7-9ppt) in creeks near Khobar, the main drainage site of the Indus (Siddiqui *et al* 2008). Similarly the suspended loads in the creeks also enhanced, as expected, during this period. It ranged between 100-1250mg l<sup>-1</sup> in Hajambro Creek and Channels around that area (Siddiqui *et al.* 2008). Much lower values (100-180 mg L<sup>-1</sup>) have been recorded earlier from Isaro Creek during non-flood period (Harrison *et al* 1997). Indus River Indus is needed to flow into the coastal areas not only for freshwater but most importantly for sediment flux to replace sediments withered during SW monsoon.

### **Main objective of the study**

The main objective of the study was to understand the ecology and plant response in the fifth largest mangrove forests in the Indus delta. The current research had its specific focus on the assessment of productivity (litter production), litter decomposition.

### **Material and method**

#### ***Area description***

Sandspit is located between Manora Island and Hawksbay at 24° 50' N and 66° 56' E while the Hajambro creek is situated at 24°08'789" N and 067°27'187"E of Karachi coast. The Indus River in Pakistan has the seventh largest delta supplied by eighth largest drainage area in the world (Wells & Coleman, 1984). During the summer monsoon seawater inundated both the active and inactive parts of the delta, leaving behind evaporate salt deposition during its retreat.

#### **Climatic data**

Climatic data, such as, temperature, humidity, and wind speed, were obtained from Meteorological Department, Government of Pakistan for the study period and used to assess the impact of climatic factors on the rate of litter production.

#### **Litter production**

The litter production study was carried out in two areas along Indus delta from April 1999 to March 2000 (Sandspit backwater) and during April 2005 to March 2006 (Hajambro creek). The traps made up of PVC pipe frame (25 x 25 cm) and fitted with conical nylon bags (1 mm<sup>2</sup> mesh), were used for the collection of mangrove litter. Three sets containing three traps each were fixed randomly and secured under mangrove trees in such a way that traps remain vertically upright and bags suspend above the high tidal water mark. The litter collected in the traps was recovered bimonthly over a period of one year. The content of each trap was carefully removed and placed in separate polythene bags and brought to the laboratory where it was sorted into different component (i.e., leaves, twigs, flower, fruits and other miscellaneous). All components were dried at 70°C for 48 hours and weighed. The weight of the total litter and of each component produced in nine traps was averaged and calculated as tones per hector per year.

#### **Statistical analysis**

Pearson correlation coefficient was used to evaluate the differences in total litter fall rate with reference to physic-chemical parameters. Statistical analysis was performed using the Minitab 14 software.

#### **Assessment of leaf-litter decomposition rates**

The decomposition of mangroves leaf-litter was studied using the litterbag technique

reported by several scientists around the world (Siddiqui & Qasim, 1988; Tam, *et al.* 1990; Shafique, 2006). Mature yellow senescent leaves of *A. marina* and *R. mucronata* were collected from the trees in March 2006 and air-dried. Known weight of leaf samples were than placed in nylon net bags (20cm x 25 cm of 1 mm mesh). Bags were incubated for 125 days in the rhizosphere among mangrove plants and retrieved at different intervals. Residual leaf material was carefully picked from the nylon bags, washed gently with distilled water and then oven dried at 70 °C for 48 hours. Difference of initial and final weights gives the weight loss at each time interval. Ash free dry weight (AFDW) was determined by igniting the leaf material at 450°C for 8 hrs (Tam, *et al.* 1990). The total nitrogen in the decomposed material and the sediments was studied according to the micro-Kjeldhal method.

### Statistical analysis

The relation ship between percent AFDW remaining (Y) and sampling time (x) was determined by simple linear ( $Y=a+bx$ ) as well as simple negative exponential ( $Y=ae^{-kt}$ ) models. The decomposition rate constant (k) was obtained from the regression models and the half life ( $t_{1/2}$ )/k was calculated according to the equation  $t_{1/2}=(\ln 2)/k$ .

## Results

### Assessment of litter production in indus delta

Litter production (leaf, fruits flowers and twigs) in the mangrove forests at Hajambro creek was observed throughout a year. A distinct seasonal pattern in total litter fall was observed at both sites (Fig. 1) with a lowest value in January and peaks in July. The average total litter production in the region would be 4.57 tonnes  $h^{-1} y^{-1}$  (4.35 tonnes  $h^{-1} y^{-1}$ ; SB and 4.8 tonnes  $h^{-1} y^{-1}$  HC).(Fig 1 and 2).

The production of various litter components, such as, leaves, twigs, flowers, fruits and miscellaneous, also vary seasonally at both stations. The percentage contribution of different components of the litter contributes highest portion 60 % (HC) of the total litter biomass. However, low values were observed from May to June., due to high production of fruit and flowers. It is interesting to note that two peaks were recorded (in August to September and February to March) (Fig. 1, 2 and 3). On the other hand, twigs, flowers, fruits and Miscellaneous components contribute respectively about 12%, 28%, 5%, and 4.438% . Flowering season appear to showing highest flower-litter in June h 5.53 gm  $day^{-1}$  (Fig 1,2 and 3).

Similarly, maximum fruits litter was collected in August (1.39 gm  $day^{-1}$ ). (Fig. 1, 2 and 3). Twigs fall was maximum in Jun, with 1.17 gm produced per day. The miscellaneous unidentified components appear to vary greatly through the year with maximum in May (0.54 gm  $day^{-1}$ ).

Climatic data obtained from Meteorological Department shows seasonal variations in wind speed, air temperature and % humidity. Only wind speed appear to have a significant positive correlation ( $r^2=0.7$ ) with total litter production.

The seasonal pattern of the litter production (the main part of this thesis, has been expressed in Fig 3, and the pie-chart is shown in Fig 4 representing percentage of various components of litter.

### Decomposition of mangroves leaves

The decomposition pattern of both *A. marina* and *R. mucronata* showed a very rapid early loss of the biomass, followed by a slower and steady decrease for the remaining period of the experiment, (Fig 5). The early rapid loss appear to correspond with the leaching of soluble organic material from the leaf biomass, as reported earlier in different studies around the world (Steinke *et al.* 1983, Valiela, *et al.*, 1985; Robertson, 1988; Tam *et al.* 1990; Steinke *et al.* 1993b). Later on, the decomposition rate slows down due to the more resistant materials,

such as cellulose and lignin, in the remaining leaf litter (Valiela, *et al.* 1985; Robertson, 1988). Such decay patterns were better described by the simple negative exponential equations (Table I) rather than simple linear regression equations.

The summary of the regression equations for both the species (*A. marina* and *R. mucronata*) were given in (Table i). Although *R. mucronata* and *A. marina* had significantly different regression slopes ( $p < 0.01$ ), but patterns of decomposition were not different from each other.

Analysis of the variance showed that there were highly significant differences in the percentage dry mass remaining between two species ( $p < 0.001$ ). Despite the similarity in litter decomposition pattern of the two species, the leaves of *R. mucronata* decomposed faster with a more rapid release of nutrients (nitrogen) than that of *A. marina* ( $p < 0.001$ ). About 90% of the AFDW of the leaf litter of *R. mucronata* was lost from litterbags after 6 wk of decomposition (Fig 5). At the end of 6 wk of incubation, leaf materials of *R. mucronata* were difficult to identify and the residual material of homogenous texture remained inside the bags. Similar observations were also recorded by Steinke *et al.* (1983). The decay constants of the *A. marina* and *R. mucronata* were found to be 0.097 and 0.109  $\text{Wk}^{-1}$ , respectively (Table I).

## Discussion

### Litter production

In the present study, leaf litter contributed 50-60 % in the total litter fall, which agrees with the data reported by Steink & Ward (1988). The present study at SB and an earlier study conducted at the same site (Siddiqui & Qasim, 1990) show differences in the production rate indicating variation in litter production in different years. This could be due to variation in different environmental parameters, such as growth condition, height of the tree, salinity, temperature, evaporation, wind speed and nutrient input, etc., which regulate the production rate (Lugo & Snedaker, 1974; Leach & Burgin, 1985; Woodruff, 1982; Pinto, 1992; Slim *et al.* 1996; Shanula and Whittick, 1999; Ake-Castillo *et al.* 2006). Generally, litter production values for mangrove forests worldwide range from 2 to 16  $\text{t ha}^{-1}$  per year (Twilley & Day, 1999). Tree height (growth condition) has been particularly considered as one of the major controlling factors in litter production by Woodroffe *et al.* (1988) who categorized the production rate and tree height relationship. For example, tree height exceeded 10 m produces litter upto 8  $\text{t.h}^{-1}.\text{y}^{-1}$  and lower litter production (3  $\text{t.h}^{-1}.\text{y}^{-1}$ ) has been attributed to a dwarf mangrove stands (Woodroffe *et al.* 1988). Comparing this data with the present study where tree height, for example, is between 10-15 m at SB, the rate of litter fall (4.35  $\text{t.h}^{-1}.\text{y}^{-1}$ ) appeared to be lower than expected considering the tree height. On the contrary, height of the trees at HC corresponds to dwarf type mangroves but the total litter production (4.8  $\text{t.h}^{-1}.\text{y}^{-1}$ ) reported here is slightly higher than what is suggested for dwarf mangrove (Woodroffe *et al.* 1988). This suggests that there ought to be some other factors than tree height which influence the litter fall, such as wind speed, fresh water input and climatic conditions, etc. Our result also shows a significant positive correlation between litter production and wind speed ( $r^2 = 0.7$ ). Therefore, it may be suggested that wind speed is more dominant factor than tree height in controlling the litter production in this area.

The present study constitutes first report on litter production in the mangrove forests of Indus Delta. Two sites that are compared in this study show seasonal variations in the total litter production with highest fall in autumn (September/October). The total litter fall at both the stations is more or less the same, but the flowering season appears to differ at both stations. Leaf litter constitute the major component of the total litter production throughout the year. On the other hand, flower and fruit production remain confined only to a specific period, but contribute significantly to the observed peak in that period.

### **Mangroves leaves decomposition**

Since leaves of both species were exposed to the same environmental conditions, so the differences in the decomposition rates are probably due to the differences in the leaf morphology, texture and chemical composition. Differences in leaf quantity are known to affect decomposition rates (Robertson, 1988; Basuguren and Puzo, 1994; Twilley *et al.* 1997). Different decay constant had been recorded for different mangroves species in different geographical location and in different regions, probably due to the differences in the nitrogen and tannin contents (Van der Valk & Attiwill 1984; Valiela, *et al.* 1985; Steinke, *et al.* 1993b; Wafar, *et al.* 1997). Plant material with a higher lignin contents or a higher C:N ratio are more refractory, and thus decompose more slowly than plant materials with relatively low lignin contents or a relatively low initial C:N ratio (Valiela, *et al.* 1985; Robertson, 1988; Steinke, *et al.* 1993b). *A. marina* leaves were reported to have comparatively lower initial C:N ratio (high nitrogen content) than *R. mucronata* (Rao, *et al.* 1994; Wafer, *et al.* 1997) and would be expected to decompose faster (Wieder and Lang, 1982). The initial N content of leaves recorded in the present study for both species was similar. Therefore our result that *R. mucronata* decomposes faster as oppose to previous studies may be due to the lignin content in leaves of the two species. Moreover, leaves of *A. marina* have more conspicuous and well-developed fibers and sclereids than those of *R. mucronata* (Valiela, *et al.* 1985; Robertson, 1988; Steinke *et al.* 1993) and therefore reduce the decomposition rate as observed in the present study.

The relatively thicker leaves with a cuticle of *A. marina* and *R. mucronata* would offer resistance to degrading organisms, thus reduce the decay rate (Tam *et al.* 1990). Initial N content of both species was low and showed increases probably due to microbial colonization (Fig 6).

The litterbag method may underestimate actual decomposition but will reflect trends and allow comparison among species and sites (Wieder and Lang, 1982). The mesh size of the bags allows small invertebrates, fungi and bacteria to access to decaying leaves, but the large invertebrates, such as, crabs which are a major competitor in leaf degradation (Steinke *et al.* 1993a,b), are excluded. The role the large macro-invertebrates in breakdown of mangrove leaf was investigated by Ashton (1999) through leaf tethering experiments. There are many other factors that also contribute to the rate of decomposition of detritus, such as salinity and aerobic/ anaerobic conditions (Mall, *et al.* 1991), soil redox potential (Alongi, *et al.* 1998), total organic nitrogen concentrations related to heterotrophic activity (Valiela, *et al.* 1985; Robertson, 1988; Steinke *et al.* 1993b), exposure to the sun (air & soil temperature) (Mackey and Snail, 1996) and desiccation (tidal inundation) (Robertson, 1988). During decomposition significant amount of nutrients (Steinke *et al.* 1993b) and organic matter (Lu & Lin, 1990) release from leaf detritus, which support forest productivity and food web.

### **Acknowledgement**

The first author (Zafar Farooqui) greatly acknowledges the support of Higher Education Commission Pakistan for providing the Indigenous PhD Scholarship (300 Scholars programme; PIN NO IKB 0349090). The people of center of Excellence in Marine Biology, University of Karachi are also acknowledged for their hospitality and logistic support during the study. The Metrological department was highly acknowledged for providing the metrological data of the area.

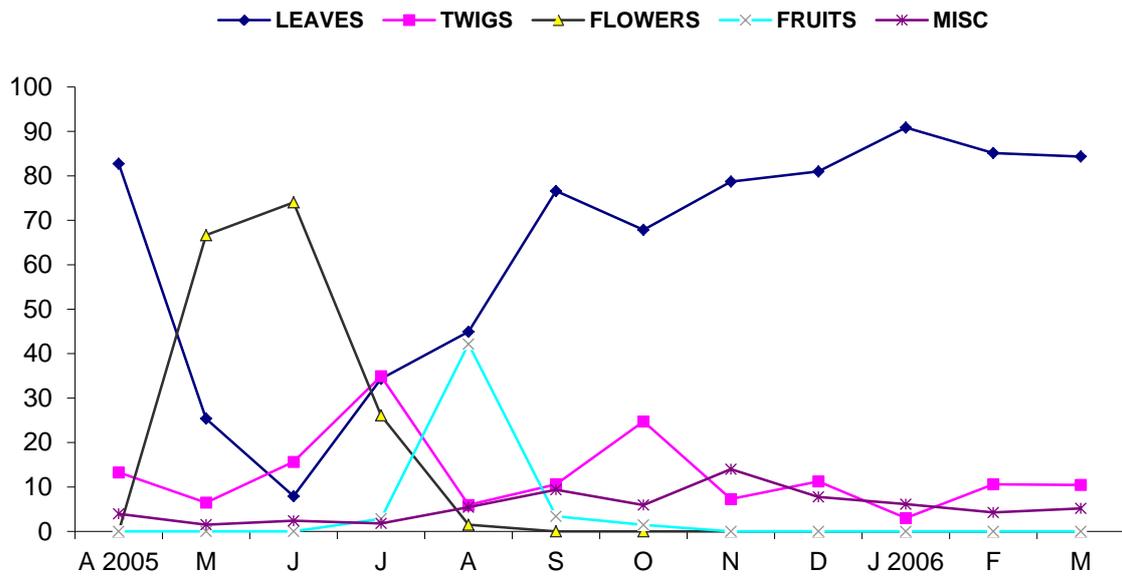
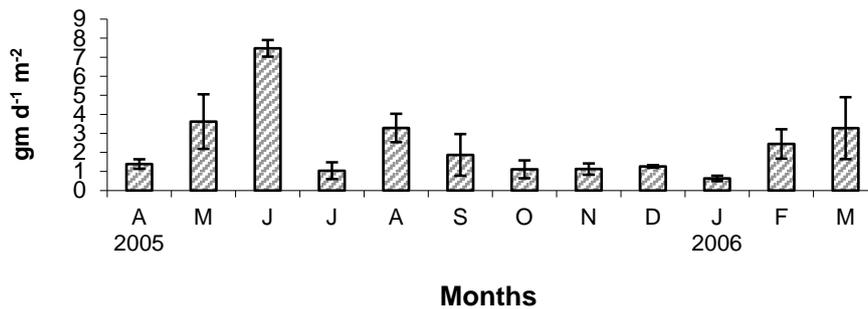


Fig 1. Changes in the contributions of various litter components to total litter Production throughout 2005-2006 in active Indus deltaic area, Pakistan.

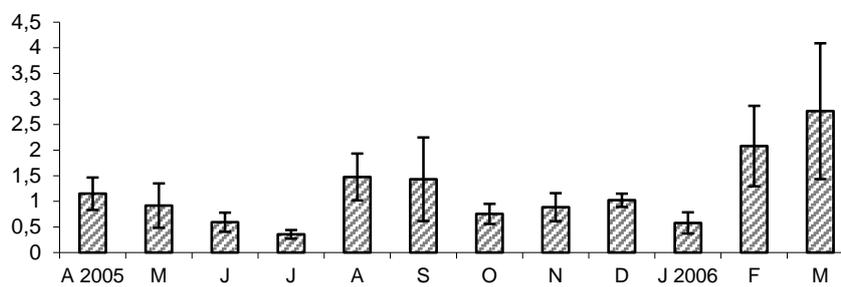
**Figures of litter production**

**Total Litter Fall**



Months

**Leaves Fall**



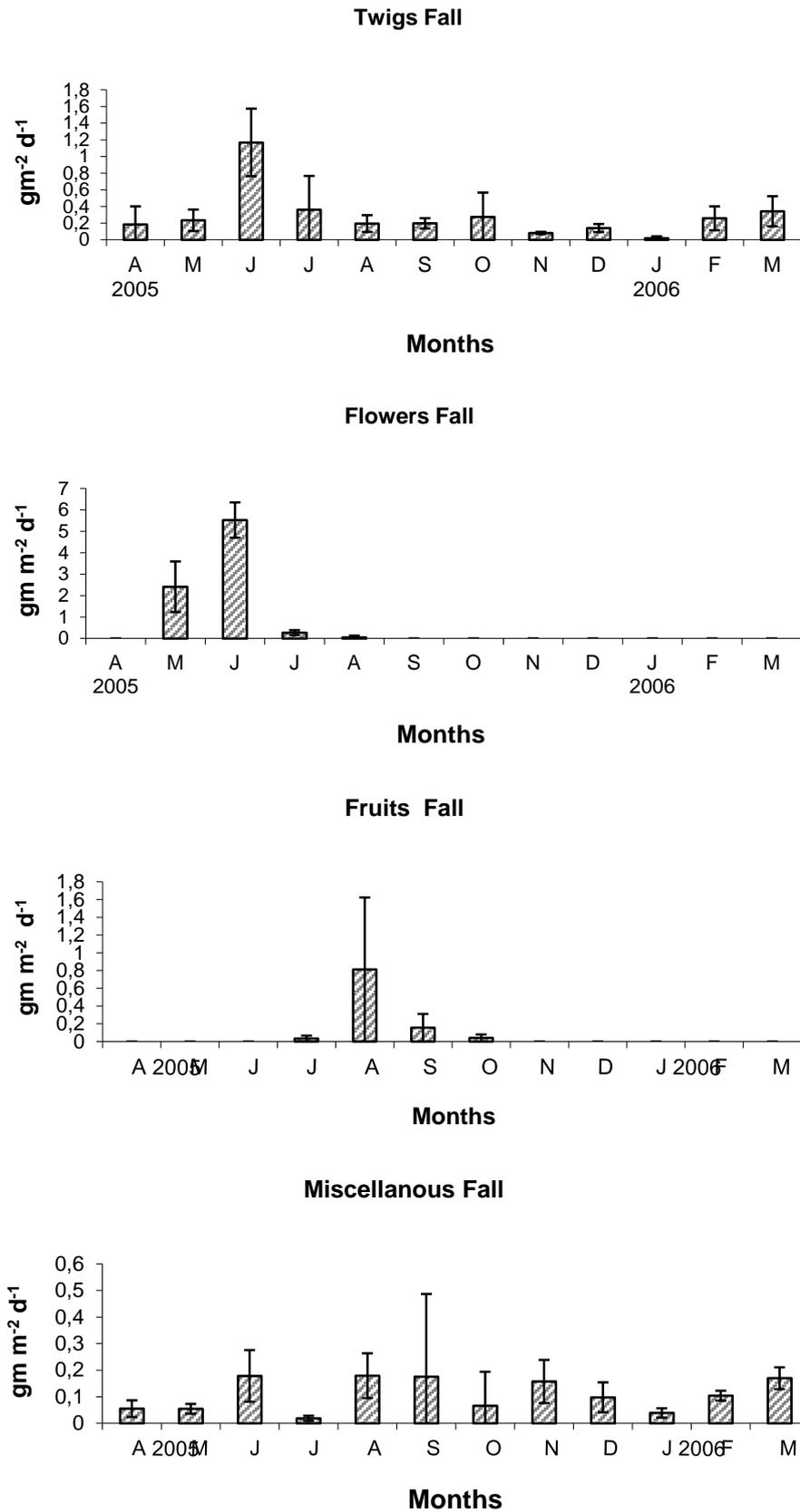


Fig 2 Monthly variation in the daily fall rate of various components of litter in the active Indus deltaic Area, Pakistan. (Values are mean (±SD)).

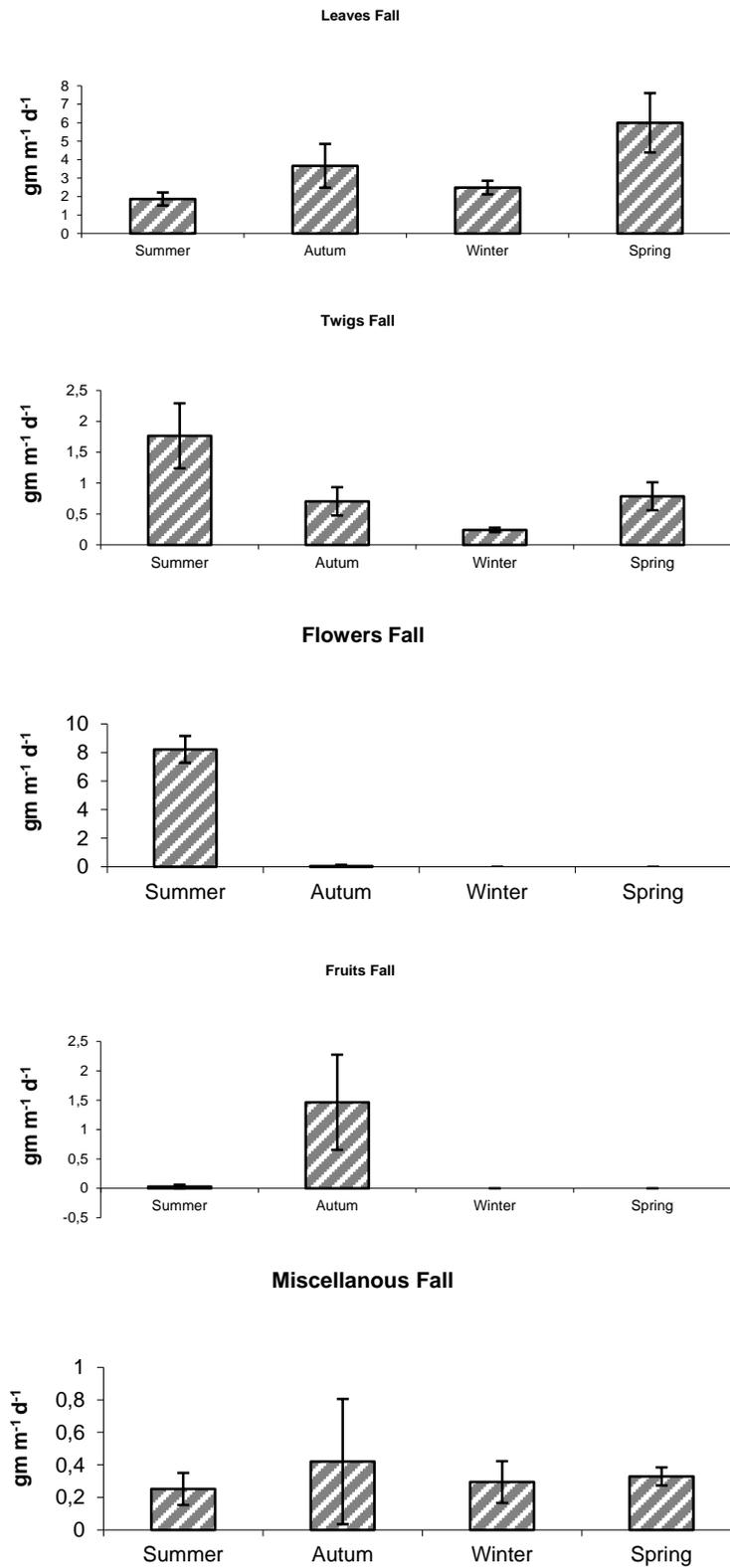


Fig 3. Seasonal variation of total litterfall and its different components.

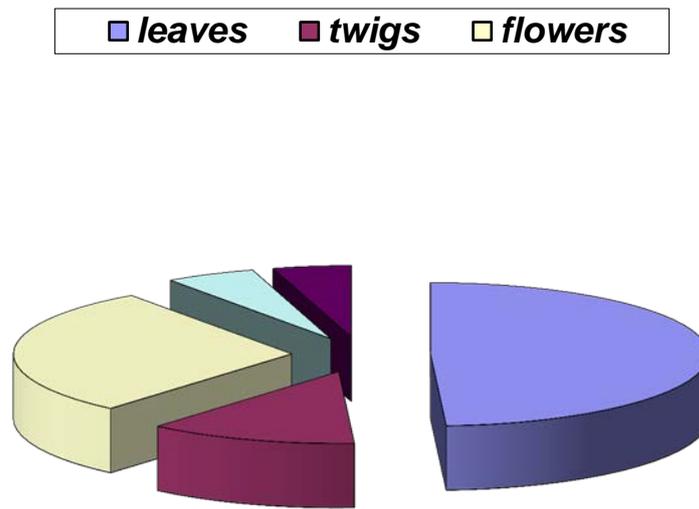


Fig 5. Pie chart representing percentage compositions of different components of litter for 2005-2006, studied in Keti-Bunder area at active Indus delta, Pakistan

Year

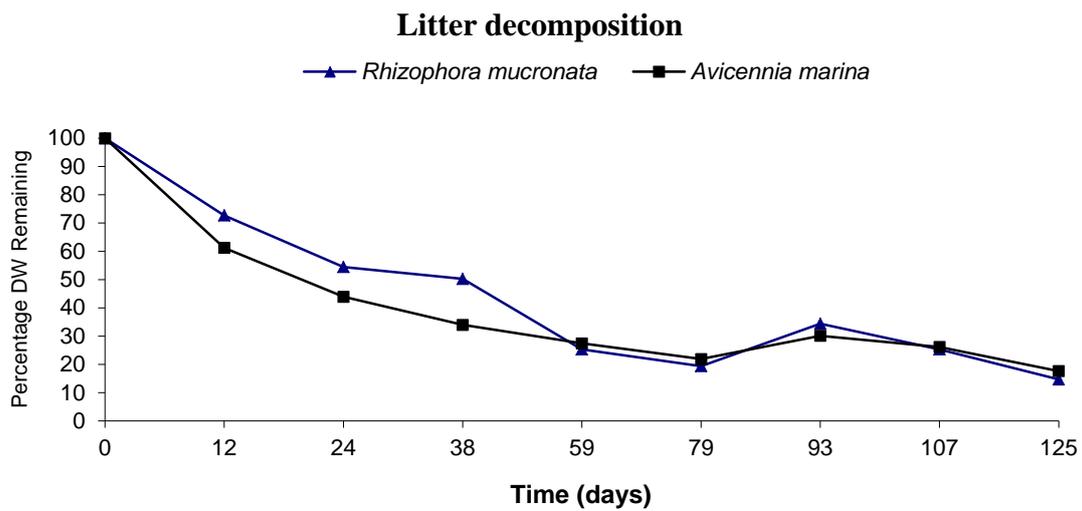
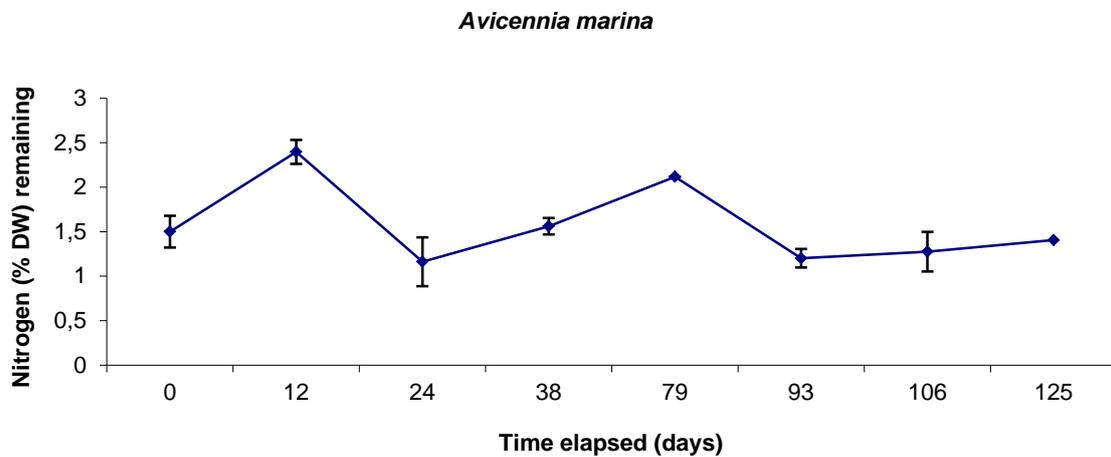


Fig 5. Comparative percent rate of decomposition of *A. marina* and *R. mucronata* leaves.



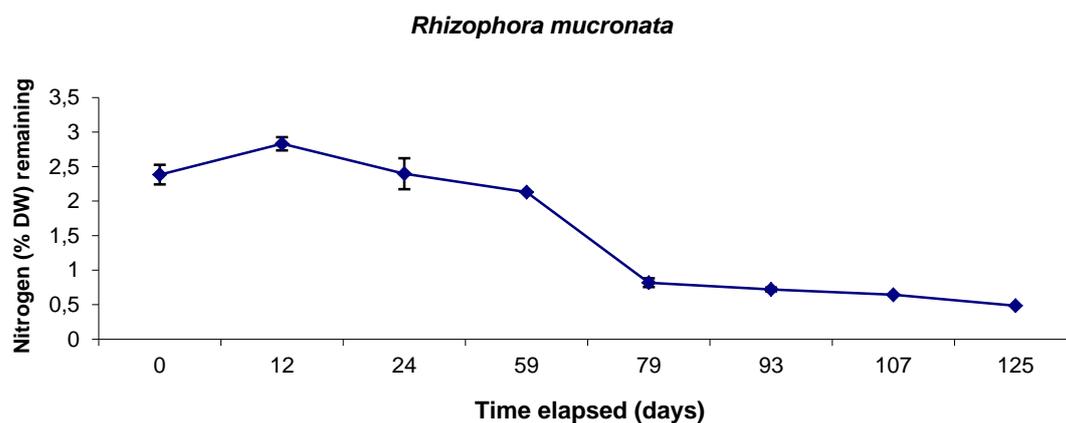


Figure 6. Total nitrogen (%DW) remaining in the residual leaf in the bags, during the process of decomposition

### Tables

Table I. Simple Negative exponential regression equations ( $Y=ae^{-kx}$  or  $Y=\ln+Kx$ ) on % of the litter mass and its nitrogen remaining in the litter bags (Y) against time (X) during decomposition of *A. marina* (Am) and *R. mucronata* (Rm)

Parameters	Plant species	Regression Equation	k (d <sup>-1</sup> )	t <sub>1/2</sub> (d)
%AFDW remaining	<i>Am</i>	$\ln Y=4.605-0.013988X$	0.014	49.55
	<i>Rm</i>	$\ln Y=4.605-0.0156X$	0.016	44.43
%N remaining	<i>Am</i>	$\ln Y=4.605-0.00629X$	0.006	110.2
	<i>Rm</i>	$\ln Y=4.605-0.0025X$	0.003	81.55

## WHITE-TAILED EAGLE (AVES: ACCIPITERIFORMES) STATUS IN REPUBLIC OF MOLDOVA

*Vitalie Ajder, PhD student*

*Igor Roșca, PhD student*

Laboratory of Natural and Anthropical Ecosystems,  
Institute of Ecology and Geography of the Academy of Sciences of the Republic of Moldova  
Academy of Economic Studies of Moldova

*Lucian Eugen Bolboacă, PhD*

*Laurențiu Petrencu, Msc*

*Emanuel Ștefan Baltag, PhD*

Faculty of Biology, Alexandru Ioan Cuza” University of Iasi,  
Romania, Grupul Sistemis, Romania

---

### Abstract

White-tailed Eagle (*Haliaeetus albicilla*) is the biggest bird of prey from the Republic of Moldova which recorded a drastic decline until the 19<sup>th</sup> century. In 2001 it was mentioned only as probable breeding species in the 2nd edition of the Red Book of the Republic of Moldova. The threats of this species are unknown for our research area and the studies on White-tailed Eagle are more than 30years old. During 2012 - 2013 we have conducted a survey programme for the White-tailed Eagle in Western Republic of Moldova to search for breeding evidence or to identify suitable habitats. During our surveys we have discovered 4 breeding pairs in the riparian forests from the Prut River. All nests were recorded on poplar (*Populus sp.*) in areas with fish farms or big lakes. Three of them had two fledglings in 2013, which implies a good feeding area. In April 2013 we have recorded an adult bird with a territorial behaviour, near the Dniester River, but we couldn't find the nest.

This is the first White-tailed Eagle survey after 1981 from the Republic of Moldova. In the next years we plan to cover the entire territory of the country in order to record all the breeding pairs of this species or to identify the suitable habitats.

White-tailed Eagle is a protected species for the Republic of Moldova being listed in Annex 3 of law 439/1995 (Republic of Moldova) as endangered.

---

**Keywords:** White-tailed Eagle (*Haliaeetus albicilla*), Republic of Moldova, ecology, breeding, distribution

### Introduction

The White-tailed Eagle (*Haliaeetus albicilla*) is one of the largest birds of prey from the Republic of Moldova and also from Europe. A drastic decrease of the world population lasted until the second half of the 20<sup>th</sup> century (Tucker and Heath 1994). In the last decades the population started to increase in some parts of its range mostly due to the abandonment of pesticides and the legal protection in most European countries (Helander and Stjernberg 2002). The population of the Danube River basin, where the Republic of Moldova population is situated, is increasing (Schneider - Jacoby et al. 2003). Now it is evaluated by IUCN as Least Concern (BirdLife International 2013), but it is protected by the Bird Directive (2009.147.EC) being listed in Annex I, by the Bern Convention being listed in Annex II - strictly protected species and by the Convention on Migratory Species.

In the Republic of Moldova the population started to decrease in the second half of the

20<sup>th</sup> century, mainly due to the increase of localities size and number, industry development, wetland drainage and to the large scale usage of the DDT (Averin, ed. Vol. I 1970). The last identified nest was in 1971 and since then there has been no data regarding the breeding pairs (Averin 1971, Uspenskii 1981, Red Book of the Republic of Moldova 2001, Munteanu 2010).

The characteristic breeding habitat of the White-tailed Eagle differs considerably along the species range. In Romania, the nests are built mainly in the crowns of tall, strong, mature trees which are close to wetland areas. The White-tailed Eagle can also breed on cliffs (Hauff 2001) but this is mainly specific for those which breed near big water bodies. In Croatia, more than 95% of the population breeds at altitudes lower than 140 m above sea level and are further than one km away from the nearest human settlement, regardless of the availability of forests (Radović and Mikuska 2008). On the other hand, in some areas in Poland some pairs show a decreasing degree of vulnerability to human influence, one pair nesting only some 400 m away from village buildings (Mizera & Szymkiewicz, 1991). For the Moldavian population which was recorded in the past, there is no data regarding the breeding habitat characteristics, except one nest from the south-eastern part of the country. This nest was occupied for 10 years, being located near the Dniester River, in a floodplain forest (Gania 1965). There is no available data regarding the anthropic pressure, but this threat was identified in other countries, like Croatia (Radović and Mikuska 2008) or north-western Tartumaa (Löhmus 2001). But the disturbance distance varies according to age and individual tolerance (Radović and Mikuska 2008).

The White-tailed Eagle is a poorly studied species for the Republic of Moldova especially in the last 40 years. The aim of this study is to assess the distribution of the White-tailed Eagle in the Republic of Moldova and to analyse the population status, breeding habitat selectivity and threats.

## **Main Text**

### **Material and methods**

The study area consists of the Republic of Moldova territory which is situated between the Prut and Dniester Rivers (33 843,5 km<sup>2</sup>). The landscape is highly fragmented, represented by hilly areas and relatively low plains, with a general north - west to south - east slope. The highest levels are in north - west and central part of the country - 300 - 400 m asl., while in the southern part, the altitudes range is between 100 -200 m asl.

Regarding habitats, the area is characterised mainly by highly fragmented agricultural fields, hilly deciduous forests, grassland and floodplain forests. The floodplain forests flanking the Prut and Dniester Rivers have medium age as well as old-growth trees.

During November 2012 - August 2013 we have conducted a counting programme in order to identify the breeding pairs of the White-tailed Eagle or characteristic habitats for this species. In order to be more efficient, we identified the forest areas adjacent to the Prut and Dniester Rivers using satellite imaging data correlated with field observation. Following this, in the months of November 2012 - February 2013 we have selected 6 squares of 2 km<sup>2</sup> each in forests along the Prut River and 4 squares of 2 km<sup>2</sup> each in Dniester River forests where we conducted transects in order to identify the nests of the White-tailed Eagle. The lack of foliage in the trees during the winter season offered the best conditions for spotting the nests. We covered the entire surface of the selected squares during the winter months. To identify the square limits and to mark the location of potential nests, we used Garmin Oregon 450t and Garmin GPSMap 62 GPS devices. For visual observations we used Nikon Monarch DCF 10 x 42 and Olympus 10 x 42 EXWP binoculars. After we identified potential nests of the White-tailed Eagle, we checked them in the breeding period, in order to confirm the breeding target species. For this, we used fixed observation points method. We took advantage of a high level area that gave us a good view over the potential nest. Using a Carl Zeiss Victory Diascope 65 T FL Fieldscope, we monitored the activity over the nest site. This method was also used to

identify the White-tailed Eagle activity in other areas where no potential nest was previously identified. This is a non-invasive method and we chose it because we did not have any data on the influence of human disturbance on White-tailed Eagle.

For each nest we took the GPS position and the data during the breeding period was recorded in a GIS database in order to calculate the habitat structure around the nest, the distance between the occupied nests or to the nearest locality or lake/fish farm.

To detect possible differences between the land use structure around the nests, we used Friedman's repeated-measures analysis of variance ( $F_r$ ).

The GIS data was analysed in Quantum GIS, v.2.0.1. and the statistical calculation were conducted in R statistical software, v. 3.0.2.

## Results and discussions

For more than 40 years, in the Republic of Moldova, there were no surveys conducted for the White-tailed Eagle and the population of this country was unknown. In all this period it was assumed that the breeding population of the White-tailed Eagle could be represented by 3 pairs (Uspenskii 1981), but there were no data regarding the possible nests location.

During our surveys, we checked 10 squares of 2 X 2 km which were selected on the Republic of Moldova main rivers, Prut and Dniester. We found 4 breeding pairs on Prut River and one possible breeding pair on Dniester River (Figure 1). All the nests were built on poplar (*Populus* sp.) even if near the tree where the nets was placed were other tree species, as willow (*Salix* sp.) or oak (*Quercus robur*). The species is known to nest in strong mature trees such as pines (*Pinus* sp.), especially in northern regions like Poland (Mizera & Szymkiewicz, 1991), beech (*Fagus* sp.), oak (*Quercus* sp.). Closely to our region, in Serbia, 1/3 of nests are located in poplar trees (Hám and Tukanov 2014).

The first nest is located in the northern part of the Republic of Moldova, near Stâncă-Costești Lake. The land use structure is represented mainly by arable land, followed by wetlands and water surfaces, pasture and herbaceous vegetation and forests (Table 1).

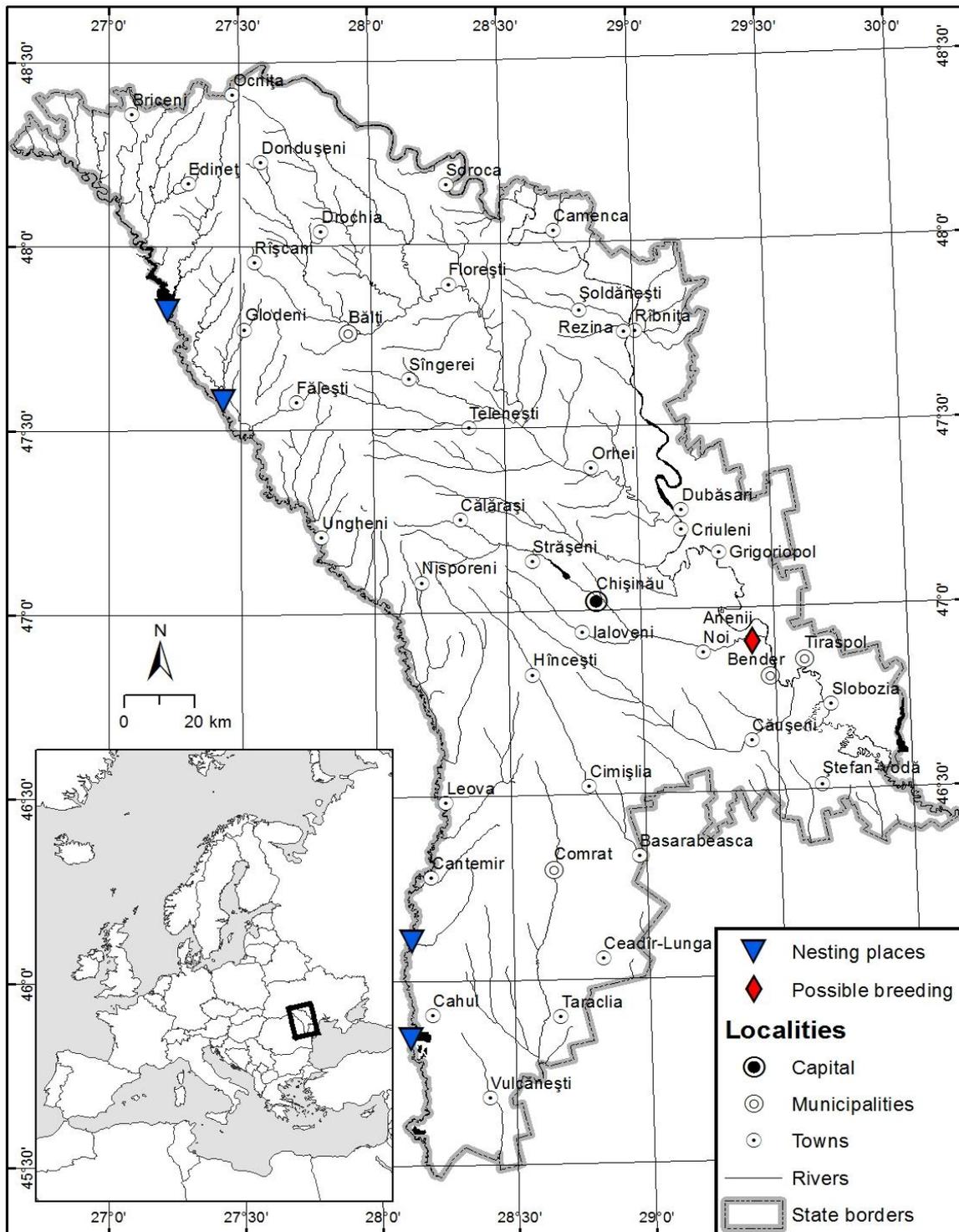
The second nest is located in a National Scientific Protected Area (Pădurea Domnească forest). This is the only nest which is in a protected area. The land use structure is represented mainly by forest, arable land and pasture and herbaceous vegetation (Table 1). For this nest, wetlands and water surfaces have a low representation of only 4.2 % and is represented mainly by oxbow lakes.

The third nest is located close to Cîrja - Mața - Rădeanu Romanian fish farms. The land use structure is represented mainly by arable land, wetlands and water surfaces, pasture and herbaceous vegetation and forest (Table 1).

The fourth nest is located near Manta fish farm and Manta Lake. The land use structure is represented mainly by arable land, wetlands and water surfaces, pasture and herbaceous vegetation and forest (Table 1).

Table 1. The land use composition near the White-tailed Eagle nest, with a buffer area of 5 km from the nest location. The values are in percentages.

land use name	Stâncă-Costești nest	Domnească Forest nest	Cîrja - Mața - Rădeanu nest	Manta nest
wetlands and water surfaces	17.15	4.20	17.80	28.32
localities and industrial areas	8.23	9.07	2.58	2.23
arable land	37.89	35.13	57.38	34.18
pasture and herbaceous vegetation	14.65	12.18	10.79	21.32
forests	13.72	37.12	7.77	9.94
fruit tree plantations	0.76	0.47	0.40	2.11
vineyards	0.94	1.50	3.29	1.89
other land use	6.67	0.32	0.00	0.00



surveys. Data was processed in Quantum GIS, v.2.0.1.

Figure 1. The distribution of the White-tailed Eagle in the Republic of Moldova recorded during the 2012 - 2013

Comparing the land use structure between the nests we cannot find a statistical significant difference ( $F_r = 0.80$ ,  $p = 0.85$ ). An optimal habitat for the White-tailed Eagle population should have a high percent of water surface (Krone et al. 2013), though nests can be found at a distance up to 10 km from the hunting territory (Glutz at al. 1971). For these nests, water is an important habitat but the surface is not the key element. Considering that

White-tailed Eagle inhabits river valleys, this land use structure is normal for our country and the lakes and fish farms are rich in fish stock.

All four nests are in the border protected area where access requires special permission, fact which keep the human disturbance at a very low level. This area is strictly monitored because it is the border with the European Union and the river banks are very sparsely populated because this is where the western border of the U.S.S.R. was.

The minimum distance between two nests was 29.4 km and the greatest distance was 172 km. This distance is quite large, but it could be explained by the habitat availability. Being a raptor with a large percent of its diet being represented by fish, the White-tailed Eagle will select those areas with water surfaces and especially with fish farms which are rich in fish stock.

Comparing the two main river valleys from the Republic of Moldova, there are big differences regarding the land use and human density (Table 2). Near the Dniester River there are larger surfaces with artificial habitats (76.49 %) than the Prut River (67.6 %). Also, the number of inhabitants is much higher near the Dniester River (767245, 2004) than Prut River (213800, 2004). Another important difference, is the access to forests and near the river, the Dniester being only a short distance away from the border with Ukraine. Because of this, the Dniester has a higher disturbance level, with many localities on the river bank. However, an adult bird was observed near Sălaş fish farm, close to the Dniester River. This individual behaved as a breeding one but we could not find the nest.

Table 2. The land use on Prut River valley and Dniester River valley with a buffer of 5 km from the river.

land use name	Prut River (%)	Dniester River (%)
wetlands and water surfaces	5.3	4.16
localities and industrial areas	9.96	13.12
arable land	51.30	54.94
pasture and herbaceous vegetation	14.55	7.20
forests	11.04	11.40
fruit tree plantations	1.71	5.23
vineyards	4.63	3.20
other land use	1.51	0.75

Four pairs of White-tailed Eagle for the Republic of Moldova is a small population but if we consider the absence of breeding evidence for more than 40 years, this data is highly important for the bird population. Also, the new breeding pairs of the White-tailed Eagle is an indicator for habitat recovering on the Prut River. The White-tailed Eagle population decreased in all the species range during the second half of the 20<sup>th</sup> century (Tucker and Heath 1994). In Romania, the neighbouring country, the White-tailed Eagle population decreased from 92 pairs in 1986 until 15 - 18 pairs in 2000 (Cramp and Simmons 1980). But in the last years the White-tailed Eagle population from Romania started to increase. In Ukraine the White-tailed Eagle breeding population started to increase after 1970 when there were only 20 -30 pairs (Brauner 1984) until 1991 when there were recorded 41 - 45 pairs and in 2009 were recorded 100 - 120 pairs (Akimov 2009).

For the next years we will select other 2 X 2 km squares to be investigated in order to have complete data on this species. Being a large bird of prey, its population status could represent a very important indicator for ecosystem stability and function.

## Conclusion

During 2012 - 2013 we investigated 10 squares of 2 x 2 km in order to identify the White-tailed Eagle breeding pairs or characteristic habitats. After this surveys 4 breeding pairs came up and another one which is recorded as possible breeding. This is the first data on species breeding after 40 years.

All 4 breeding pairs of the White-tailed Eagle are located near Prut River in the border protected area. There is no difference between the land use structures around the nests. The

nests are close to water bodies, habitats suited for its feeding habits.

Prut River is sparsely populated and the natural habitats from this area are protected by the border territory which require a special permission for access. This important factors may lead the nesting of White-tailed Eagle in the flood plain forests from this area.

### References:

- Averin, I. V., (ed.) 1970 Birds of Moldova Volume I, Chisinau, Știința (Аверин Ю.В., (Под редакції) Птицы Молдавии. Том I, Штиинца, Кишинев, 1970)
- Averin, I. V., (ed.) 1971 Birds of Moldova Volume II, Chișinău, Știința (Аверин Ю.В., (Под редакції) Птицы Молдавии. Том II, Штиинца, Кишинев, 1971)
- Акимов, І.А., (ed.) Red Book of Ukraine. Wildlife, (Червона книга України. Тваринний світ), Kiev Hlobalkonsaltnh, 2009.
- BirdLife International. *Haliaeetus albicilla*. In: IUCN 2013. IUCN Red List of Threatened Species. Version 2013.2. <[www.iucnredlist.org](http://www.iucnredlist.org)>. Downloaded on 21 January 2014, 2013.
- Brauner, A., A. Notes about birds from the Kherson province, Odessa, 1894 (Браунер, А. А. Заметки о птицах Херсонской губернии, Одесса, 1894)
- Cramp, S., and Simmons, K.E.L. The birds of the Western Palaearctic. London, U.K.: Oxford University Press, 1980.
- Glutz, von Blotzheim U. N. Bauer, K. M. and Bezzel, E., Handbuch der Vögel Mitteleuropas 4,
- Hám, I. and M. Tukanov Experiences in protection of nesting sites of White-tailed Eagle *Haliaeetus albicilla* in Pannonian part of Serbia:  
[http://www.danubeparks.org/files/528\\_WTEinPannonianSerbia\\_TucakovMHamI.pdf](http://www.danubeparks.org/files/528_WTEinPannonianSerbia_TucakovMHamI.pdf) ,  
Downloaded on 20 January 2014.
- Hauff, P., Horste und Horstbäume des Seeadlers *Haliaeetus albicilla* in Mecklenburg-Vorpommern. Ber. Vogelwarte Hiddensee 16: 159–169, 2001
- Helander, B., and M. Stjernberg, Action Plan for the Conservation of the White-tailed Sea Eagle (*Haliaeetus albicilla*). BirdLife International and Conseil de l'Europe, Strasbourg, 2002
- Gania, I. M. The ecological characteristics of birds of prey from Moldova in Ecological questions and practical necessities of Moldavian mammals and birds, Chisinau, 1965 (Эколого-фаунистическая характеристика дневных хищных птиц Молдавии. В сборнике Вопросы экологии и практического значения птиц и млекопитающих Молдавии, выпуск 2 Кишинев, 1965)
- Krone, O., M. Nadjafzadeh and A. Berger, White-tailed Sea Eagles (*Haliaeetus albicilla*) defend small home ranges in north-east Germany throughout the year, 2013.
- Löhmus A. Selection of foraging habitats by birds of prey in north-western Tartumaa. *Hirundo*
- Mizera, T., Szymkiewicz, M., Trends, status and management of the White-tailed Sea Eagle *Haliaeetus albicilla* in Poland, Birds of Prey Buletin No 4, 1991.
- Munteanu, A., (ed.) The Atlas of Breeding Birds from Republic of Moldova (Atlasul Pasařilor Clocitoare din Republica Moldova), Chisinau, 2010
- Schneider-Jacoby, M., A. Mohl and U. Schwarz, The white-tailed eagle in the Danube River Basin, pp. 133–140. In: Helander, B., M. Marquiss and W. Bowermann (eds), Sea Eagle 2000, Swedish Soc. For Nature Conservation/SSF and Atta, Stockholm, 2003
- The Red Book of the Republic of Moldova, ed. 2, Chișinău, Știința 2001, Cartea Roșie a Republicii Moldova. -ed. a 2-a. -Chișinău.: Știința, 2001
- Tucker, G.M. and Heath M.F., Birds in Europe: Their Conservation Status. BirdLife International, Birdlife Conservation series No. 3, Cambridge, U.K, 1994
- Radović, A., Mikuska, T. Population size, distribution and habitat selection of the white-tailed eagle *Haliaeetus albicilla* in the alluvial wetlands of Croatia, 2008
- Uspenskii, G. A. (ed.) Birds, Chișinău, Știința, 1981( Успенский Г. А. (Под редакції)

# **BIOTECHNOLOGY FOR ENERGY PRODUCTION: CONSTRUCTION OF A MICROBIAL FUEL CELL USING THE INDUS RIVER SEDIMENT SOIL AND WATER COUPLED WITH THEIR MICROBIAL FLORA**

*Muhammad Qasim Hayat PhD*

*Syeda Qudsia, MS*

Department of Plant Biotechnology, Atta-ur-Rahman School of Applied Biosciences (ASAB),  
National University of Sciences and Technology (NUST), H-12 Islamabad, Pakistan

---

## **Abstract**

Current study provides new openings for the sustainable generation of energy by using Microbial Fuel Cells (MFCs) biotechnology. We constructed a MFC using the Indus River sediment soil and water with their microbial flora without adding any additional chemical source of energy. In resulted MFC, voltage readings were observed and their significance is calculated statistically. Furthermore, based on present findings we have proposed a microbial fuel generator model for the Indus River in Pakistan, which can be executed any where in the world.

---

**Keywords:** Microbial Fuel Cells, MFCs, Indus River, Microbial flora, Energy generation

## **Introduction**

Energy has remained a priority area of research all the times in the world (Asif et al., 2007). At the movement, a range of energy sources are in use (Asif et al., 2007). However, a much focus is on renewable and sustainable energy solutions (Du et al., 2007; Lovley, 2006). In this regard, biotechnology has introduced MFCs as a candidate product for sustainable production of electricity (Potter, 1911; Lovley, 2006).

MFCs are bioelectrochemical systems that produce electricity from the catalysis of organic matter by the interplay of aerobic and anaerobic microbes (Logan, 2009). The decomposition of organic compounds leads to natural production of electrons that enter into the circuit via the anode (Potter, 1911). This transfer can happen in two ways: whether with the help of soluble chemical mediators or the electrons are directly deposited on the anode by bacterial biofilm. On other hand the protons, which are generated in the process, migrate to the cathode through the electrolyte and are reduced to form water (Bullen et al., 2006).

The first demonstrations of MFCs are credited to a professor of botany from University of Durham in 1911, who demonstrated the development of electric potential as a function of degradation of organic compounds by microbes in crude yeast cultures and cultures of *E. coli*. Potter also showed the production of 1.25 milli Amperes of current in a set up consisting of 6 cells connected in series, where copper plates were employed as electrodes (Potter, 1911). In early 1930's, Cohen reported the production of up to 35 Volts from MFC units connected in series (Bullen et al., 2006). The research in this field was resurrected in the 1970's, with researchers looking to improve the technology by studying different bacterial cultures and redox mediators (Tanaka et al. 1983; Delaney et al. 1984). In the light of these investigators findings it was observed that river sediments soils and water with their natural microbial flora are capable to host microbial electricity generators (Reimers et al., 2001), but little attention has been paid on the optimization and applicability.

MFCs may potentially be used to indefinitely power oceanographic instruments which can be deployed *in situ* (Reimers et al., 2001), in wastewater treatment (Yu et al., 2012) and as power source in off-grid locations (Ajayi and Weigele, 2012). The simplest design among all MFCs is a sedimentary soil and water (along with their microbial flora) MFC, the principle of which is to harness electrical energy from microbes present naturally in river soil sediments under water and in flowing river water. The power generated in such a design is dependent upon electrode design, size and metal type, sediment composition, water quality and its microbial flora (Bandyopadhyay et al., 2013; Sacco et al., 2012). The other factors may include seasonal variations in environmental variables (Nielsen et al., 2007).

Scientists have tried MFC model in oceans. In these cells the anode plate is placed below the sediments and the cathode is made to float in top of seawater (Reimers et al., 2001). 'Benthic' MFCs were developed and deployed at sediment-water interface on experimental basis and showed significant potentials for their use (Reimers et al., 2006). Reimers et al. (2006) reported one such case of two MFCs deployed at Monterey Canyon, California, for studying voltage and power production and analyzing enriched microbial communities around the anode. Later on Reimers et al., (2006) and Mohan et al. (2009) showed stagnant water bodies with algal mats at their surfaces as better sites for benthic MFCs. A number of sedimentary systems have also been prepared and evaluated (Ajayi and Weigele, 2012; Song et al., 2011). The aim of such finding is to keeping the cost minimum as it could be and to provide an electrical source in off-grid areas. Ajayi and Weigele (2012) experimented upon bio-batteries for off-grid areas using terracotta flower pots and carbon electrodes without using any catalyst. They further enriched the microbial flora by river sediments inoculums and concluded that using different soil inocula give different results, due to differences in the composition of the sediments. The same evidence was observed in research of Song et al. (2011).

In Pakistan the science and technology of MFCs is a virgin field. Scientific reports are scanty for the evaluation and characterization of the local river soil sediments and water along with microbial communities for their potential use in microbial fuel generators. There are many studies on MFCs constructions in abroad in which researcher have proved experimental evaluation of MFCs developed from soil sediments and waters with their microbial obtained from different lakes and rivers of the world (Zhao et al., 2012; Hong et al., 2009) and evaluation of bacterial communities that play a major role in such complex systems (Mocali et al., 2013; Pisciotta et al., 2012; Song et al., 2011). In this paper, an effort has been made to evaluate the Indus river sediments soil and water for its potential use in sustainable generation of electricity. The specific objectives of this paper were to: (a) Construction of a MFC using the Indus river sediment soil and water along with their microbial flora without the input of any catalyst or external energy source and (b) preparation of a microbial fuel generator model for the Indus River.

## Materials and methods

The Indus River soil (Weaver and Mickelson, 1994) and water (APHA, 1995) samples was obtained from Kund Park (District Attock) at the point where the River Kabul falls in the Indus River (Fig. 1). We constructed lab scale MFCs in a 250 mL glass bottles (Fig. 2 & 3). Each bottle was filled up to 5-6 cm with river soil. A carbon electrode (anode) was buried in the soil for the hosting of anaerobic biofilm on its surface. For current flow an insulated copper wire was connected with this electrode. The rest of bottle is filled with river water. In the same way the second carbon electrode (cathode) was suspended in water for hosting of aerobic biofilm. During investigation, the whole apparatus was kept in room temperature and conditions. Voltages on anode and cathode terminals were recorded manually with Multi-Tester (Model: Samwa YX-360, China) on daily basis for 40 days. We performed our

experiment in triplicate. For voltage parameter variations standard deviation and average was calculated. Resultant data was presented graphically.

## Results

All MFCs constructed during this study shown significant amount of voltage in their outputs. The time and average voltage relationships are shown in Fig. 4. During triplicate experiments the measurement of average voltage ranged between 0.4 V to 0.6 V and standard deviations vary along 0.07 to 0.14.

## Discussion

MFCs are attractive sustainable energy generation sources because they are environment friendly, with zero-carbon emission (Lovley, 2006) and can be applicable to small and large scale processes (Bullen et al., 2006). Current study was focused on demonstrating the phenomenon potential in the Indus River sediment soil and water coupled with their microbial activity. All the MFCs which are constructed during this study showed the significant amount of electricity generation. During replication experiments we obtain very low value of standard deviation which increases our confidence on average voltage. Fig. 4 depicts that initially, from the day first, the voltage is very low but with the passage of time notable boost is observed. This explains the positive correlation exists between 'the biofilm formation for electricity generation on anode and cathode terminals' with the 'time'. During this 'time' the biofilm stabilizes itself on the surface of carbon electrodes. The development of a biofilm on the anode in a sedimentary MFC is considered vital for the steady current production and maintenance of voltage (Franks et al., 2010).

Different studies have been conducted on sedimentary MFCs on different levels. Song et al. showed in 2012 the performance of six sedimentary samples obtained from different sites within the Lake Taihu. The maximum voltage that one of the samples in the study gave was 0.58 volts (employing a 1000  $\Omega$  resistance in the external circuit) equating to 112 mW/m<sup>2</sup> power density. Further in his studies some samples failed to produce any substantial voltage at all (Song et al., 2012). Reimers et al., 2006, demonstrated voltage production in deep-ocean cold seep at Monterey Bay, California in two benthic Microbial Fuel Cells, which were observed for their effects for a period of 125 days. They also conducted two lab scale experiments. a) The cathode of the deployed benthic MFC gave a maximum potential of 0.384 volts (against Ag/AgCl reference electrode) and the anodic potential dropped to 0.427 volts against the same reference. a) The lab scale set-ups gave 0.65 volts and 0.3 volts.

In our experiments, all MFCs gave voltages, the observed peak values being ranged between 0.4 and 0.6 volts. These voltage values were found to evolve over time till the stabilization of biofilm (Fig. 4). The voltage readings increased noticeably around 14 day of experimentation and were found to stabilize after 25 days of operation. Our developed MFCs are environment friendly as no catalyst or additive was used for controlling any of the biochemical reactions which are happening within the cells. Based on our lab findings, we have proposed a Microbial Fuel Generator model for the Indus River (Fig. 5). It depicts the feasibility of such a system at large scale. But before moving to this large scale mega investment, there are few new question which need to be addressed in advance. What kinds of materials are best for electrode manufacturing for hosting of biofilm for a particular river or lake for maximum production of electricity? Environmental factors which influence the production of electricity required to be identified. The pressure of seasonal variations along with climate change should be investigated. Similarly, the microbial diversity across the biofilm can be another aspect of the study.

## Acknowledgement

Authors are thankful to NUST Research Directorate for their financial support and ASAB for services.

## Conclusion

From above discussion it is concluded that the MFC biotechnology is an emerging field for sustainable energy production. The Indus River natural microbial flora is capable of biotechnological production of electricity. There is immediate need of the time that more research and data should be generated by scientists for the practical execution of the project.

## References:

- Ajayi and Weigele. A terracotta bio-battery. *Bioresource Technology*, 2012.
- APHA . Standard methods for water and waste water examination (19<sup>th</sup> Ed.). American Public Health Association, Washington DC, USA.
- Asif and Muneer. Energy supply, its demand and security issues for developed and emerging economics. *Renewable & Sustainable Energy Reviews*, 2007.
- Bandyopadhyay, Thivierge, McNeilly and Fredette. An electronic circuit for trickle charge harvesting from littoral Microbial Fuel Cells. *IEEE Journal of Oceanic Engineering*, 2013.
- Bullen, Arnot, Lakeman and Walsh. Biofuel cells and their development. *Biosensors and Bioelectronics*, 2006.
- Delaney, Bennetto, Mason, Roller, Stirling and Thurston. Electron-Transfer coupling in Microbial Fuel-Cells .2. performance of Fuel-Cells containing selected microorganism-mediator-substrate combinations. *Journal of Chemical Technology and Biotechnology*, 1984.
- Du.Z, Li.H and Gu.T. A state of the art review on Microbial Fuel Cells: A promising technology for wastewater treatment and bioenergy. *Advance Biotechnology*, 2007.
- Franks, Malvankar and Nevin. Bacterial biofilms: The powerhouse of a Microbial Fuel Cell. *Biofuels*, 2010.
- Hong, Chang, Choi and Chung. Experimental evaluation of influential factors for electricity harvesting from sediment using Microbial Fuel Cell. *Bioresource Technology*, 2009.
- Logan. Exoelectrogenic bacteria that power Microbial Fuel Cells. *Nature Reviews. Microbiology*, 2009.
- Lovley. *Microbial Fuel Cells: Novel microbial physiologies and engineering approaches. Current Opinion in Biotechnology*, 2006.
- Mocali, Galeffi, Perrin, Florio, Migliore, Canganella, Bianconi, Di Mattia, Dell'Abate, Fani and Benedett. Alteration of bacterial communities and organic matter in microbial fuel cells (MFCs) supplied with soil and organic fertilizer. *Applied Microbiology and Biotechnology*, 2013.
- Mohan, Srikanth, Raghuvulu, Mohanakrishna, Kumar and Sarma. Evaluation of the potential of various aquatic eco-systems in harnessing bioelectricity through Benthic Fuel Cell: Effect of electrode assembly and water characteristics. *Bioresource Technology*, 2009.
- Nielsen, Reimers and Stecher. Enhanced power from chambered benthic microbial fuel cells. *Environmental Science & Technology*, 2007.
- Pisciotta, Zaybak, Call, Nam and Logan. Enrichment of Microbial Electrolysis Cell biocathodes from sediment Microbial Fuel Cell bioanodes. *Applied and Environmental Microbiology*, 2012.
- Potter. Electrical effects accompanying the decomposition of organic compounds. *Proceedings of the Royal Society of London Series B, Containing Papers of a Biological Character*, 1911.
- Reimers, Tender, Fertig and Wang. Harvesting energy from the marine sediment-water interface. *Environmental Science and Technology*, 2001.

- Reimers, Girguis, Stecher, Tender, Ryckelynck and Whaling. Microbial Fuel Cell energy from an ocean cold seep. *Geobiology*, 2006.
- Sacco, Figuerola, Pataccini, Celina, Erijman and Corton. Performance of planar and cylindrical carbon electrodes at sedimentary microbial fuel cells. *Bioresource Technology*, 2012.
- Song, Tan, Wu and Zhou. Effect of graphite felt and activated carbon fiber felt on performance of freshwater sediment microbial fuel cell. *Journal of Chemical Technology and Biotechnology*, 2012.
- Tanaka, Vega and Tamamushi. Thionine and Ferric Chelate Compounds as Coupled Mediators in Microbial Fuel-Cells. *Bioelectrochemistry and Bioenergetics*, 1983.
- Weaver and Mickelson. *Methods of soil analysis: Microbiological and biochemical properties*. Soil Science Society of America, 1994.
- Yu, Seon, Park, Cho and Lee. Electricity Generation and Microbial Community in a Submerged-Exchangeable Microbial Fuel Cell System for Low-Strength Domestic Wastewater Treatment. *Bioresource Technology*, 2012.
- Zhao, Li, Ren, Wang and Jian. Electricity generation from Taihu Lake cyanobacteria by sediment microbial fuel cells. *Journal of Chemical Technology and Biotechnology*, 2012.

Fig. 1. The Indus River sediment soil and water sampling site (Red dot).



Fig. 2. Lab scale MFC Construction



Fig. 3. Working scheme of lab scale MFC

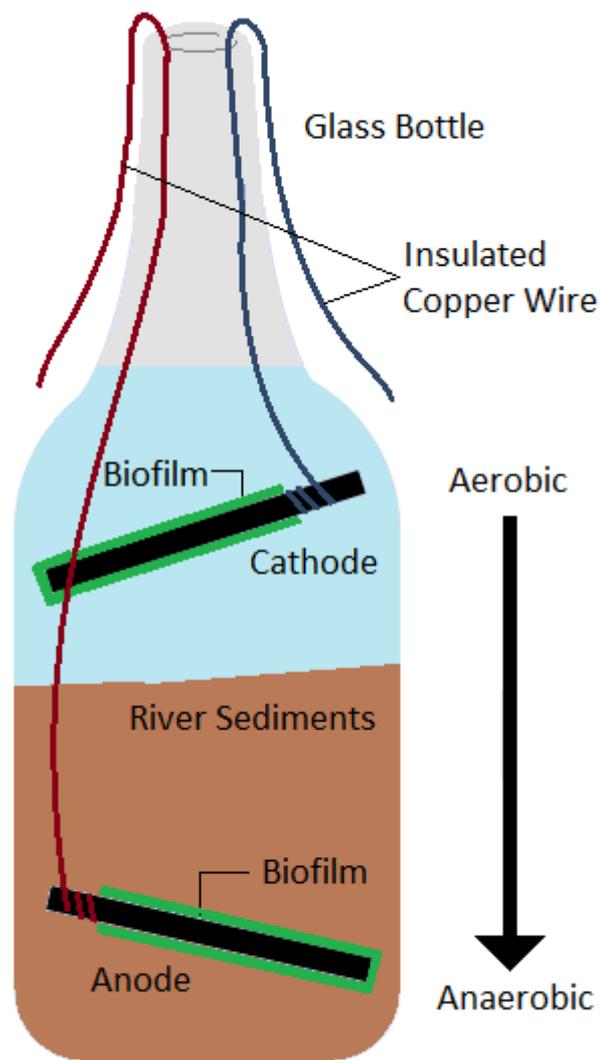
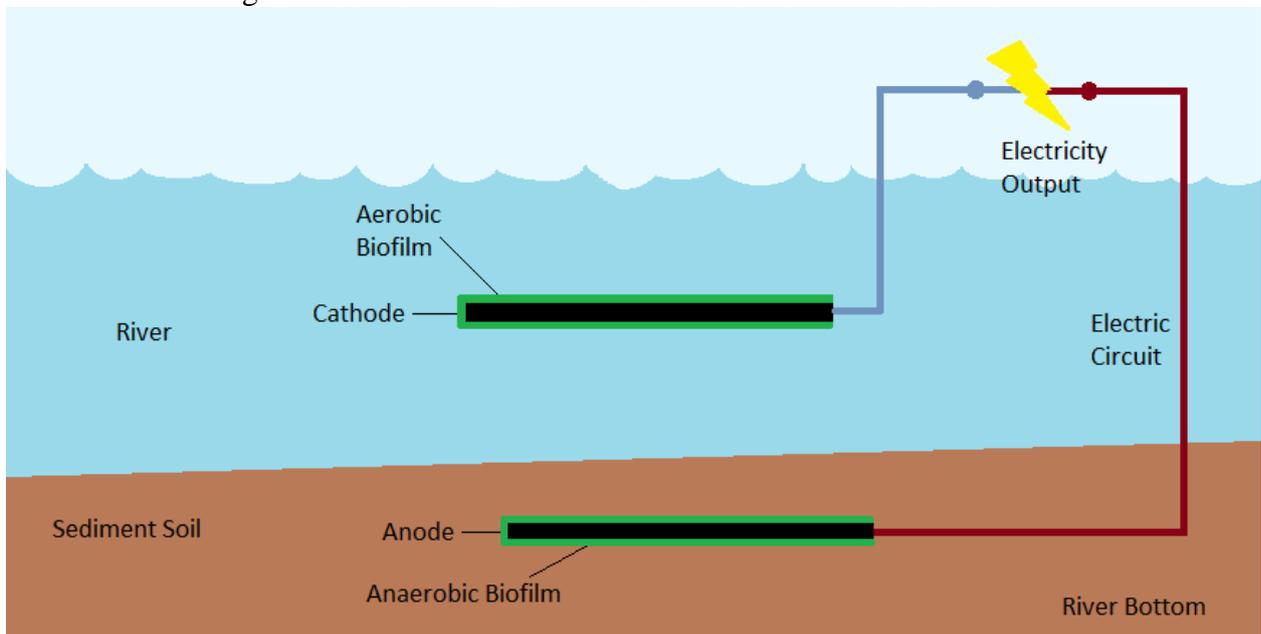


Fig. 4. Electricity generation in MFCs during experimental period



Fig. 5. Model of Microbial Fuel Generator for the Indus River



# THE PH DEPENDENCE OF NATURAL ORGANIC MATTER SORPTION TO NANOPARTICLES AND ITS ABILITY TO STABILIZE NANOPARTICLES IN AQUEOUS SOLUTIONS

*Phenny Mwaanga Dr.*

Department of Environmental Engineering, The Copperbelt University, Kitwe, Zambia

*Elizabeth R. Carraway Dr.*

*Mark A. Schlautman Dr.*

Clemson Institute of Environmental Toxicology, Pendleton, Clemson University,  
SC USA, Department of Environmental Engineering and Earth Sciences,  
Anderson, Clemson University, SC USA

---

## Abstract

Several studies have demonstrated that natural organic matter (NOM) can reduce toxicity of most toxic chemicals through sorption /complexation processes. In the area of nanoecotoxicology, this has also been demonstrated. The sorption of NOM on to the nanoparticles (NPs) has further been lauded for particle stabilization and hence lessening the effect of particle aggregation. Comprehensive understanding of NOM – NPs interaction can help improve our predictive capability of fate and transport of nanomaterials in the aquatic environment. In this study, the particle stabilization of NOM on both sonicated and non-sonicated TiO<sub>2</sub>NPs at different pH values was examined. The study further examined the sorption of NOM to TiO<sub>2</sub>NPs at the same pH values. The unadsorbed NOM was separated from the sorbed by both ultracentrifugation and 50 nm polycarbonate membrane filters (the results of both methods agreed to within 3%). The dynamic light scattering (DLS) technique was used to characterize the aggregates. The PALS Zeta potential analyzer was used to estimate surface charge. The total organic carbon was measured by the Total Organic Carbon Analyzer- Shimadzu (TOC-VCPH). The results indicated that the NPs stabilization by NOM was pH dependent and was more pronounced at higher pH, but lowest at pH values close to the point of zero charge (PZC) for the TiO<sub>2</sub>NPs. The ability of NOM to stabilize non-sonicated NPs was found to be mild. As expected, the sorption results showed that the least amount of NOM was sorbed at higher pH, despite the observation that the highest stabilization occurred at higher pH.

---

**Keywords:** NOM, TiO<sub>2</sub> nanoparticles, stabilization, sorption

## Introduction

Humic substances are a series of relatively high molecular substances that are ubiquitous in the environment (Koopal et al. 2005; Wang et al. 2010). The interaction of humic substances through sorption can affect fate and transport of various chemicals in the environment (Chen et al., 2003) including that of nanoparticles (NPs). Several studies have in fact shown that humic substances can form surface coatings or sorb to NPs surfaces in aqueous solutions (Amal et al., 1991; Baalousha et al., 2008; Yang et al., 2009; Keller et al., 2010). Such surface coating of NPs or particle encapsulation by NOM presumably affect aggregation behavior, resulting in reduced aggregation through a number of mechanisms such as anion exchange (electrostatic interaction), ligand exchange, hydrophobic interaction, entropic effect, hydrogen bonding, and cation bridging (Baalousha et al., 2008; Yang et al., 2009). However, other studies have also shown that any concentration of NOM in aqueous

solution at or below the critical coagulation concentration (CCC) can enhance aggregation, presumably through charge neutralization and bridging mechanisms (Stumm and Morgan, 1981; Illes and Tombacz 2006; Keller et al., 2010). This interaction of NOM with NPs has interesting toxicological implications as it can influence particularly the chemistry (fate, transport and bioavailability) and physics (optical properties) of nanoparticles as both have influence on the NPs behavior and toxicity in aqueous environment (Stedmon et al., 2003). If the NOM-NPs interaction results in enhanced aggregation, sedimentation may occur (Scown et al., 2010; Keller et al., 2010). This would inevitably lead to reduced exposure and diminished effects on water column (pelagic) organisms, but potentially increasing adverse effects on the benthic organisms (Scown et al., 2010). However, when NOM-NPs interaction results in particle stability (Yang et al., 2009), there can be prolonged exposure of water column organisms and possibly increased transportation of the NPs over long distances (Baalousha et al., 2008; Scown et al., 2010). Whether this would result in increased negative effects or not, it may probably depend on the nature and strength of NOM-NPs complexation and on the environmental conditions (presence of adsorbates with higher adsorption affinity in guts of organisms).

The NOM is considered a flexible polyelectrolyte that has anionic functional groups with hydrophobic components (O'Melia, 1990). Structurally, its configuration can be affected by the pH and ionic strength of the aqueous solution in which it is dissolved (O'Melia, 1990; Stumm and Morgan, 1996). In fresh waters with moderate pH and relatively low ionic strength, its molecules assume extended shapes (structurally relaxation) as a result of intramolecular electrostatic repulsive interaction (O'Melia, 1990; Stumm and Morgan, 1996). However, in low pH environments the NOM molecules coil (aggregation), while in high pH environments, their molecules extends (relaxation) (Hudson et al., 2007), a situation likely to influence NOM-NPs interactions. When metal oxide NPs are introduced into the aqueous solution with dissolved NOM, surface ligand exchange (carboxylic or phenolic with surface hydroxyl groups) occurs augmented by hydrophobic interaction from hydrophobic components (Stumm and Morgan, 1996; Yang et al., 2009). This can result into the accumulation of negative charges on the surfaces of the metal oxide NPs causing electrostatic stabilization (Yang et al., 2009) and hence particle stability. However, if the NOM concentration is not high enough to cause complete charge reversal on the NP metal oxide surface, there would be particle aggregation (Stumm and Morgan, 1996; Illes and Tombacz, 2006). At low pH or high ionic strength where the NOM molecules are not well deprotonated, the interactions are mainly hydrophobic and the resultant particle stabilization could be due to steric effects. This means that the presence of macromolecular layer causes entropically unfavorable conditions at the close approach of particles (Stumm and Morgan, 1981; Illes and Tombacz, 2006). The of NOM-NPs interaction has been reported to be influenced by several environmental factors such as pH, ionic strength and divalent metal cations (McKnight et al., 2001; Chen et al., 2003; Swietlik and Sikorska, 2005). The high ionic strength conditions are presumed to cause charge screening and ultimately increase the hydrophobicity of the dissolved NOM in aqueous solutions (Chen et al., 2003).

Given the ubiquitous nature of dissolved NOM in aquatic systems on one hand and the increased release of NPs in aquatic systems on the other, it is critical to have comprehensive understanding of the NOM - NP interaction as this could help improve our predictive capability on the transport and fate of nanomaterials in the aquatic environment. In this study, the NOM-NPs interactions were investigated by examining the particle stability of NOM on both sonicated and non-sonicated TiO<sub>2</sub> NPs at different pH values and further the sorption of NOM to TiO<sub>2</sub> NPs at the same pH values was examined. The dynamic laser light scattering (DLS) technique was used to characterize the NPs stability (by measuring average aggregate sizes). The PALS Zeta potential analyzer was used to estimate surface charge. The separation of non-complexed/non-sorbed NOM from NOM sorbed to NPs was carried out using both

filtration and ultracentrifugation and the comparison of the two separation techniques was performed. The total organic carbon was measured by the Total Organic Carbon Analyzer-Shimadzu (TOC-VCPH).

## Materials and Methods

### Materials

Titanium dioxide NPs used in this study were P25 (< 50 nm) purchased from Degussa Corporation. The Suwannee River Humic Acid (SRHA), reverse osmosis isolate (NOM-ROI) was purchased from International Humic Substances Society (IHSS). The following buffers were used as purchased without further purification: 2-(4-morpholino) ethanesulfonic acid monohydrate (MES); piperazine-N, N'- bis (2-ethanesulfonic acid) (PIPES); sodium acetate (NaAc); Tris-base. The pH measurements were carried out using a ThermoOrion pH meter and Ross combination glass electrode. The Autotitrator 836 titrator connected with pH meter -  $\Omega$  metrohm was used for determining the point of zero charge (PZC) for TiO<sub>2</sub> NPs. The METTLER TOLEDO balance, Xs 205 dual range; max 81/220 g capable of measuring weight down to 0.01 mg was used to weigh NPs. Surface Analyzer micromeritics 2010, was used to determine surface area using BET technique. High purity water, milli-Q water with resistivity >18 M $\Omega$ .cm was used throughout the experimental work. The degree of particle aggregation and hence determining stability were measured by dynamic laser light scattering (DLS) technique using both the Coulter N4 Plus and Brookhaven Instrument Corporation (BIC). The zeta potential was measured by the Zeta PALS of the BIC. The amber colored 125 mL bottles with Teflon lined caps were used for sorption study (preliminary experiments showed no significant adsorption of NOM to these bottles). The separation of non-sorbed NOM and NOM sorbed to NPs was carried out using both the 50 nm pore size polycarbonate filters and the Ultra centrifuge SORVALL EVOLUTION RC S/N 10300582. The TOC analysis was measured by Carbon Analyzer - Shimadzu (TOC -VCPH).

### Methods

The NOM-NPs interactions at different pH values was carried out using TiO<sub>2</sub> NPs primarily because of its low dissolution over a wide range of pH. The first part involved determining the point of zero charge (PZC) for TiO<sub>2</sub> NPs. Then the ability of dissolved NOM to stabilize TiO<sub>2</sub> NPs at three different pH values was investigated. This was done at the PZC and two other pH values selected by taking two pH points below and above the PZC. This study was carried out using both sonicated and non-sonicated TiO<sub>2</sub> NPs at 5 mg/L particle loading and at three levels of dissolved NOM concentration (0.5, 2.5 and 5 mg C/L NOM). To maintain the pH at the specified values, buffer solutions were used. For the sorption study, the buffer solutions were not used because the analyte of interest, the total organic carbon is also contained in these buffers. The particle loading that was used in the sorption study was 300 mg/L.

### The Determination of the Point of Zero Charge for TiO<sub>2</sub> NPs

The suspension of TiO<sub>2</sub> NPs at 4.0 g/L was prepared in 0.01 M NaNO<sub>3</sub> solution as a background electrolyte and introduced into the titration vessel. The suspension was purged with argon gas with constant stirring to drive out all the carbon dioxide (CO<sub>2</sub>) gas. This was performed for about 45 to 50 minutes. The pH was then lowered to 3.85 using 0.1M HCl. Then the suspension was titrated with 0.1 M NaOH solution at 0.01 mL aliquot to a pH 10.5. The titration was done using two runs. During the first titration, subsequent addition of further aliquots of the titrant was continued only after the electrode stability reading was 0.5 mV/minute. In the second run, the titration was carried out slowly and the subsequent additions of the titrant was only done after the electrode stability reading was less 0.1 mV/minute.

## **Experimental Method for Particle Stability**

### **The Sonicated TiO<sub>2</sub> Nanoparticles**

The stock suspension of TiO<sub>2</sub> NPs at 100 mg/L in 0.01M solution of sodium nitrate (NaNO<sub>3</sub>) was prepared and sonicated for 60 minutes using the Branson® 5510 sonication bath. These metal oxides NPs suspensions were then stored at room temperature of 69-73 °F (20.55 – 22.77°C) under quiescent conditions in the dark. Prior to preparation of the test suspensions, the stock suspension was sonicated using the Branson® 5510 sonication bath for 10 minutes to homogenize the suspension and as well as to break any aggregates that may have formed. The test suspensions were prepared by pipetting appropriate volumes of the stock suspension of TiO<sub>2</sub> NPs and 50 mg C/L NOM stock solution into 400 mL beakers and then diluting to 100 mL with each buffer to give the following concentrations: 5 mg/L particle loading at 0.5, 2.5 and 5.0 mg C/L NOM. The following buffers in 0.01M NaNO<sub>3</sub> solution were used: 0.01M acetate, pH 4.50; 0.01M PIPES, pH 6.50; 0.01M Tris–base, pH 8.50. For each pH (buffer solution) there was a control suspension that comprised the matrix of each test suspensions except NOM. The purpose of the control suspensions was to check the influence of buffer solutions on particle stability or aggregation. Once prepared, the test suspensions were kept under quiescent conditions in the dark. The samples for the DLS and zeta potential measurements were taken every 24 h for 5 days (for 24, 48, 72, 96 and 120 h post preparation).

### **The Non-sonicated TiO<sub>2</sub> Nanoparticles**

The test suspensions were made by weighing 0.5 mg of TiO<sub>2</sub> NPs using a microbalance, the METTLER TOLEDO, Xs 205 dual range 81/220 g that can weigh masses down to 0.01 mg. The weighed TiO<sub>2</sub> NPs were each introduced into 20 mL of 0.01M NaNO<sub>3</sub> solution in a 400 mL beaker. Each resulting suspension was allowed to stand for 24 h at room temperature of 69-73 °F (20.55 – 22.77°C) under quiescent conditions in the dark. Then to each suspension was added an appropriate volume of 50 mg C/L NOM stock solution and then diluted to 100 mL with appropriate buffer solution to give the following: 5 mg/L particle loading at 0.5, 2.5 and 5.0 mg C/L NOM. The following buffers in 0.01M NaNO<sub>3</sub> solution were used: 0.01M acetate, pH 4.50; 0.01M PIPES, pH 6.50; 0.01M Tris–base, pH 8.50. For each pH (buffer solution) there was a control suspension that comprised the matrix of each test suspensions except NOM. The purpose of the control suspensions was to check the influence of buffer solutions on particle dispersion or aggregation. Once prepared, the test suspensions were kept at room temperature of 69-73°F (20.55 – 22.77°C) under quiescent conditions in the dark. The samples for the DLS and zeta potential measurements were taken every 24 h for 5 days (for 24, 48, 72, 96 and 120 h post preparation).

### **Experimental Method for NOM Sorption to TiO<sub>2</sub> NPs**

This study was carried out at a constant room temperature of 24 ±1°C (75.7 °F) in batch reactors (150 mL amber colored bottles). The study examined NOM sorption to TiO<sub>2</sub> NPs at 3 pH values of 4.50, 6.50 and 8.50 and at a constant ionic strength of 0.01M of NaNO<sub>3</sub> solution. A series of 7 sets of TiO<sub>2</sub> NPs of about 0.03 g each were weighed and each introduced into 20 mL of 0.01M NaNO<sub>3</sub> solution in a 400 mL beaker for each pH studied. Then each suspension was sonicated for 30 minutes and kept under quiescent conditions for overnight. Then appropriate volumes of NOM stock solution of 50 mg C/L (NOM dissolved in 0.01M NaNO<sub>3</sub>) were pipetted and introduced into the suspensions and diluted to 100 mL using 0.01M NaNO<sub>3</sub> solution to yield a range of concentrations from about 2 mg C/L (5 mg/L NOM) to 32 mg C/L (80 mg/L NOM). The pH of interest was achieved by additions of appropriate volumes of HCl or NaOH (< 100µL) with stirring with a magnetic bar. During addition of HCL or NaOH care was taken to avoid inclusion of CO<sub>2</sub> by covering the beakers with parafilm. Once the desired pH was achieved and remained constant for over 24 h, the

contents of each beaker were transferred into the 150 mL amber colored bottles and sealed with Teflon lined caps and were ready for tumbling.

For the determination of initial concentration of dissolved NOM in mg C/L, a parallel 7 sets of solutions were carefully prepared by pipetting appropriate volumes of NOM stock solution of 50 mg C/L dissolved in 0.01M NaNO<sub>3</sub> into 400 mL beakers and diluting to 100 mL to yield a range of concentrations from about 2 mg C/L (5 mg/L NOM) to 32 mg C/L (80 mg/L NOM) (same concentrations as the ones with NPs). The pH of interest was achieved by additions of appropriate volumes of HCL or NaOH solutions (< 100 $\mu$ L). Once the desired pH was achieved and was constant for over 24 h, a sample of 12 mL for each solution was taken for the measurement of total organic carbon. Then, the remainder of contents of each beaker were transferred into the 150 mL amber colored bottles and sealed with Teflon lined caps and were ready for tumbling. A blank solution for each pH was included which contained only 0.01M NaNO<sub>3</sub> solution. Then both the bottles containing TiO<sub>2</sub> NPs suspensions and the solutions were tumbled for 120 h (preliminary tests indicated that equilibrium is reached after 72 h). After tumbling, the pH of both the suspensions and the solutions were measured. Then the TiO<sub>2</sub> NPs suspensions of each sample (bottle) were divided into two portions, one portion was filtered through a 50 nm polycarbonate membrane filter and the other was centrifuged using Ultra centrifuge SORVALL EVOLUTION RC S/N 10300582 at 20500 rpm for 2 h and then both portions (filtrates and supernatants) were analyzed for the total organic carbon and the results were compared for agreement. Prior to the filtration of the samples, the 50 nm pore size polycarbonate filter membrane was thoroughly washed with Milli-Q water and then about 3 mL of the suspension was passed through the membrane to ensure that any possible sorbing surfaces were saturated. Once this was done, a well washed and dried vacuum flask was used for the filtration and collection of the filtrate.

The solution of each sample (samples without particles) was divided into 3 portions. The first portion was filtered just as described for the suspension. The second portion was centrifuged just as described above, while the third portion was used directly and all these portions were analyzed for total organic carbon and the results were compared for agreement.

## Statistics

The one way ANOVA with Tukey's pair wise comparisons of means from Origin Pro 8.6 software was used to identify the significant differences between means. The means (each calculated from three replicates) at each pH for three levels of NOM and the means (each calculated from three replicates) at each NOM at three levels of pH were examined for the significant difference using this software both stability and sorption studies.

## Results and discussion

### Point of Zero Charge for TiO<sub>2</sub>NPs

The results for the point of zero charge (PZC) for the TiO<sub>2</sub>NPs in this study was found as 6.50 (Figure 1). This value is consistent with the literature values that range from 4.20 to 7.5 (Fernandez-Nieves et al., 1998; Kosmulsiki, 2009). However, it is important to note that the PZC for the metal oxide NPs can vary widely depending on several factors such as chemical modification, surface modification, particle size and particle transformation (Hotze et al., 2010, Lin et al., 2010). In this study as indicated under the materials section, the P25 TiO<sub>2</sub> NPs of 50 nm particle size were used and this material (NPs) were manufactured about two years earlier before being used in this investigation. Therefore, a very specific value of PZC for these NPs was needed as an input in the next part of this study. The analysis as described under the methods section was carried out using two runs. The first run was quick and was meant to be a guide for the second run whose value was used for the next part of our study.

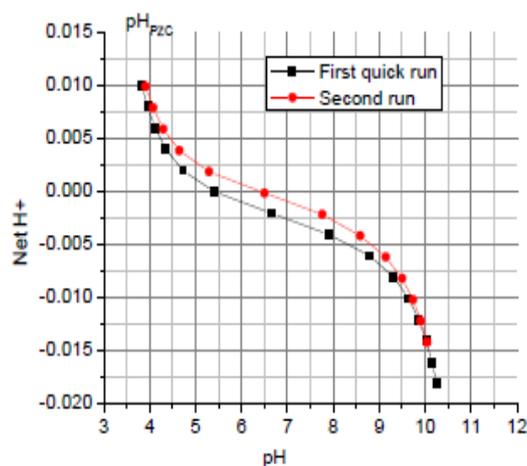


Figure 1: The pH of point of zero charge for TiO<sub>2</sub> nanoparticles

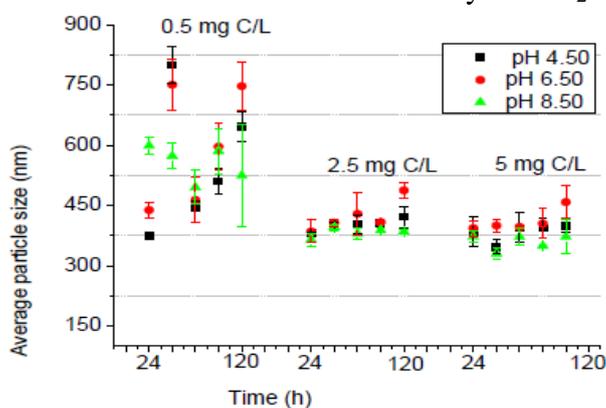
### NOM Stability of both sonicated and non-sonicated TiO<sub>2</sub> NPs at different pH values

Based on the PZC for TiO<sub>2</sub> NPs (found as 6.50), three pH values of 4.50, 6.50 and 8.50 were selected (as described under methods section) and used to investigate the ability of dissolved NOM to stabilize TiO<sub>2</sub> NPs at three levels of NOM (0.5, 2.5 and 5.0 mg C/L) for both sonicated and non-sonicated NPs. These results indicated that NOM indeed caused the stability of TiO<sub>2</sub>NPs as evidenced by the differences in the average aggregate sizes between the controls and those with NOM (Figures 2 to 5). For the controls, the average aggregate particle sizes were significantly larger than ( $p < 0.05$ ) those treated with NOM and their average aggregate sizes were outside the measuring range (2 nm to 3000 nm). The data also indicated that there were NOM concentration dependent differences in the average aggregate particle sizes. For example, for the sonicated TiO<sub>2</sub> NPs (Figures 2 and 4) at 0.5 mg C/L NOM, the average aggregate particle sizes were significantly larger ( $p < 0.05$ ) than the average aggregate particle sizes at 2.5mg C/L and 5.0 mg C/L NOM for all the three pH values. However, the differences in the average aggregate sizes at 2.5 mg C/L and 5.0 mg C/L NOM for all the pH values (except for pH 6.50 at 120 h at both 2.5 and 5.0 mg C/L NOM) were not significantly different ( $p > 0.05$ ). These results therefore seem to suggest that there is a maximum NOM concentration above which there could be no differences in the TiO<sub>2</sub> NPs stability. Furthermore, at the NOM concentration of 2.5 mg C/L and 5.0 mg C/L, the data suggest that there is pH dependence in the stability of the TiO<sub>2</sub> NPs, although the differences were not statistically significant ( $p > 0.05$ ).

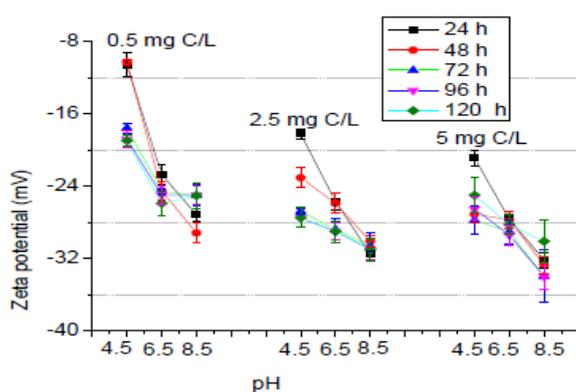
For the non-sonicated TiO<sub>2</sub> NPs, the results revealed an interesting and probably most environmentally relevant trend. For example, at 0.5 mg C/L NOM the average aggregate particle sizes (for non-sonicated) were outside the measuring range (2 nm to 300 nm), indicating that this concentration of NOM was unable to stabilize the TiO<sub>2</sub> NPs. However, at the NOM concentrations of 2.5 mg C/L and 5.0 mg C/L, the data showed that NPs stability was achieved and the average aggregate particle sizes for the two concentrations of NOM (Figures 3 and 5) were not statistically different ( $p > 0.05$ ). The comparison of the average aggregate particle sizes for the non-sonicated NPs and sonicated NPs showed that the average aggregate particle sizes for the non-sonicated TiO<sub>2</sub> NPs were much larger than the sonicated TiO<sub>2</sub> NPs. These results suggest that in the absence of sonication (like in actual environments), the ability of NOM to stabilize NPs is quite mild and would require large concentrations of NOM to stabilize the NPs. The values of the zeta potential (ZP) for both the sonicated and the non-sonicated TiO<sub>2</sub> NPs were, as expected observed to be getting more negative with increases in NOM and pH (Figures 2b, 3b,4b and 5b). The data also revealed higher variability in the ZP of the non-sonicated NPs than the sonicated NPs. The ZP of the controls (results not shown) was also getting more negative as the pH increased. However, it

was particularly interesting to observe that pH dependent ZP had small effect on suspension stability (based on the surface charge of controls), whereas NOM-pH dependent ZP had large effect on suspension stability. The NOM dependent increase in the stability of NPs suspensions could be attributed to NOM sorption to NPs and the higher the NOM concentration the greater the sorption and hence the greater the increase in the stability either by steric repulsion or electrostatic repulsion depending on the pH of the suspensions.

The highest increase in the NPs stability was observed at pH 8.50 (trend wise) for all NOM concentrations used and this could be attributed to the electrostatic repulsion of highly ionized NOM adsorbed on the NPs (Yang et al., 2009). The next higher NPs stability was observed at pH 4.50 (trend wise), where the NOM molecules were assumed not ionized in comparison to that at pH 8.50. The NOM-NPs interactions at the pH 4.50 were predominantly hydrophobic and therefore the stabilization was attributed to steric hindrance (Illes and Tombacz, 2006). The least stability was observed at pH 6.50 (the PZC). This was expected since the lowest stability of particles is always around the PZC (Stumm and Morgan, 1981; Illes and Tombacz, 2006). The observed higher variability in the zeta potential of the non-sonicated NPs could be attributed to the greater heterogeneity (non-uniformity) in surface site energies of the NPs (Amal et al., 1990), which could be expected to be higher in the non-sonicated NPs. The use of controls in this study demonstrated that the buffer solutions used in this investigation had no influence on the observed stability of TiO<sub>2</sub> NPs.

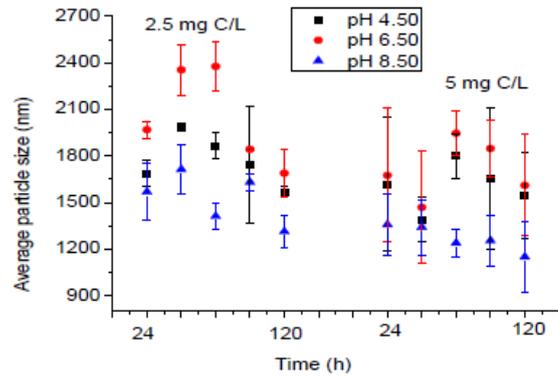


(a)

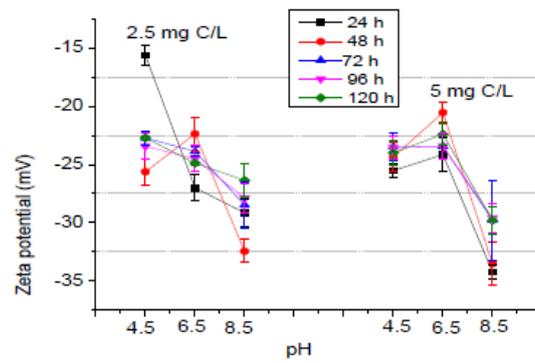


(b)

Figure 2: Effect of pH at constant NOM on particle dispersion (a) and the corresponding zeta potential (b) for sonicated TiO<sub>2</sub> NPs. The error bars indicate the standard deviation of the three replicates (n = 3)

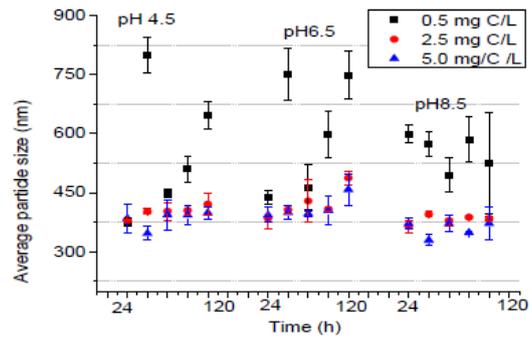


(a)

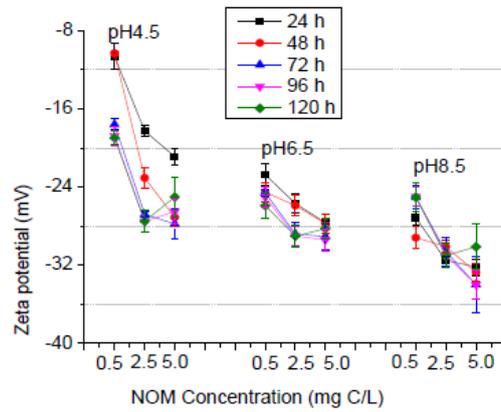


(b)

Figure 3: Effect of pH and NOM on particle dispersion (a) and the corresponding zeta potential (b) for non-sonicated TiO<sub>2</sub> NPs. The error bars indicate the standard deviation of the three replicates (n = 3)

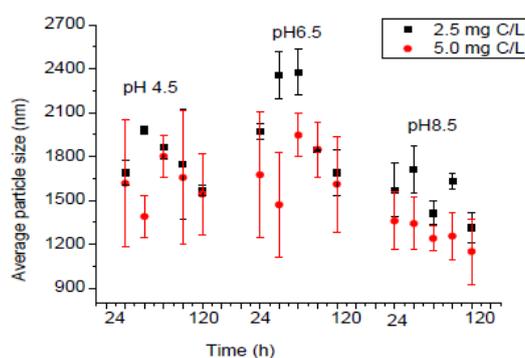


(a)

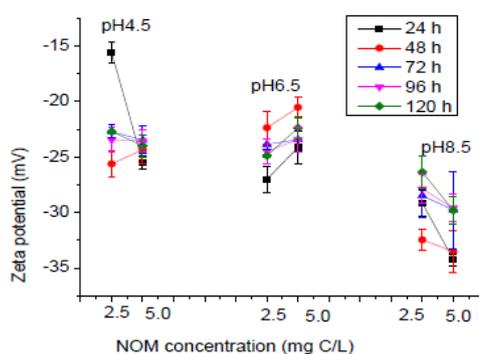


(b)

Figure 4: Effect of NOM at constant pH on particle dispersion (a) for sonicated  $\text{TiO}_2$  NPs (b) and corresponding zeta potential. The error bars indicate the standard deviation of the three replicates ( $n = 3$ )



(a)



(b)

Figure 5: Effect of NOM at constant pH on particle dispersion (a) for non sonicated  $\text{TiO}_2$  NPs (b) and corresponding zeta potential. The error bars indicate the standard deviation of the three replicates ( $n = 3$ )

### Sorption of $\text{TiO}_2$ NPs to NOM at different pH values

Arising from the results of the stability study that indicated that NOM promotes NPs stabilization and that this stabilization is influenced by the pH of the suspension, a study was therefore designed to explain the observed stability in terms of sorption. This was carried out at the three different pH values (same as considered in the stability study). Our hypothesis was that NOM would sorb to NPs more at lower pH than at higher pH values.

The amount of the NOM sorbed to  $\text{TiO}_2$  NPs were determined from the difference between the concentration of the initial NOM measured as total organic carbon (TOC) before sorption and the final concentration of NOM when at equilibrium during sorption. The results of the TOC measurements between the filtered and centrifuged suspensions agreed with in a precision of about 2%. The TOC results for the solution of the filtered, centrifuged and the directly measured indicated an agreement within 3% precision. With the agreements of the filtration and centrifugation results being within less than 5% precision, the results were used without any corrections.

The results of this study consistent with our hypothesis, demonstrated that the highest amount of NOM was sorbed to  $\text{TiO}_2$  NPs at pH 4.50, followed by sorption at pH 6.50 and the least sorbed was at pH 8.50 (Figure 6). The sorption of the largest amount NOM at low pH can be attributed to the fact that the NOM molecules at low pH were less ionized and the interaction was predominantly hydrophobic with increased van der Waals forces of attraction (O'Melia, 1990). This meant that once some NOM molecules were sorbed further molecules could still be sorbed due to attractive van der Waals forces. At higher pH, the NOM molecules were highly ionized and after initial sorption of NOM to NPs, less sorption could further take place due to electrostatic repulsion and hence the observed low sorption at pH 8.50. At the

intermediate pH 6.50, NOM molecules were not completely ionized. There were still some hydrophobic influences and hence some van der Waals forces of attraction, but at the same time some electrostatic repulsive forces were exerting their influence and hence the observed relatively low sorbed NOM compared to pH 8.50.

The relationship between the surface charge (ZP) and the amount of the NOM sorbed at the three pH values considered in this study was further examined. As expected the results indicated that the surface charge (zeta potential) was more negative at pH 8.50 and corresponded to the least amount of NOM sorbed (Figure 7). The surface charge at pH 4.50 was the least negative and corresponded to the highest amount of NOM that was sorbed. Therefore the stability of NPs was due to NOM sorption and when taken together, the stability and the sorption results suggest that stabilization of the TiO<sub>2</sub> NPs suspension is more effective with NOM electrostatic repulsion than with the NOM steric hindrance.

The sorption data was fitted to the nonlinear Langmuir model. The model described the experimental data at all pH values fairly well as shown in Figure 8. However, the fundamentals or the basic concepts of the Langmuir cannot be said to have been met at all the three pH values. However, based on the sorption data, it can probably be argued that the basic concepts of the Langmuir adsorption isotherm were fulfilled (fixed adsorption sites, equal surface energies and no interaction between sorbed molecules) at pH 8.50 where the sorption was assumed predominantly electrostatic. But at pH 4.50 and pH 6.50 the Langmuir adsorption isotherm was probably not met as the interaction could have involved hydrophobic moieties of NOM through van der Waals attraction. The model was used to estimate the values of the total amount of sorbate that could be sorbed at equilibrium ( $Q_{max}$ ) and the Langmuir constants ( $K_L$ ) for each pH studied. At pH 4.50, the  $Q_{max}$  and the  $K_L$  were found as 14.8 mg NPOC/g TiO<sub>2</sub>NPs and 0.36 respectively. While at pH 6.50, the  $Q_{max}$  and the  $K_L$  were found to be 10.4 mg NP OC/g TiO<sub>2</sub> NPs and 0.22 respectively, and at pH 8.50, the  $Q_{max}$  and the  $K_L$  were found as 2.4 mg NP OC/g TiO<sub>2</sub> NPs and 0.15 respectively. These values were consistent with the observed experimental results which showed higher sorption for lower pH and lower sorption for higher pH.

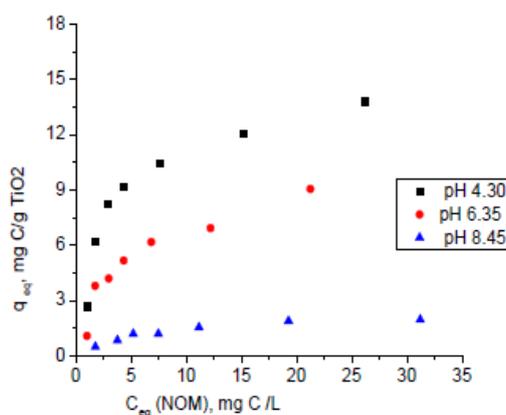


Figure 6: Sorption of NOM to TiO<sub>2</sub> nanoparticles at different pH values

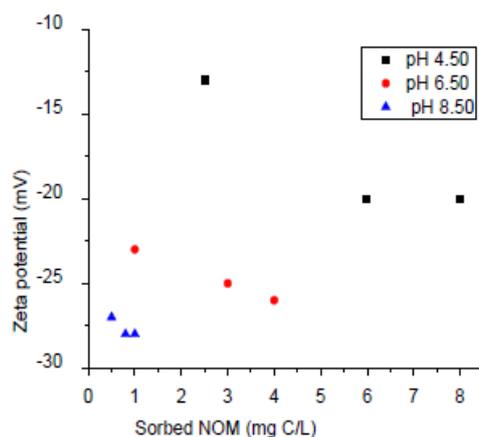


Figure 7: Relationship of zeta potential and adsorbed amount of NOM at given pH

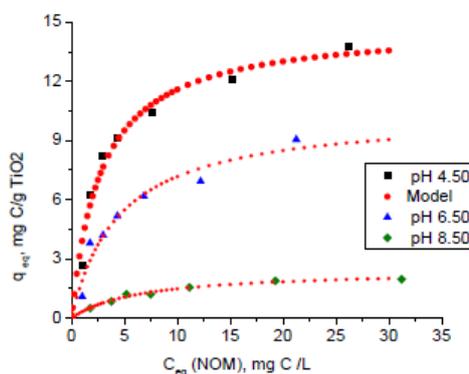


Figure 8: Fit of sorption experimental data to nonlinear Langmuir adsorption isotherm

## Conclusion

The NOM-NPs interaction in aqueous medium can result in several outcomes. For instance, it can lead to enhanced stability of NPs and hence increased residence time and increased transportation within the aqueous environment. The results of this study have demonstrated that the stability of TiO<sub>2</sub> NPs upon interaction with NOM was due to the sorption of NOM. The data also demonstrated that the NOM concentration was critical in promoting NP stability. The results further suggest that the stability is pH dependent and that it is much higher at higher pH than at lower pH values. According to the sorption study, the amount of NOM sorbed was however, demonstrated to be higher at the lower pH than at higher pH values. With non-sonicated TiO<sub>2</sub> NPs, barely stabilized, this study would also suggest that when NPs are aggregated whilst in powdered form, breaking them apart required much more energy than could possibly be supplied by NOM.

## References:

- Amal, R., Rapper, J.A., and Waite, T.D. (1990): Fractal structure of hematite aggregates, *J. Colloid Interface Science*. 140, 158-168.
- Amal, R., Rapper, J.A., and Waite, T.D. (1991): Effect of fulvic acid adsorption on the aggregation kinetics and structure of hematite particles, *Journal of Colloid and Interface Science* 151, 244-257.
- Baalousha, M., Manciuola, A, Cumberland, S., Kendall, K., and Lead. J. R. (2008): Aggregation and surface properties of iron oxide NPs: influence of pH and natural organic matter, *Environmental Toxicology and Chemistry*, 27, 1875-1882
- Chen, J., Gu, B., Royer, R.A., and Burgos, W.D. (2003): The roles of natural organic matter in chemical and microbial reduction of ferric iron, *The Science of the Total Environment* 307 167-178

- Fernandez-Nieves, A., Richter, C. and De las Nieves, F.J. (1998): Point of zero charge estimation for TiO<sub>2</sub>/water interface. *Programme of Colloid Polymer Science*, 110: 21-24
- Hotze, E.M., Phenrat, T. and Lowry, G.V. (2010): Nanoparticle aggregation: challenges to understanding transport and reactivity in the environment, *Journal of Environmental Quality*, 39:1909–1924
- Hudson, N., Baker, A. and Reynolds, D. (2007): Fluorescence analysis of dissolved organic matter in natural, waste and polluted waters – a review, *River Research and Applications*. 23: 631–649
- Illés, E., and Tombácz, E. (2006): The effect of humic acid adsorption on pH-dependent surface charging and aggregation of magnetite nanoparticles, *Journal of Colloid and Interface Science* 295, 115–123 167
- Keller, A.A., Wang, H., Zhou, D., Lenihan, H.S., Cherr, G., Cardinale, B.J., Miller, R. and Ji, Z. (2010): Stability and aggregation of metal oxide nanoparticles in natural aqueous matrices, *Environmental Science and Technology*, 44, 1962–1967
- Kitis, M., Karanfil, T. and Kilduff, J.E. (2004): The reactivity of dissolved organic matter for disinfection by-product formation, *Turkish Journal of Engineering and Environmental Sciences*, 28, 167 - 179.
- Koopal, L.K., Saito, T., Pinheiro, J.P. and van Riemsdijk, W.H. (2005): Ion binding to natural organic matter: General considerations and the NICA Donnan model, *Colloids and Surfaces A: Physicochemical and Engineering Aspects* 265, 40–54
- Kosmulski, M. (2009): pH dependent surface charge and point of zero charge. IV. Update and new approach, *Journal of Colloid and Interface Science*, 337,439-448
- Lin, D., Tin, X., Wu, F., and Xing, B. (2010): Fate and transport of engineered nanomaterials in the environment, *Journal Environmental Quality*, 39:1896–1908
- McKnight, D.M., Boyer, E.W., Westerhof, P.K., Doran, P.T., Kulbe, T. and Andersen, D.T. (2001): Spectrofluorometric characterization of dissolved organic matter for indication of precursor organic material and aromaticity, *Limnology and Oceanography* 46 (1) 38-48
- O'Melia, C.R. (1990): Kinetics of colloid chemical process in aquatic systems: in Stumm, W. (Eds): Aquatic chemical kinetics, reaction rates of processes in natural waters, 447- 472, John Wiley & Sons, New York
- Scown, T.M., van Aerle, R. and Tyle, C.R. (2010): Review: Do engineered nanoparticles pose a significant threat to the aquatic environment? *Critical Reviews in Toxicology*, 40(7): 653–670
- Świetlik, J. and Sikorska, E. (2005): Characterization of natural organic matter fractions by high pressure size-exclusion chromatography, specific UV absorbance and total luminescence spectroscopy, *Polish Journal of Environmental Studies Vol. 15, No. 1*,145-153 168
- Stedmon, C.A., Markager, S. and Bro. R. (2003): Tracing dissolved organic matter in aquatic environments using a new approach to fluorescence spectroscopy, *Marine Chemistry* 82, 239–254
- Stumm, W. and Morgan J.J. (1981): Aquatic chemistry: An introduction emphasizing chemical equilibria in natural waters, 2nd Edition; John Wiley & Sons, Inc. New York
- Stumm, W. and Morgan J.J. (1996): Aquatic chemistry: Chemical equilibria and rates in natural waters, 3rd Edition; John Wiley & Sons, Inc. New York
- Wang, X., Chen, X., Liu, S., and Ge, X. (2010): Effect of molecular weight of dissolved organic matter on toxicity and bioavailability of copper to lettuce, *Journal of Environmental Sciences*, 22(12) 1960–1965

# A COMPARATIVE STUDY OF BIODIVERSITY CONSERVATION COPING WITH CLIMATE CHANGE IN CHINA AND CAPE VERDE

*Jaelsa Mira Gonçalves Moreira, Msc. In Environmental Sciences*

*Dong Shikui, Prof.* Beijing Normal University, Beijing, China

*Adjunct Prof.* Department of Natural Resources, Cornell University, Ithaca,  
New York, USA) Beijing Normal University, Beijing - China

---

## Abstract

Climate change is a real and urgent challenge that is already affecting people and the environment worldwide. Significant changes are occurring on Earth, including increasing air and ocean temperatures, widespread melting of snow and ice, and rising sea levels. Biodiversity loss and ecosystems degradation are being accelerated by climate change. The link between biodiversity conservation and climate change flows both ways: Biodiversity conservation increases the resilience of the physical and biological systems to changing environmental conditions and changes in climatic variables as genetically rich populations and species-rich ecosystems have greater potential for adaptation. This study aimed to find out how climate change affects the choice of instruments used to promote biological conservation in Cape Verde and China, to compare the policies and measures for Climate Change: adaptation and mitigation existent in both countries with respect to their applicability and sustainability. The findings of this study show that Cape Verde and China need more efforts to adapting and mitigating the impacts of climate change. Some progress has been made in promoting biodiversity conservation coping to climate change as well in both countries, but more improvements are required to sustain it and to get the sustainable development.

---

**Keywords:** Biodiversity Conservation, Climate Change, Adaptation, Mitigation, sustainable development

## Introduction

The concern of the twenty-first century is the big issues related to environment and ecology like climate change. The constant environmental threats that jeopardize the survival of many species of animals and plants including the man himself have claimed that there are qualified people in that area to try to mitigate this problem.

Cape Verde is highly vulnerable to climate change, with a low capacity to adapt. In the more immediate planning horizon (next 10-20 years), climate induced changes include seasonal water shortages at an increasing number of economically important sites and year round shortages at other sites. In addition, climate variability is predicted to increase, with more storms, floods and droughts and a shorter rainy season. This situations are similar to China.

Africa and South Asia are the most vulnerable continents to climate change variability and change because of multiple stresses and low adaptive capacity. Some adaptation to current climate variability is already taking place. However, this may be insufficient for future change in climate.

Mangroves and coral reefs are projected to be further degraded, with additional consequences for fisheries and tourism.

Biodiversity conservation increases the resilience of the physical and biological systems to changing environmental conditions and changes in climatic variables as genetically rich populations and species-rich ecosystems have greater potential for adaptation.

The impacts of climate change pose fundamental challenges for current approaches to biological conservation. Changing temperature and precipitation regimes will interact with existing drivers such as habitat loss to influence species distributions despite their protection within reserve boundaries (Hagerman and Chan, 2009).

Biodiversity loss matters because species and habitats are the building blocks on which human livelihoods depend, the foundation for production forests, fisheries, and agricultural crops. Enhanced protection and management of biological resources will also contribute to solutions as nations and communities strive to adapt to climate change (World Bank, 2008).

Habitat loss and fragmentation, overexploitation, pollution, the impact of invasive alien species and increasingly, climate change all threaten global biodiversity. Climate change may thus further accelerate both the ongoing impoverishment of global biodiversity, caused by unsustainable use of natural capital, and the degradation of land, fresh water and marine systems (CBD, 2009).

Moreover, this degradation and disturbance in terrestrial and aquatic ecosystems generate niches that can be exploited by invasive exotic species (World Bank, 2008).

Global climate change is a change in the long-term weather patterns that characterize the regions of the world. Scientists state unequivocally that the earth is warming (S. Vijaya *et al.*, 2012).

Although climate change can not be avoided entirely, the most severe impacts of climate change can be avoided by substantially reducing the amount of heat-trapping gases released into the atmosphere. However, the time available for beginning serious action to avoid severe global consequences is growing short (S. Vijaya *et al.*, 2012).

According to UNDP (2012), a good ecosystems healthy like forests and bogs - contain massive carbon reservoirs and are vital to regulating the global climate.

The sustained supply of certain ecosystem services such as stream flow regulation in drought prone areas will be critical in buffering human populations from the adverse impacts of climate change, which include coastal flooding, droughts and other hazards. Healthy and diverse natural ecosystems are expected to be more resilient in the face of climate change than ones that have been degraded (UNDP, 2012).

Increasing evidence shows that shifts in China's climate have already occurred and the changes will continue in the coming years. The average surface air temperature across China increased 0.5-0.8°C during the 20th century. The upper end of this range is higher than the global average during the same period (PRC, 2007).

The potential for developing synergies between climate change mitigation and adaptation has become a recent focus of both climate research and policy (S. Vijaya *et al.*, 2012).

Climate change is one of the causes of biodiversity loss. At same time, climate change will accelerate further if biodiversity and ecosystems are not effectively protected (European Commission, 2009).

Adaptation is a way of reducing vulnerability, increasing resilience, moderating the risk of climate impacts on lives and livelihoods, and taking advantage of opportunities posed by actual or expected climate change. Adaptation options will evolve as knowledge relating to climate change increases, and information is gathered on the success or failure of adaptation options (POST, 2006).

Improved protection of high biodiversity forests, grasslands, wetlands, and other natural habitats provides benefits for biodiversity as well as carbon storage. Integrating protection of natural habitats and improved management of natural and agricultural resources

into adaptation plans can contribute to cost-effective strategies for reducing vulnerability to climate change (World Bank, 2008).

The aim of this study was compare the responses from Cape Verde and China and to documenting the principles politicizes and measures for Climate Change: adaptation and mitigation strategies between China and Cape Verde; Learning lessons that China and Cape Verde could used to promote biological conservation in coping with climate change.

## **Methodology**

The study was developed in Beijing Normal University – Beijing from October 2011 to December 2012.

The research methods include mainly the questionnaire, desktop research and interviews. The questionnaires were issued out to different groups of people ranging from University students, faculties, citizens, NOGs, governmental officials, right up to those involved in carrying out climate change, biodiversity conservation and publics. In this way, the questionnaires cover competent authorities, research /educational institutes and relevant environmental agencies and NGO.

One survey questionnaire from teachers, students, experts/Officials Government and NGOs, and public generated the data. These sectors differed in characteristics such as age, gender, profession and level of education.

To make sure that all people interviewed have a good understanding about the questionnaire, were translated it into Chinese as well in Portuguese. All questionnaires applied were checked for errors and corrected unclear answers as needed such as incomplete, mistakes, and redundant answers. Out of 300 questionnaires applied to students, teachers, and experts/Officials Government and NGOs, and public 180 returned valid questionnaires: Cape Verde (51) China (136) questionnaires.

## **Interviews**

Formal and informal interviews were conducted with key informants within formal and local institutions. Open and close questions were designed in order to identify the key constraints of the climate change: adaptation and mitigation practice and biodiversity conservation in those countries.

## **Data analysis**

The key information's form all questionnaires and interviews were then combined to provide a summary of the results.

All data obtained was put in Excel and described with measure tendency and central and measure variability. Analysis of correlation and comparatives were realized with the auxiliary of the computer software. One-way and multi-one way ANOVA (Analysis of Variance) were used R Commander (R Gui) to examine differences in attitudes and beliefs among the biodiversity conservation and climate change: adaptation and mitigation. Analytical results was expressed as means and standard deviation (SD). Differences were considered statically significant at  $p < 0.05$  for all ANOVA.

## **Results & Discussions**

The evaluation criteria to climate change: adaptation and mitigation follow the international standards but every region has its own criteria that depend of their social, climate vulnerability and building capacity. For that the criteria are different from Cape Verde and China.

Biodiversity conservation can promote the food security and sustainable development. Chinese's and Cape-Verdeans are agreed that to get a sustainable development we need to protect our biodiversity.

According to Department of Environmental Conservation of New York, 2012 conserving as many plants and animals as possible is important for the benefit of humans and of other species. Individual species help us to meet our basic needs. We literally need to conserve biodiversity as our lives depend on it.

Adaptation to climate change and sustainable human development are inextricably linked because development can both contribute to climate change and reduce vulnerabilities to its impacts (UNDP, 2011).

The respondents claimed that decline of population size, species loss and mutation are the principals effects of global change on species. There are not different responses between interviews from the two countries. This is due to the respondents of the two countries already having knowledge's on effects of climate change on biodiversity because most them were students, teacher and also they are young. They only need take her own responsibility in protect biodiversity.

Analysis of Interviews Results: According to respondents of the interviews, biodiversity protection is necessary because it is the foundation of ecosystems as well it can provide service for the human beings. Biodiversity can be catalogued at different levels including species, community, ecosystem and landscape. All different types of ecosystems have their unique functions. Clearly, life plays a major role in the function of ecosystems, and the variety, or diversity, of this life has played a major role in the evolution of the world. Through protecting biodiversity, we can promote the sustainable development of our planet.

Climate change can affect the temperature and rainfall distribution, so the vegetation distribution can be affected. Biological conservation shouldn't focus only on species. Biodiversity conservation can be achieved at both species and habitat protection. The habitat protection including vegetation protection and landscape conversation is also important.

### **The question**

How biodiversity conservation helps adaptation in other sector like social, cultural, economic and scientific to climate change? They are a conscience that biodiversity can be regarded as an ecosystem service. It is related to other social services such as educational services, cultural heritage and so on. It also helps increase public consciousness, which is very essential in our society. Sometimes the effectiveness of biodiversity conservation is reduced. Some respondents think there is still a long way to go.

NGO is very important for protect biodiversity in some extent. Some NGOs help increase public awareness for biodiversity protection through education programs. Some NGOs carry out protection project, and others conduct propaganda for biodiversity protection.

The weaknesses in China are the human disturbance that is too expensive to avoid the impact, also, some laws and regulation cannot be fully executed due to economic considerations. In Cape Verde, island biodiversity conditions will become fragile if the human disturbance increases. Biodiversity will be affected by other natural shocks including sea level rise, some hurricanes or other extreme weathers.

### **Some weakness from both two countries**

The main threats to biodiversity in China include: overconsumption of wild animals and plants; destruction and overexploitation of habitats; lack of protection of some wild animals and plants; invasive alien species; deforestation; pollution; and overuse of land. Anthropogenic factors with direct and indirect consequences on the vegetation include: pluvial farming; fire wood; overgrazing and the introduction of exotic species are the mainly weakness for Cape Verde.

Either the two countries have vulnerable species or endemics species that should be monitored both for early warning signs of climate change or empirical tests of predictions.

They need to increase the scientific and technological knowledge of biodiversity conservation coping climate change: adaptation and mitigation.

Combination of climate change impacts and unsustainable human management practices are the biggest weakness from China and Cape Verde to coping biodiversity conservation with climate change.

The multiple pressures of developing the economy, eliminating poverty and mitigating the emissions of GHGs constitute difficulties for China in its efforts to cope with climate change, since the country is undergoing rapid economic development.

Lessons learned each other: Cape Verde could learn from China his increasable to extent of tree plantations with reforestation and afforestation programmes in special the urban afforestation. According to Secretariat of CBD (2008), the extent of tree has often been proposed as both mitigation and an adaptation measure. Cape Verde as arid region the afforestation will help in to mitigating the soil and coastal erosion also helps in avoiding desertification. Forests are an important part of the global carbon cycle since trees and plants absorb CO<sub>2</sub> through photosynthesis.

The plan the energy efficiency adopt to China is an example that many country could follow up like Cape Verde. China is already the world leader in renewable energy capacity and Cape Verde could cooperate with China in order to learn or import his technology for renewable energy to supply his energy demand.

China could support and assist Cape Verde in human resources development and technical cooperation on environmental protection.

## Conclusion

Addressing climate change requires two types of responses. Firstly, and importantly, we must reduce our greenhouse gas emission (take mitigation action) and secondly we must take adaptation action to deal with the unavoidable impacts. The severity of the impacts of climate change varies by regions.

Based from the results of the survey questionnaires, the education, involvement of whole society play an important role in promotes the biodiversity conservation coping climate change adaptation and mitigation. The law provides a forum to mediate disputes over resources because as impacts of climate change intensify, there will be increasing conflicts over scarce resources. Many wild species will likely need more protection, not less, to help them adapt to the effects of climate change.

Building more corridor ecology, zoos, botanic garden and protect areas may reduce extinction risk enabling the passive shifting of some species to new geographic range, and reinforcing species distributions. Some species may not be able to track changing climatic conditions quickly enough because they are natural or human barriers in the way.

Cape Verde need more efforts to adapting and mitigating the negatives consequences of climate change because is an island biodiversity!

The evidence from this study proved that some progress have made in promoting biodiversity conservation coping to climate change in both countries, but more improvements are required to sustain it and to get the sustainable development. More impacts assessment and identifies changes on biodiversity input by climate change to promoting biological conservations. The difference between China and Cape Verde concerning the protection of biodiversity are great since China has more financials and technologies resources to promote the conservation of its mega-biodiversity than Cape Verde. However, China iniquities with regard to the involvement of the society in protecting thereof. Cape Verde for their already fragile economic stake more in human resources for the promotion of biodiversity conservation. Clearly, the tools used to conserve biological diversity differ between the two countries since the geographical, climatic and vulnerabilities are different. The face up to China now is how to balance economic development with sustainable development.

Public education is the essential key to promote biodiversity conservation and consequently mitigate and adapt to extreme conditions resulting from climate change.

The integration of whole society in conserving biodiversity and its coping with climate change made effectiveness to adapting and mitigating the pressure of the climate change.

Restoration ecology, improve the living conditions and training in special in rural areas will help Cape Verde and China to warrantee biodiversity conservation at social, economic and political dimensions.

### References:

- Carmen Richerzhagen and Imme Scholz, Discussion paper: China's capacities for mitigating climate change. German Development Institute. Bonn, 2007
- China EPA. Chinese Country Study on Biological Diversity. China Environmental Science Press, Beijing, 1998.
- C. McSweeney, M. New and G. Lizcano. UNDP Climate Change Country Profiles. Cape Verde. (<http://country-profiles.geo.ox.ac.uk>), Date unknown.
- Constance I. Millar *et. al.* Climate change and forests of the future: Managing in the face of uncertainty. Ecological Application, vol.17 No.8, 2007.
- Dale Jiajun Wen. Climate Change & China: Technology, Market and Beyond. A report for focus on the Global South. Occasional paper 6, 2009.
- Davies, J., Poulsen, L., Schulte-Herbruggen, B., Mackinnon, K., Crawhall, N., Henwood, W.D., Dudley, N., Smith, J. and Gudka, M. Conserving Dryland Biodiversity, 2012.
- David Rodima-Taylor. Social innovation and climate change adaptation: Local collective action in diversifying Tanzania. Applied Geography, 2012.
- DEFRA (Department for Environment, Food and Rural Affairs). England biodiversity strategy - climate change adaptation principles: Conserving biodiversity in a changing climate. London, 2008.
- Ding Yihui, Ren Guoyu, Shi Guangyu, Gong Peng, Zheng Xunhua, Zhai Panmao, Zhang Deer, Zhao Zhongci, Wang Shaowu, Wang Huijun, Luo Yong, Chen Deliang, Gao Xuejie and Dai Xiaosu. China's National Assessment Report on climate change (I): Climate change in China and the future trend. Advances in climate change research, 2007.
- Environmental Law Institute. Legal and policy tools to adapt biodiversity management to climate change. Resource Manuel, final draft, 2010.
- Food and Agriculture Organization of the United Nations (FAO). Adaptation to climate change in agriculture, forestry and fisheries: perspective, framework and priorities. Rome, 2007.
- He Jiankun, Liu Bin, Chen Ying, Xu Huaqing, Guo Yan, Hu Xiulian, Zhang Xiliang, Li Yue, Zhang Aling, Chen Wenying, Wei Zhihong, Duan Maosheng, Zhang Xiaohua and Lu Yingyuan. China's National Assessment Report on climate change (III): Integrated evaluation on policies of China responding to climate change. Advances in climate change research, 2007.
- Hagerman, S. M. and K. M. Chan. Climate change and Biodiversity conservation: impacts, adaptation strategies and future research directions, 2009.
- Haigen Xu, Shunqing Wang and Dayuan Xue. Biodiversity Conservation in China: Legislation, Plans and Measures. Biodiversity and Conservation, 1999.
- Hazevoet, Cornelis J. Fourth report on birds from the Cape Verde islands, including notes on Conservation and records of 11 taxa new to the Archipelago. Bulletin Zoologisch Museum. University Van Amsterdam. Holland, 1999.
- IPCC (International Commission on Climate Change and Development). A proposal of the global leadership for climate change action: Facilitating an international agreement on climate change: adaptation to climate change), June 2009.

- Intergovernmental Panel on Climate Change (IPCC). Climate change and Biodiversity. IPCC technical paper V. April, 2002.
- IUCN (International Union for Conservation of Nature), UNEP (United Nations Environment Programme), UNU (United Nations University). Biodiversity Conservation and response to climate variability at community level. Dhaka - Bangladesh, 2009.
- J. Wang. Climate Change and China's Agricultural Sector: An Overview of Impacts, Adaptation and Mitigation, 2010.
- L. Hannah, G. F. Midgley and D. Millar. Climate change – integrated conservation strategies. *Global Ecology & Biogeography*, 2002.
- Lin Erda, Xu Yinlong, Wu Shaolong, Ju Hui and Ma Shiming. China's National Assessment Report on climate change (II): Climate change impacts and adaptation. *Advances in climate change research*, 2007.
- Liu, Junhui, Jia Wang and Qin Dan. *China's Environment*. China Intercontinental Press, 2010.
- Li, Xiaohua. The implementation of Biodiversity Convention in China. Program Officer, Environmental Protection Committee, National People's Congress. 5th international conference on environmental compliance and enforcement, 1998.
- Mark E. Harrison and Simon J. Husson. The relevance of biodiversity studies for climate change adaptation and mitigation in Indonesian peat-swamp forests. (Date unknown)
- Ministry of Environment and Agriculture of the Republic of Cape Verde. National Adaptation Programme of Action on Climate Change (2008-2012), 2007.
- Ministry of Environment of Republic of Cape Verde, Directorate General of Environment Third report on Status of Biodiversity of the Cape Verde. Convention on Biological Diversity, September, 2006.
- Nick Brooks. Climate change and development in Cape Verde. Review and screening of national development plans and programmes. (Data unknown).
- Nicole E. Heller and Erika Zavaleta. Biodiversity management in the face of climate change: a review of 22 years of recommendations. *Biological Conservation* 142. 14 - 32 pages. 2009.
- Robert W. Buddemeir (Kansas Geological survey), Joan A. Kleypes (National Center for Atmospheric Research) and Richard B. Aronson (Dauphin Island Sea Lab.). February 2007.
- Secretariat of the Convention on Biological Diversity. Connecting Biodiversity and Climate Change Mitigation and Adaptation: Report of the Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change. Montreal, Technical Series No. 41, 2009.
- Secretary General of the OECD (Organization for Economic Co-Operation and Development), 2008. Climate Change Mitigation: what do we do?
- Shannon M. Hagerman and Kai MA Chan. Climate change and biodiversity conservation: impacts, adaptation strategies and future research directions. *Journal Biology Reports*, 2009.
- S. Vijaya Venkata Raman and Ranko Goic. A review of climate change, mitigation and adaptation. *Renewable and Sustainable Energy Reviews*, 2011.
- Susan Galatowitsh, Lee Frelich and Laura Phillips-Mao. Regional climate change adaptation strategies for biodiversity conservation in midcontinental region of North America. *Biological Conservation* 142, 2009.
- Thompson, I., Mackey, B., Mc Nulty. S., Mosseler, A. Forest resilience, biodiversity, and climate change. A synthesis of Biodiversity/ Resilience/ Stability relationship in forest ecosystems. Secretariat of the Convention on Biological Diversity, Montreal. Technical Series, 2009.
- UNDP. Climate change in the African drylands: options, adaptations, and mitigation, Date unknown.
- UNFCCC. Climate Change: impacts, vulnerabilities and adaptation in Developing Countries. Section III: Assessing the impacts of, and vulnerability and adaptation to, climate change), 2007.

- World Bank. Policy and Institutional Reforms to Support Climate Change Adaptation with Development Programmes. A Practical Guide, 2008.
- World Bank. Biodiversity, Climate Change, and adaptation. Nature-Based Solutions from the World Bank Portfolio. The International Bank for Reconstruction and Development/ the World Bank 2008.
- W. Wende *et al.* Climate change mitigation and adaptation in strategic environmental Assessment. Environmental Impact Assessment Review, 2012.
- Y. Li et al. Integrating climate change factors into China's development policy: Adaptation strategies and mitigation to environmental changes. Ecological Complexity, 2011.
- Young, J., Parr, T., Heip, C. & Watt, A.D. Climate change and biodiversity conservation: knowledge needed to support development of integrated adaptation strategies. Report of an e-conference, 2005.
- China Environmental Science Press. Biodiversity Conservation Action Plan. Beijing, 1994.
- Zhong Guo. National report: the implementation of biodiversity Convention in China. China Environmental Press, Beijing - March, 1998.
- Convention on Biological Diversity. Summary of the Fourth Meeting of the Conference of the Parties to the Convention on Biological Diversity, May, 1998).
- People's Republic of China (PRC). China's National Climate Change Programme. Prepared under the Auspices of National Development and Reform Commission. June 2007.
- Intergovernmental Panel on Climate Change (IPCC), November 2007. Synthesis Report: Summary for Policymakers. Fourth Assessment Report, IPCC XXVII, Valencia Spain.
- Primack Richard B. A primer of Conservation Biology. Fourth Edition. www.sinaauer.com - Boston University, May 2008.
- UNDP. Adapting to climate change. UNDP-GEF initiatives financed by the least developed countries fund, special climate change fund and strategic priority on adaptation. US - May 2011.

# BIOSENSORS FOR FAST DETECTION OF TOXIC COMPOUNDS

*Camelia Bala, PhD*  
*Lucian-Gabriel Zamfir*  
*Lucian Rotariu*

University of Bucharest, Department of Analytical Chemistry, Bucharest, Romania

---

## Abstract

Due to the fact that biosensors play a significant analytical role in agriculture, food safety, environmental and industrial monitoring we present an overview on the biosensor field, especially the design of the interface between the physical transducer and the biological recognition elements for the fast detection of pesticides. We will introduce novel concepts in the area of bioanalysis based on nanomaterials (carbon nanotubes) and composite based on nanomaterials in order to enhance the performance of the developed biosensors. Also, different immobilization procedures for biorecognition element will be presented. Technical description and analytical characterization of the biosensor will be detailed.

---

**Keywords:** Sensors, toxic compounds, fast detection

## Introduction

Pesticides and phenolic compounds account for 43% of the total amount of organic chemicals used in Europe or worldwide. These compounds are constantly introduced in the environment mainly as a consequence of agricultural and industrial activities and can produce toxic effects towards non-target organisms and flora. Moreover, once they have reached the earth surface, they can suffer biotic and abiotic degradation, with the subsequent formation of transformation products, such as oxo derivatives and sulfoxides, which are more toxic than their parent compounds [1]. Besides, chloro and nitrophenols are the main degradation products of many chlorinated phenoxyacid herbicides and organophosphorous pesticides, respectively. Due to the toxicity and persistence of some of these compounds, the governments and environmental agencies have included different pesticides and phenolic compounds in the environmental monitoring programs by stressing the need of analysing these organic pollutants and transformation products under very low levels of concentration in drinking water and surface water. As a consequence, the achievement of analytical methods, which permit the unequivocal identification, and confirmation of pesticides along with their transformation products in the environment in a quick and reliable way are emerging.

The scientific community concerns in the field of environmental pollutants controlling and monitoring are continuously centring on the research and development of analytical techniques that are able to offer the analytical information, in real time, for a variety of target analytes and matrices. If the 70's, were characterized by the apparition of the first portable gas chromatographs, that permitted the pollutants identification, in the 80's, the analytical chemists developed the immunochemical techniques in clinical laboratories, adapting these techniques to the detection of toxic compounds from environment. In the last decade there was a considerable interest in the development of highly sensitive, selective, rapid and reliable analytical methods, especially for continuous monitoring of the pollutants that present a high level of toxicity. On one hand, current analytical techniques, like gas chromatography and high performance liquid chromatography are very sensitive and reliable. On the other hand,

they are time consuming and expensive. Moreover, only highly trained technicians can perform them.

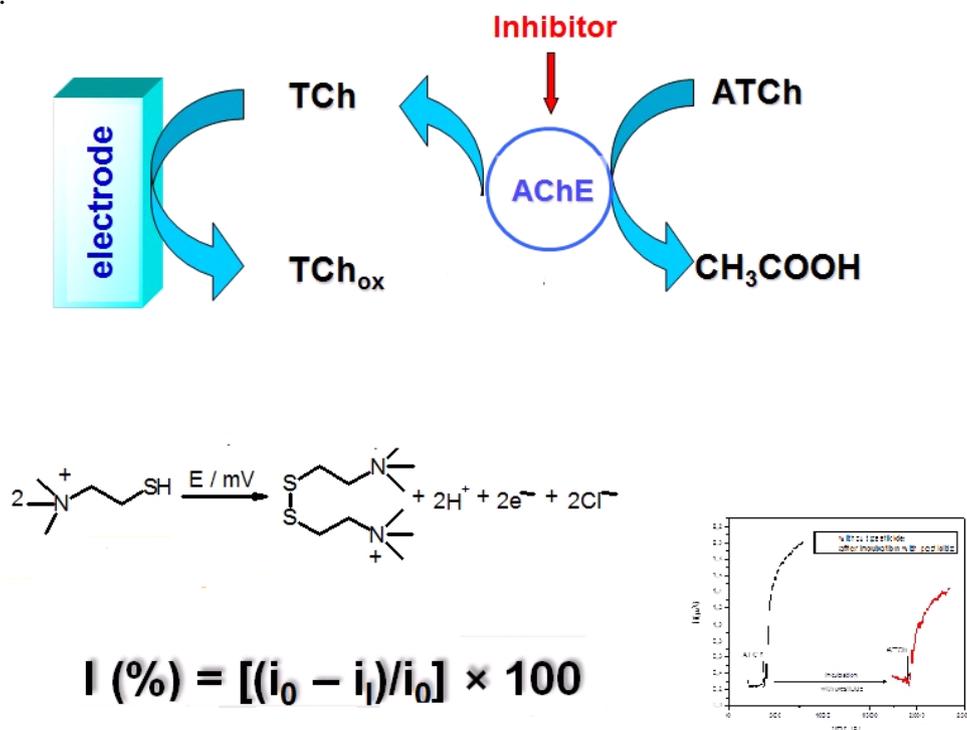
Biosensors represent an alternative method to detect quickly neurotoxins and they have been an active research area since several years. The unique feature of a biosensor is that the device incorporates a biological sensing element in close proximity or integrated with the signal transducer, to give a sensing system specific for the target analyte [2-3]. The use of this indirect means of assay means that chemically similar solution species can be identified by their biospecific reaction with an immobilized biomolecule such as an enzyme, antibody, nucleic acid, etc. A transducer converts an observed change (physical or chemical) into a measurable signal, usually an electronic signal whose magnitude is proportional to the concentration of a specific chemical or set of chemicals. Those the biosensors combines the specificity of biological systems with the sensitivity of a physical transducer.

### Main Text

Organophosphate and carbamate pesticides that are mainly used in agriculture show low environmental persistence but display high acute toxicity. Their presence in water and food poses a potential hazard to human health. In general, these compounds inhibit acetylcholinesterase (AChE), the enzyme that is responsible for the transmittance of the nervous impulse to the cholinergic synapses [4]. The cholinesterases enzymes are extracted from different sources (*Drosophila melanogaster*, *Electrophorus electricus*, *Caenorhabditis elegans*) and some of them are commercially available.

The working principle of an acetylcholine esterase biosensor is based on the enzymatic hydrolysis of acetyl thiocholine (ATCh) which leads to the formation of acetic acid and thiocholine (TCh) – an electroactive compound. Initial enzyme activity is determined by monitoring the formation of TCh. After incubation with pesticide a new measurement is performed after addition of ATCh and the residual enzyme activity is determined.

The detection of the analyte is simply based on the determination of the difference in enzyme activity in the presence and absence of inhibitor, according to the formula reported in figure 1.



The organophosphoric pesticides inhibit irreversibly the activity of the enzyme acetylcholinesterase, leading to acetylcholine accumulation at post-synaptic membrane level.

The poisoning effect of organophosphate and carbamate pesticides is based on the inhibition of the acetylcholinesterase (AChE) by phosphorylation or carbamoylation of the active site [5]. The enzymatically generated thiocholine (TCh) is an electro-active compound, which can serve as an indicator to reflect the inhibition effect of pesticides. On unmodified carbon-based electrodes, TCh is oxidized at a potential as high as +700 mV vs. Ag/AgCl. The inhibition degree of AChE can be monitored through electrochemically oxidation of enzymatically generated thiocholine (TCh). On unmodified carbon-based electrodes, TCh is oxidized at high potential (+700 mV vs. Ag/AgCl). Such a high value leads to a high background current and can cause interferences from other electroactive species present in analyzed samples.

To develop a biosensor for pesticide we take into consideration several issues. First, the transducer used for detection of TCh, has to provide a fast electron transfer between the analyte and electrode surface in the electrochemical oxidation reaction. Lower applied potential is needed to offer a higher selectivity for TCh detection. Higher sensitivity for pesticide detection could be achieved only if the analytical signal (in our case current) obtained for electrochemical oxidation of TCh is as highest as possible.

Second, the immobilization of AChE should provide an environment that preserves the enzyme activity. In the case of biosensors based on substrate conversion it is recommended a high amount of immobilized enzyme to ensure a high amount of detectable product. On the contrary, in the case of pesticide biosensors the amount of immobilized enzyme should be as low as possible because the inhibition degree, which is proportional with the amount of pesticide, will be higher at a low enzyme loading. TCh concentration should be also very careful settled because the enzyme activity is determined at higher concentration substrate. In this particular case AChE could be inhibited at higher concentration of ATCh. So, ATCh concentration should be optimized in order to avoid inhibition by excess of substrate. And finally, regeneration of biosensor is often a requirement.

The electrochemical oxidation of TCh occurs at high applied potential on classical electrodes. Our idea was to try to use a composite gel based on Carbon nanotubes CNT and ionic liquid as electroactive material for a TCh electrochemical sensor.

Carbon nanotubes due to their extraordinary mechanical and electrical properties, high active surface, were extensively used in the last years for sensors and biosensors applications. Ionic liquids (ILs) based on imidazolium cation has been shown to be very promising for electrochemical applications. In these work composite materials based on CNTs, mediators or ILs will be used for electrochemical transducer modification [6-9]. Synergistic effect of the counterparts is exploited in different type of composites in order to improve the analytical performances of composite modified electrodes. The gel between carbon nanotubes and imidazolium ionic liquids act as better materials for improving the electrochemical transfer in electrochemical biosensors.

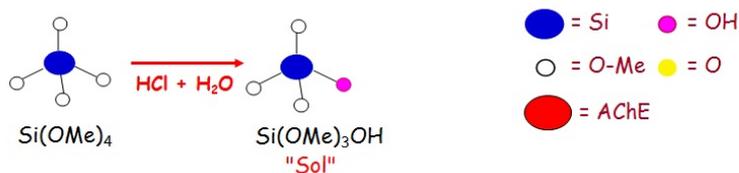
The immobilization of the active biological component on the transducer surface represents a critical stage in the biosensors development and it has as a goal the settlement of the enzyme on the surface of the physical transducer. The chosen immobilization procedure has to keep the enzyme in the native conformation, especially at active center level, simultaneously ensuring the free diffusion of the substrate, of the reaction product and/or of the inhibitors through the sensitive layer. Due to the fact that during the immobilization step some of the properties of the enzymes may be affected, it is necessary to control rigorously the process. Often, in the case of enzymes immobilization, it was observed a diminishing in enzyme activity due to pH influence, ionic strength or due to the possible conformational modifications that can appear during the process. The immobilization method used for the achievement of an enzymatic biosensor has to fulfill some requirements: to ensure the free

diffusion of the substrate, reaction products and/or inhibitors through the bio sensitive layer; to preserve the enzyme conformation and activity during immobilization process; to ensure a short response time; to preserve the enzyme affinity for substrate and inhibitors.

The most widely used approaches for the immobilization are the adsorption on the surface of the physical transducer, the covalent attachment on a functionalized surface of the sensor, the use of avidin- (or streptavidin-) biotin interactions, or the entrapment in the matrix of a polymer. The immobilization of the enzymes in sol-gel matrix was chosen (figure 2).

### 1. Alcoxide hydrolysis

Precursors: tetramethoxysilane (TMOS), methyltrimethoxysilane (MTMOS)



### 2. Condensation (in the presence of AChE)

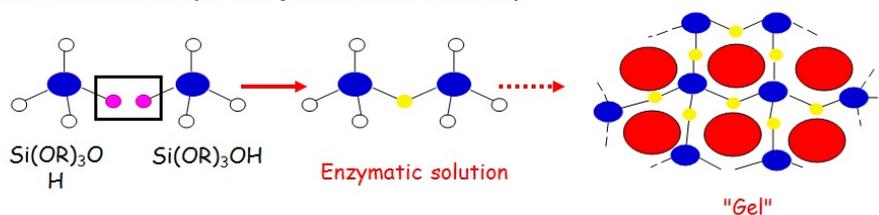
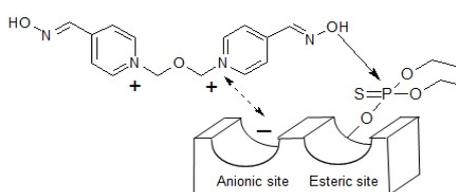
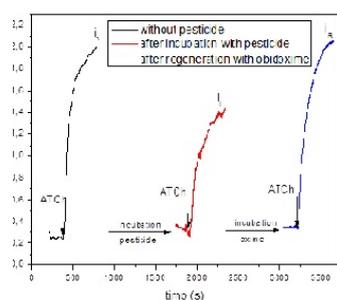
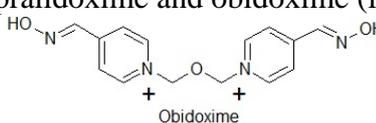
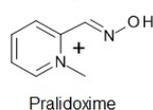


Figure 2. Enzyme immobilization in sol-gel matrix.

Another issue to be address is the regeneration of the enzyme activity in order to reuse the biosensor. The advantages of the regeneration with different oxime compounds will be discussed, especially the regeneration with pralidoxime and obidoxime (figure 3)



$$\text{Regeneration (\%)} = (i_R - i_i / i_0 - i_i) \times 100$$

Figure 3. Regeneration principle.

## Conclusion

The presentation will highlighted the analytical parameters that should be investigated in order to increase the assay sensitivity using inhibition biosensors. Several applications for the detection of pesticides will be presented.

**References:**

- C. Fest, K.-J. Schmidt, *The chemistry of organophosphorus pesticides, reactivity, synthesis, mode of action, toxicology*, Springer-Verlag Heidelberg, New York, 1973.
- D.R. Thevenot, K. Toth, R. Durst and G.S. Wilson, Electrochemical biosensors: recommended definitions and classifications. *Biosensors and Bioelectronics*, 16, 121-131, 2001
- A. Avramescu, S. Andreescu, T. Noguer, C. Bala, D. Andreescu, J-L. Marty, Biosensors designed for environmental and food quality control based on screen-printed graphite electrodes and different configurations, *Analytical and Bioanalytical Chemistry*, 374, 25-32, 2002.
- A. Amine, L. El Harrad, F. Arduini, D. Moscone, G. Palleschi, Analytical aspects of enzyme reversible inhibition, *Talanta*, 118, 368-374, 2014.
- C. S. Pundir, N. Chauhan, Acetylcholinesterase inhibition-based biosensors for pesticide determination: A review, *Analytical Biochemistry*, 429, 19–31, 2012.
- L. Rotariu, L.G. Zamfir, C. Bala, Low potential thiocholine oxidation at carbon nanotube-ionic liquid gel sensor, *Sensors & Actuators: B. Chemical*, 150, 73–79, 2010.
- L. Rotariu, L. G. Zamfir, C. Bala, A novel, sensitive, reusable and low potential acetylcholinesterase biosensor for chlorpyrifos based on 1-butyl-3-methylimidazolium tetrafluoroborate/multiwalled carbon nanotubes gel, *Biosensors and Bioelectronics*, 26, 3692–3695, 2011.
- L. Rotariu, L.G. Zamfir, C. Bala, A rational design of the multiwalled carbon nanotube–7,7,8,8-tetracyanoquinodimethane sensor for sensitive detection of acetylcholinesterase inhibitors, *Analytica Chimica Acta*, 748, 81-88, 2012.
- L.-G. Zamfir, L. Rotariu, C. Bala, Acetylcholinesterase biosensor for carbamate drugs based on tetrathiafulvalene–tetracyanoquinodimethane/ionic liquid conductive gels, *Biosensors and Bioelectronics*, 46(15), 61-67, 2013.

# FROM THE PARADIGM OF SEEING TO THE TOUCH PARADIGM: THE BECOMING HAPTIC IN THE CONTEMPORARY ARTISTIC CREATION

*Salif Silva, MSc in Design and Communication Sciences*

University of Cape Verde (Uni-CV), Cape Verde

---

## Abstract

The haptic perception claims a central place in the interactive experience. The interactive art is tactile art by definition. This paper aims to deepen the relationship between the haptic perception and the media art, reinforcing the relationship between the user and interfaces, as well as the tactile attribute of that experience where the user acts and updates artwork; Explore the meaning of the tactile sense for our experience and understanding of the world; Questioning the primacy of the visual experience and the rhetoric of oculo-centrism, combining three elements: the haptic perception, the field of media art, and phenomenological thought of Merleau-Ponty;

What is the role of haptic perception towards the intensification of sensory stimuli of digital culture? This is a question about interfaces and the becoming haptic in the experience of art, not as an aesthetic trend in general, but as a possibility of the art.

---

**Keywords:** Haptic, interactivity, media art, interface, technology, body

## Introduction

There are an increasing number of studies in various subjects that focus on the haptic perception issue. That given impulse to research in fields such as physiology, psychology and sociology isn't casual. The concept of haptic, associated to the exploration of the sense of touch, or in other words, to gesture and to the skin, has been recently used to define a type of perception that subverts the optic-spatial organization, namely, the Alberti<sup>1</sup> perspective, with its linear coordinates, with its fixed and exterior point of view. The haptic perception, a synonym for the instauration of a multisensory access to images, articulates two sensory modalities: kinesthesia and tactile. This concept contains the ideas of continuity, direct contact and resonance when it comes to the sense of proximity and empathy towards the object.

## Main Text

The haptic has been mentioned progressively in relation to new image technologies with the culmination of the abstractization of the body and the experience. The haptic potentializes as an alternative pathway to the immaterial notion itself and to the subjectivation of the image experience. The technologic images explore a new amplified corporality, connected and haptic in which the computer arises as "incarnated virtuality". New perceptive phenomena emerge from the incorporated interaction and the technified kinesthesia. Hence, appears an artificial sensitivity based on the multisensory and multimodal experience impregnated by "tactility" and "gestuality".

---

<sup>1</sup> Panofsky states that "the subjective visual impression was indeed so rationalized that this very impression could itself become the foundation for a solidly grounded and yet, in an entirely modern sense, infinite (...)The result was the transformation of psycho-physiological space into mathematical space; in other words, an objectification of the subjective". Panofsky, Erwin: *Perspective as Symbolic Form*. Tusquets, Barcelona, 1973

In historical terms, a haptic expression appears for the first time in studies by Alois Riegl<sup>2</sup> in *Spatromische Kunstindustrie*<sup>3</sup>, related to aesthetics. Riegl had considered the term tactile too limited and proposed therefore, haptic to define the visual tactility. Deleuze takes hand on the term and expands it. He considers the haptic space as the tactile sense of the eye; an approximated vision, made up of sensation and rapture opposed to the calculated distance of representation. For Deleuze, the sensory organs do not oppose each other in the haptic space, beforehand, they suppose that their functions overcome the limits that are commonly attributed to them<sup>4</sup>.

In the beginning of the 20th century, Filippo Marinetti had already proposed a new art form based on tactile perception<sup>5</sup>. After this Italian futurist, many other artists explored the concept, at different moments and with distinct technologies. These artists sought above all to validate the perceptive construction linked to body – space relation in the poetic field. From the 50s and 60s, perception and body then became central themes of art<sup>6</sup>. Artists such as Joseph Beuys, Dennis Oppenheim and Bruce Nauman explored the senses and questioned the limits of vision, the overcoming of visual staticity of perspective and the visual inputs. They sought above all, a criticism to the instrumental vision, in rupture and distancing from traditional speeches concerning the body in art. They abandoned the formal speech structures and began to operate on a more transcendent level on the relation with the material. Various artistic projects such as *Sensory Masks* (1967) by Lygia Clark, proposed to rethink the bodily actions and seek bodily relationships with the spectator and its transformation into a work of art. By inserting interactivity, they anticipate the line of strength of the actual technologic arts. Stelarc, for example, uses the concept of “obsolete body” to frame his works, which are structured by the connection to robotic/biologic prosthetics and telematic devices of perception expansion.

While in convergence with Sterlac’s proposals in cinema, Cronenberg questions the body and its adequacy to the current necessities in films<sup>7</sup>. He confronts the classic representation of the body with new discussions: of the closed body, finished, delimited, exhibited from the exterior, and reveals a body in transformation and hybrid – the becoming body underlying the cyborg idea.

In the last decades, the contamination of art by digital technology has had profound implications on the cultural, as well as on the social texture. The artistic practices of the virtual reality, linked to the sensory consciousness, amplify, subvert and question our perception of what is real<sup>8</sup>. As an integrant part of the contemporary artistic creation context, the media art has exhaustively explored all the possibilities conquered by the digital world and the contingencies of manipulation of our perceptions. By subverting the functioning of digital

<sup>2</sup> Riegl developed the term while working as a curator of the Art and Industry Museum (applied arts) in Vienna during the second half of the 19th century. He held a privileged position - the one of a tactile and textural contact with materials – to lecture on the haptic theory. In Bruno, Giuliana: *Atlas of emotion: journeys in art, architecture, and film*. Verso, New York, 2007.

<sup>3</sup> Riegl, Alois: *Late Roman Art Industry*. Giorgio Bretschneider, Roma, 1985.

<sup>4</sup> Deleuze, Gilles. *Logic of Sensation*. Continuum. Londres, 2003, p. 99. Vid. Silvio Ferraz, *Música e repetição: a diferença na composição contemporânea*. EDUC, São Paulo, 1998, pp. 160-161.

<sup>5</sup> In his *Manifesto of Tactilism*, published in *INComoedia* on January 1921, he would propose to develop a new form of art that sought in it the haptic sense and that was absolutely separated from the genre of the worlds engendered by the visual artists.

<sup>6</sup> Impulsed mainly by several avant – garde artistic movements, such as happenings, fluxus action art and body art.

<sup>7</sup> His movies *Videodrome* (1983) and *Existenz* (1999) share the relations between the body and technology on the recurrent contemporary art of technologic apparatus as extensions of bodily capabilities and positioning itself between the humanization of the machine and the human dehumanization.

<sup>8</sup> Hoyas, Gema: *Percepción Táctil e Interactividad en la Creación Artística de Realidades Virtuales*.

Laboratório de Creações Intermedia. UPV. Em linha:

[http://www.upv.es/intermedia/pages/laboratori/grup\\_investigacio/textos/docs/gema\\_hoyas\\_percepcion\\_tactil.PDF](http://www.upv.es/intermedia/pages/laboratori/grup_investigacio/textos/docs/gema_hoyas_percepcion_tactil.PDF) (23-10-2011).

equipments, the artists problematize the dichotomies between perception and thought, with emphasis on the experience of the body as the creating field of senses.

At this reaffirmation of digital incarnation, it is the touch that gains relevance in the field of interaction in virtual environments. The haptic aesthetics – arising from the haptic interaction and from the digital interfaces in the artistic experiences – emerges, thereby, in rupture with the traditional visual arts. Its creative strategies focus essentially in the sensory – motor dynamics and on the multi – sensory experience and offers new perspectives of the construction of what is real in a profound sensitive reformulation. Artists such as Harold Cohen, Jeffrey Shaw, Gideon May, Berndt Lintermann, Rafael Lozano Hemmer and Will Bauer present innumerable works that exemplify well the discursive approaches ensuing the haptic perception.

Myron Krueger had demonstrated in the 70s, through his work titled as *Videoplace*, the endless possibilities regarding forms and processes of human – computer interaction in the field of media art, with the introduction of artificial reality in facilities of digital art.

Monika Fleischmann, Christian A. Bohn and Wolfgang Strauss, in *Liquid Views – Narcissus' Virtual Mirror* (1993), problematize the sense of touch in virtual environments. In this piece of work, the user provokes undulations and his reflex dissolves in the liquid image by touching the screen. On the other hand, in *Interactive Plants Growing* (1992) by Christa Sommerer and Laurent Mignonneau, when real plants are touched, virtual plants are generated and appear on the screen in real time. Michael Gleich, in *Web of Life* (2002), introduces tactile interfaces that establish patterns of normatized abstraction on the perceptive, cognitive and emotional level, out of summary images from the digitalized palm of the hands of participants. Golan Levin and Zach Lieberman, in *Manual Input Session*<sup>9</sup> (2004), emphasize perception and interpellate new ways of understanding experience while exploring the expressive possibilities of manual gestures and of finger movements. Tecla Schiphorst in *Bodymaps: Artifacts of Touch* (1995 -1997) presents the space inhabited by the body, mediated by technology, in which proximity, the touch and the gestures from the participants evoke sounds and images. Throughout touch, the skin confronts with technology, the interaction the proprioceptive experience and the integration of the senses. Also regarding cinema, the haptic perception finds support to construct kinesthetic experiences from the connection between moving images and physical objects, memory and the user's interaction<sup>10</sup>. Thus, the artists seek to establish objective connections between data belonging to heterogeneous sensory spheres. Through technologic interfaces and the perceptive unfolding of the body, complex forms of aesthetic appropriations expand the perceptive limits. However, inter-relations between body image – interaction in organic interfaces subsist in these artistic experiences. From image – time, we head on to image – body that is fluid and malleable from the inputs of the spectator. It is a matter of a displacement of the hegemony of the look and the passive posture of the public contemplating the image to the demand of an active presence of the user.

The media artistic productions of digital technologies allow rethinking phenomenologically the world we live in.

Merleau-Ponty<sup>11</sup>, by defining perception as a cradle of the sense of the general experience, and furthermore, by relating it with the bodily attitude, emphasizes the experience of the body as a field creator of senses and the perceptive world. The phenomenological body arises consequently, as being primordial and the bodily learning as the principal factor of attribution of sense to the images. Thus, the phenomenological knowledge that leads to the

<sup>9</sup> It is an explicit evoking to this language invented by Myron Krueger in *Videoplace*.

<sup>10</sup> As elucidated by works like “Blindness Series” of T. Kim – Trang, *Aletheia* (1992), *Operculum* (1993), *Kore* (1994), *Ocularis: Eye Surrogates* (1997), *Ekeleipsis* (1999) and *Alexia* (2000). Marks, L. U. (2002). *Touch: Sensuous Theory and Multisensory Media*. U of Minnesota Press.

<sup>11</sup> Merleau-Ponty, Maurice: *Fenomenologia da Percepção*. Martins Fontes Editora, São Paulo, 1994

discovery of the creative center in rhythm, body and senses, is allied to the promotion of individual expansion of the consciousness as well as sensory capacity of the individual.

### **Conclusion**

Therefore, it can be sintetized that the haptic perception claims without any doubt, a highlighted role in the media art panorama. However, this approach implies to have a look at its multiplicities. If on one hand, the digital technologies convert art into a reality simulation on a digital immaterial structure that groups kinesthetic spaces, on the other hand, the digital interfaces, the digital hipersensory and the image saturation lead to the affective sensory mutilation in a certain perceptive irony.

Art contains critical sectors that can help the body not to fade in the experience field that offers the possibility to reinvent it in its own experience. The media art emerges as a catalyst instrument of a consciousness expansion through multiple interactions, while based on a participative embodiment. Hence, it reveals as it has already been mentioned, new possibilities to rethink the world phenomenologically based on the body's experience. In summary, it is in the fluidity of digital media and throughout the bonds of perception that the artists search for new existential forms.

### **References:**

- Bruno, Giuliana. *Atlas of emotion: journeys in art, architecture, and film*. New York: Verso, 2007.
- Deleuze, Gilles. *Logic of Sensation*. Londres: Continuum, 2003.
- Hoyas, Gema. *Percepción Táctil e Interactividad en la Creación Artística de Realidades Virtuales*. Valencia: Laboratório de Creaciones Intermedia - UPV.
- Marks, Laura U. *Touch: Sensuous Theory and Multisensory Media*. Minneapolis: University of Minnesota Press, 2002.
- Merleau-Ponty, Maurice: *Fenomenologia da Percepção*. São Paulo: Martins Fontes Editora, 1994.
- Panofsky, Erwin. *Perspective as Symbolic Form*. Tusquets, Barcelona, 1973.
- Riegl, Alois. *Late Roman Art Industry*. Giorgio Bretschneider, Roma, 1985.
- Ferraz, Silvio. *Música e repetição: a diferença na composição contemporânea*. São Paulo: Editora da PUC-SP, 1998.

# EUROPEAN GROUND SQUIRREL (MAMMALIA: RODENTIA) POPULATION FROM EASTERN ROMANIA: DENSITY, DISTRIBUTION AND THREATS

*Emanuel Ștefan Baltag, PhD*  
*Gheorghe Zaharia, MSc Student*  
*Lucian Fasolă, MSc Student*  
*Constantin Ion, PhD*

“Alexandru Ioan Cuza” University of Iasi , Romania  
Sistemis Group Association

---

## Abstract

The number of European Ground Squirrel (*Spermophilus citellus*) is in continuous decline across the species range, particularly in the southern, north-western and northern areas where decline is more severe. The species population from Eastern Europe is poorly studied and the main ecological indicators (density, distribution, trend and threats) are unknown. These data are very important for the species conservation strategy focused on actual information.

During 2013 we conducted 600 transects in Eastern Romania for European Ground Squirrel counting. The density varies along the study area between 0 individuals/ha and 107 individuals/ha (with an average of 15.41 individuals/ha). Also, the species population from this area is highly fragmented with more colonies in the southern and eastern part of our study area. The main threats are habitat fragmentation, grazing management and floods. The protection of this species is poor, because Natura 2000 and national protection sites cover only small parts of the European Ground Squirrel colonies, most of them being in the state or private grazing areas.

These are the first ecological indicators on European Ground Squirrel from Romania. All this information will contribute to Natura 2000 sites management and development, but also for the first national action plan for this species.

---

**Keywords:** European Ground Squirrel (*Spermophilus citellus*), Romania, ecology, density, distribution

## Introduction

The European Ground Squirrel (*Spermophilus citellus*) is a small diurnal mammal and obligate hibernator, endemic to central and south-eastern Europe, where it occurs at altitudes of 0 – 2,000 m (Coroiu et al. 2008). European Ground Squirrel inhabits different types of pasture habitats, both semi-natural and artificial, though with strong preference to grasslands with permanent short-stalk vegetation (10-20 cm) developed on different soil types, fine-grained soils (such as those developed on sand) to heavy soils and both on deep as on shallow soils with presence of soil skeleton, but usually with good water retention and medium aeration (Janderková et al. 2011). The number of European Ground Squirrel is in continuous decline across the species' range, particularly in the southern, north-western and northern areas where decline is more severe. Overall, declines are suspected to be more than 30% over the last ten years (Coroiu et al. 2008). For this reason the species is assessed as Vulnerable (A2bc) by IUCN (Botnariuc et al. 2005, Coroiu et al. 2008). A Vulnerable species is considered to be facing a high risk of extinction in the wild (IUCN Standards and Petitions Subcommittee, 2013). Also, the species is listed in Annexes II and IV EU Habitats Directive,

Appendix II (strictly protected fauna species) Bern Convention, National Red List - strictly protected species (Act Nr. 49/2011).

This species should be carefully monitored to be able to record all the fluctuations in number and distribution. Without any studies the species could record a steep decline or even become extinct in a short time. The European Ground Squirrel is already extinct in Croatia and Germany and was reintroduced in Poland (Coroiu et al. 2008).

There are numerous gaps in the knowledge on European Ground Squirrel distribution in the southern part of its range (Koshev 2008). The European Ground Squirrel is poorly studied in Romania, its density being almost unknown for the main part of the distribution area. Most of the data which we find in the current literature are old records, but there are no recent complex studies to confirm existing information, especially for those colonies which are located in Eastern Romania. Without these data we cannot record any trends and is very difficult to evaluate its conservation status at a regional scale.

Even if its specific habitat has undergone major changes due to agricultural fields expansion and road network intensification, there are no recent studies. In available scientific data for Romania there is no information about its density and the possible threats were not studied. Between 2006 and 2009, in the Western Plain of Romania, the species was located in 79 UTM grids of 10×10 km (Hegyeli et al, 2012). Also, the population from the Romanian regions of Oltenia, Muntenia, Moldova and Dobrogea, was summarily assessed in 2009 and 2010, results showing relatively large populations in Dobrogea and some parts of Moldova, but with considerable gaps of the current distribution in the southern part of the country (Hegyeli et al, 2012). At the national scale it is known as a common species for pastures but the population trend is unknown. Some observations made in the Southern and Western Romania show that the population is decreasing due to habitat fragmentation and anthropic pressure (Murariu 2006, D. Szilard pers.comm.).

The aim of this study is to assess distribution of European Ground Squirrel in Eastern Romania and to analyse the relative abundance, threats and colonies status.

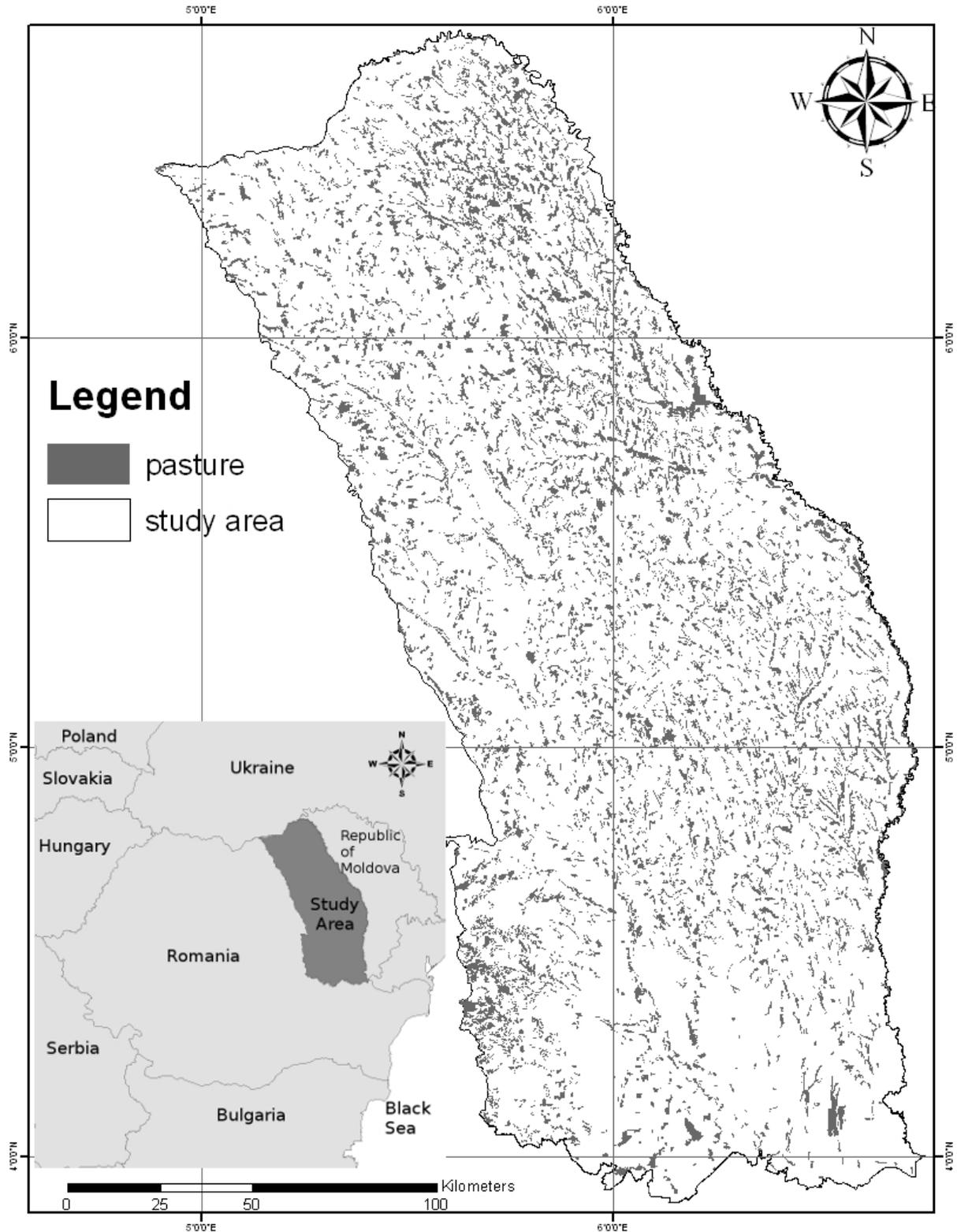
## **Main Text**

### **Materials and Methods**

The study was conducted during May - August 2013 in Eastern Romania (46°48' 0N, 26°57' 0E), on an area of 27,173 km<sup>2</sup> (Figure 1). The study area is situated at the Eastern border of the European Union and in the North-Eastern part of the species' distribution area. This area is a mosaic of artificial and natural habitats where land management is still conducted in a traditional way (Baltag et al. 2013). Our study was focused on pasture and herbaceous vegetation which are mainly grazed by domestic animals.

There are no uniform methods available to estimate the European Ground Squirrel density for monitoring studies (Cepáková & Hulová 2002, Katona et al. 2002). Direct observations (daily activities) or indirect observations (counting the entries in the burrow) can be applied successfully because they are visible on the small grassy meadows (Yensen et al, 1992). The number of entries in the burrow does not give the exact population size, but it can serve as a good measures of the relative changes in local population density of ground squirrels in time and space (Hubbs et al, 2000).

Figure 1: Study area and pasture distribution.



In our study, we investigated the abundance by counting the vertical spring burrow entrances on transects (3 X 150 m) within a distance of 2.5m on every side of the counted European Ground Squirrel holes (Koshev 2008) and by direct counting of animals (Katona et al. 2002). The counting was done during the first period of their activity, when the young are not outside. All the data was recorded on forms specially created for this study. The number of transects on the area of the European Ground Squirrel colonies surveyed was 600, which

equates to 1,350 ha. The transects were randomly chosen using Quantum GIS software, v.2.0.1. All transects were chosen on pastures or herbaceous vegetation, habitats with a high suitability for European Ground Squirrel.

We calculate the relative abundance for each transect, but to compare the European Ground Squirrel colonies we classified the relative abundance into four categories according to Koshev (2009): A: 107 – 15 individuals/ha; B: 14 – 2 individuals/ha; C: <2 individuals/ha; D: without active holes. To detect possible differences in the relative abundance among transects we used Friedman's repeated-measures analysis of variance ( $F_r$ ) in R v.3.0.1 statistical software.

To quantify the main threats for our target species we will record all the possible threats, which were reported in the scientific literature, but also those which we found on the field and we think that can affect the European Ground Squirrel population. Also, land management, number of grazing domestic animals, information about surrounding habitats and human disturbance were recorded. This activity will take longer than the counting because we will have to collect more data about land management and possible threats and also we need to record coordinates for all features which fragmented the habitats.

We used a generalized linear model (GLM) to determine the influence of threats on European Ground Squirrel population. Prior to the analysis we examined the distribution of each considered threat with the Newman-Keuls *post hoc* test ( $P < 0.01$ ; Sokal and Rohlf 2001). We ran these calculations in the R v.3.0.2. statistical software.

## Results

The relative abundance of European Ground Squirrel varied over the study area ( $F_r = 235.37$ ,  $df = 599$ ,  $P < 0.0001$ ). Except the areas where the European Ground Squirrel was absent, the lowest relative abundance was 4.44 individuals/ha and the highest was 107 individuals/ha with an average of 15.41 individuals/ha.

Almost half of the surveyed areas did not host European Ground Squirrel colonies (43.81 %, category D). The highest ranked category (A: 107 – 15 individuals/ha) cover 31.44 % from our transects and the second category (B: 14 – 2 individuals/ha) cover 24.75 %. The third category (C: <2 individuals/ha) was absent for our study area.

The distribution of European Ground Squirrel occurs mainly in the eastern and southern part of our study area. The suitable habitat for European Ground Squirrel is fragmented because of agriculture expansion and road network development. Habitat loss and degradation are the leading threats, affecting 86% of all threatened birds, 86% of the threatened mammals assessed and 88% of the threatened amphibians according to the 2006 IUCN statistics (Le Galliard 2014).

The major threats for the European Ground Squirrel population from Eastern Romania were pasture degradation and building up (Table 1). Higher pasture degradation were associated with lower number of observed individuals. Also, higher building up areas were associated with lower number of observed individuals. However, roads, vegetation height and tree cover did not significantly influence the numbers of European Ground Squirrel (Table 1). Another important threat for the populations settled in valleys was flooding, especially in the last years when this hydrological phenomenon was more frequent.

Table 1. Generalized Linear Model results for the observed numbers of European Ground Squirrel. Model factors consist of pasture degradations, roads, building up, vegetation height and tree cover (see text for details).

Variable	No. individuals	P
pasture degradations	3.062	0.002
roads	-0.635	0.525
building up	-2.400	0.010
vegetation height	-1.540	0.124
tree cover	0.721	0.471

## Discussions

This is the first study on European Ground Squirrel population from Eastern Romania which covers the entire territory considered to be in the distribution of this species. During 2013 we conducted 600 randomly selected transects, in this area, in order to record species distribution, density and the main threats.

The relative abundance varied in the study area, but individuals were found only in 66.19 % of the investigated area. The mean density for the entire study area was 15.41 individuals/ha, but if we calculate the density only for those areas where we found the species the value is 27.33 individuals/ha. We found similar densities with the Bulgarian population (Koshev 2008, Koshev 2009) but higher than in Austria (Hoffmann et al. 2008, Millesi and Hoffmann 2008) and Czech Republic (Matějů et al. 2008). However, European Ground Squirrel is still well represented and with high density, 55.70 % of colonies in category A and 44.30 % in category B.

The distribution of European Ground Squirrel population is concentrate in eastern and southern part of the studied area. Probably the species was more common in the past and more widespread but is very difficult to prove that if there is no previous data. In Bulgaria, about 30 % of 90 investigated colonies disappeared, 28% are vulnerable and there were not recorded any increasing colonies (Koshev 2008). In Slovakia, 87% of the colonies identified during 1996-2008, are not present anymore (Michal Ambros 2008). Another species of ground squirrel that is threatened is the Spotted Ground Squirrel (*Spermophilus suslicus*). In Polish steppes and this species lost more than 90 % of its populations and about 70 % of its individuals over the last 50 years (Gondek et al. 2006). We cannot compare the relative abundance and distribution with previous data because there are no previous studies on this species. This lack of data on European Ground Squirrel makes it difficult to compare the species distribution with a previous one and to find out if it disappeared from some of the studied areas.

The main threats for the European Ground Squirrel, according to GLM analyses, are pasture degradation, building up areas and flooding. The threats were also identified for Bulgarian populations as the most frequent (Koshev, 2008).

In many areas the suitable pasture management was not applied in the last 10 years, which led to a degradation of vegetation and soil structure. Also, there are many areas where the grazing was abandoned and the pasture resembles a grassland with high vegetation. The current decline of the species in the Xerinae subfamily, due to intensification of agriculture, may represent a threat to biodiversity in the steppe environments, can produce a cascade effect on their predators, for example, saker falcon, buzzards, eagles and mustelids (Carpaneto et al, 2011). Avoidance of this may be ensured by a moderate livestock grazing, owing to the higher ecological success of these rodents in the presence of large herbivores keeping a low grass cover (Carpaneto et al, 2011). Because of an increase of grass height in prairies, making these pastures unsuitable, for example in the European steppe of Russia, two species of ground squirrels (*Spermophilus citellus* and *Spermophilus pygmaeus*) almost completely disappeared (Galushin et al, 2000). Building up is an important threat now, when many localities grow and

there are many factories planned for next years. Most of the new buildings cover pasture areas because they are less and less used for grazing.

Flooding started to be more common in the last years when this hydrological phenomenon covered large valleys in southern part of our study area. During the autumn of 2013 we found large colonies on flooded valleys. At the same time the rivers represented major dispersal corridors for the species (Koshev 2008). The vulnerability of European Ground Squirrel on flooding was proven also for Bulgaria (Koshev 2008) and Austria (Hoffmann et al. 2003).

Natura 2000 areas are mainly located outside potential European Ground Squirrel habitat. The species distribution modeling showed that on average, only 0.65% of suitable ground-squirrel habitat overlap with Natura 2000 areas (Heither and Blomenkamp 2012). Most of the colonies were identified outside of the Natura 2000 areas. Only a small percent (15%) was identified in areas with a type of protection, Natura 2000 or national protected areas. This situation will influence the species' protection strategy on a long term.

## Conclusion

European Ground Squirrel is a Vulnerable species according to IUCN criteria and is poorly studied in Romania. In 2013 we conducted 600 randomly selected transects. The mean relative abundance for entire study area was 15.41 individuals/ha (between 0 individuals/ha and 107 individuals/ha). The European Ground Squirrel was present in only 66.19 % of studied areas.

The distribution of European Ground Squirrel is not uniform in the study area. It is more common in the eastern and southern part of our study area, but the population is very fragmented.

The main threats for European Ground Squirrel are pasture degradation, building up areas and flooding. These threats were similar with those from Bulgaria and are specific for developing countries where the environment education is still at a basic level.

Most of the colonies have no protection, being in private or public areas where people or local authorities can develop economical activities without an impact study to identify any potential threats on European Ground Squirrel.

These populations are very sensitive to any disturbance, therefore, we consider adoption of the species action plan as fully justified and hope that this study will contribute to its successful implementation. It would be highly beneficial to carry out similar studies in other parts of European Ground Squirrel distribution range from Romania.

## Acknowledgements

We wish to thank to Laurențiu Petrencu, Lucian Bolboacă, Sergiu Pleșcan, Andrei Ștefan, Marina Iosub, Vlad Andrei Verdeanu for their help during the survey program and also to Mr. Dumitru Murariu for his help and suggestions in data analysis. This work was supported by the Conservation Leadership Programme. The study complied with the Romanian laws.

## References:

- Baltag, E. S., Pocora, V., Sfică, L. and Bolboacă, L. E. Common Buzzard (*Buteo buteo*) population during winter season in North-Eastern Romania: the influences of density, habitat selection, and weather. *Ornis Fennica* 90:186-192, 2013.
- Botnariuc, N. and Tatole, V. eds. Cartea Roșie a vertebratelor din România (*Romanian Redbook of vertebrates*): *Spermophilus citellus*. București: Curtea Veche, 2005.
- Cepáková, E. and Hulová, Š., Current distribution of the European souslik (*Spermophilus citellus*) in the Czech Republic. *Lynx*, n. s., 33: 89–103, 2002.

- Carpaneto G. M., A. Mazziotta, R. Pittino, L. Luiselli, Exploring co-extinction correlates: the effects of habitat, biogeography and anthropogenic factors on ground squirrels–dung beetles associations, *Biodivers Conserv* 20, 3059–3076, 2011.
- Coroiu, C., Kryštufek, B., Vohralík, V. and Zagorodnyuk, I. *Spermophilus citellus*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1.: <http://www.iucnredlist.org/><"www.iucnredlist.org">. Downloaded on 01 January 2014, 2008.
- Le Galliard, J. F. Habitat fragmentation and evolution of dispersal. <http://www.jf.legalliard.free.fr/teaching/Fragmentation.pdf>. Downloaded on 09 January 2014.
- Galushin V, Moseikin V, Sanin N, Saker falcon breeding range and populations in European Russia. In: Proceedings of the II International Conference on the Saker Falcon and Houbara Bustard. Mongolia, pp 34–43, 2000
- Gondek A, Verduijn M, Wolff K Polymorphic microsatellite markers for endangered spotted suslik, *Spermophilus suslicus*, *Mol Ecol Notes* 6:359–361, 2006
- Heither H., Blomenkamp S.,: European Ground Squirrel (*Spermophilus citellus*) conservation: a potential distribution approach. Bachelor thesis, Van Hall Larenstein University of Applied Sciences, Leeuwarden, The Netherlands. 2012
- Hegyeli Z., Nagy A, Daróczi S. J., Kecskes A, Latková H., Current distribution and status of the European ground squirrel in Romania, IV European Ground Squirrel Meeting, 2012
- Hoffmann, I. E., Turrini, T, and Brenner, M. Do European Ground Squirrels (*Spermophilus citellus*) in Austria adjust their life history to anthropogenic influence? *Lynx*, 39(2):241 – 250, 2008.
- Hoffmann, I. E., Millesi, E., Pieta, K. and Dittami, J. Anthropogenic effects on the population ecology of European ground squirrels (*Spermophilus citellus*) at the periphery of their geographic range. *Mammalian Biology*, 68:205 – 213.
- Hubbs A. H., Karels T. and Boonstra R.. Indices of population size for burrowing mammals. *The Journal of Wildlife Management* 64: 296–301. 2000
- IUCN Standards and Petitions Subcommittee. Guidelines for Using the IUCN Red List Categories and Criteria. Version 10.1. Prepared by the Standards and Petitions Subcommittee: <http://www.iucnredlist.org/documents/RedListGuidelines.pdf>. Downloaded on 05 January 2014, 2013.
- Janderková J., Matějů J., Schnitzerová P., Petruš J., Sedláček J., Uhlíková J. : Soil characteristics at *Spermophilus citellus* localities in the Czech Republic (Rodentia, Sciuridae). *Lynx n. s. (Praha)*, 42: 99-111, 2011.
- Katona, K., Vaczi, O. and Altbacker, V., Topographic distribution and daily activity of the European ground squirrel population in Bugacpuszta, Hungary. *Acta Theriol.*, 47: 45–54, 2002.
- Koshev, Y. S. Distribution, isolation and recent status of European ground squirrel (*Spermophilus citellus* L.) in Pazardzhik district, Bulgaria. – *Annual of Shumen University “Konstantin Preslavsky”, Faculty of Natural Sciences*, Vol. XIX B6: 97-109. ISSN: 1311-834X, 2009.
- Koshev, Y. S. Distribution and status of the European Ground Squirrel (*Spermophilus citellus*) in Bulgaria, *Lynx*, 39 (2): 251 – 261, 2008.
- Matějů, J., Nová, P., Uhlíková, J., Hulová, Š., and Cepáková, E. Distribution of the European Ground Squirrel (*Spermophilus citellus*) in the Czech Republic in 2002 – 2008. *Lynx*, 39 (2):277 – 294, 2008.
- Millesi, E. and Hoffmann, I. E. Body mass and timing of the active season in European Ground Squirrels (*Spermophilus citellus*) at high and low population density. *Lynx*, 39(2):305 – 515, 2008.
- Michal Ambros, Current knowledge on the distribution of the European Ground Squirrel (*Spermophilus citellus*) in Slovakia in 1996–2008, *Lynx* 39 (2): 219–233, 2008

- Murariu D. Mammal ecology and distribution from Dobrogea (Romania). - *Trav. Mus. Nat. His. Nat. Gr. Antipa*, Vol: 49: 387-399, 2006.
- Sokal, R.R. And Rohlf, F.J. *Biometry: the principles and practice of statistics in biological research*. 3<sup>rd</sup> ed. New York: W.H. Freeman and Co., 2001
- Yensen E., Quinney D. L., Johnson K., Timmerman K. and Steenhof K.. Fire, vegetation changes, and population fluctuations of Townsend's ground squirrels. *American Midland Naturalist* 128:299–312. 1992.

# PORE SIZE AND GEOMETRY OF RESERVOIR ROCKS USED AS KEY FACTOR FOR DRILLING AND COMPLETION FLUID DESIGN OF OIL WELLS

*Ali Elsaeh Enbaia Dr., Petroleum Engineering Department*

*Illiya Amalina Binti Ahmad Ramdzani,*

Applied Geology Department, School of Engineering and Sciences,  
Curtin University of Technology, Miri, Sarawak, Malaysia

---

## Abstract

The initial poor well productivity in many cases is a result of the lack of control for fluid loss and the invasion during drilling and completion operations. Rock formation attributes like pore geometry within the rock should be considered as a key factor in the design and selection of reservoir drilling and completion fluids with capabilities to control the fluid loss and the invasion effectively.

Drilling and completion engineers as well as related professionals need to have a better understanding of sizes and shapes within the reservoir pore system in order to formulate optimum fluids to minimize the formation damage. The size and shape of pores, pore geometry, is usually determined using direct visual methods like petro graphic thin section analysis and scanning electron microscopy (SEM). The Mercury injection porosimetry has also been used as an indirect method to get the pores' size.

Limitations of pore geometry SEM measurements have been revised and applied in both synthetic and real formation samples with the usage of fundamental concepts, methods and available data of pores. The digital image processing and analysis are presented as an applied technology tool used to enhance the pore system interpretation, as soon as images were obtained through conventional SEM practice. Concepts like pore throat, body, connectivity and 2D to 3D analysis were discussed in detail to make the actual pore geometry information more accessible and useful to drilling and completion fluid design teams.

---

## Introduction

Reservoirs drilling fluids or Drill-In fluids have become widely used in recent years due to their relationship with higher levels of well productivity. Properties of these fluids have been studied mainly from the perspective of rheological and filtration tests performed extensively in the lab in a trial and error approach.

Filtration testing using paper or synthetic ceramic media is an approximate way to evaluate bridging materials in order to control possible fluid losses. This approximation introduces an error in fluid design that will be critical if there is not a good matching with representative rock pore geometry, piece of information not available in most cases, and introducing the use of field rules of thumb, like the calculation of the square root of permeability to get pore geometry "risky" values.

Formation attributes from any candidate well come usually as a geological-petro physical report from offset well cores, with little or no mention to formation pore geometry. Sometimes mercury porosimetry is presented, somehow its interpretation is not simple, and data provided is an indirect pore size distribution technique. Pressure is measured and pore aperture radii and general pore size are calculated from it. There is no information of pore shape.

Direct visual methods, on the other hand, give no representative quantitative but rather qualitative information of pore sizes and shapes. This limitation can be solved after appropriated sample preparation and observation through SEM in BSE (Backscattered Electron) detection mode followed by digital image processing and analysis of two dimensional images.

Stereology has been defined (Russ, 1991) as the study of the three-dimensional structure as revealed in two-dimensional images, usually of sections through it. Stereometry is, therefore, the measurement of these structures. In Stereology we are forced by the very nature of the measurement process to sample the 3-D structure, and the extent to which our samples reveal the “truth” about what is there is fundamentally a statistical problem. In our case, two-dimensional images are representative sections through a 3-D structure of a rock. This is almost always shown as a plane, because it makes the mathematical analysis simpler and corresponds in most cases to the way actual sections are prepared (by cutting, grinding, etc). These images show pore geometry clearly differentiated from the clastic grain arrangement or fabric as geologists call it. More accurate measurement of pore bodies and throats and how they are connected will be the input to optimum selection of seal properties on any working fluid proposal.

#### Pore Geometry Fundamentals (Precompaction Geometry-Packing)

Two principal sedimentary characteristics, which affect the packing, are the shape of grains and their geometric arrangement. Almost all theoretical and experimental studies of packing have used spherical particles or points in space. The principles are well understood and for geologists interested in sediments, have been presented at length by Graton and Fraser (1935), who dealt with the regular packing of spheres and progressed, to more irregular, random packing arrangements. Naturally, there is criticism of using spheres as model grains.

There are two types of layers, which are stable against the force of gravity acting alone; they are the square and simple rhombic (Figures 1A-B), and there are three simple ways of stacking square layers one on top of another (Figures 2A-F). Because two of the three ways of staking square layers are identical to, but differently oriented from, two of the three ways of staking simple rhombic layers, there are six fundamental regular arrangements. Two of these six arrangements repeat as to form (grain volume, porosity) but differ in symmetry and hence in tortuosity and permeability.

In addition, the six packing types can be characterized in terms of coordination numbers and the number of other grains touched by an arbitrarily chosen central grain. Coordination numbers, which are common in crystallographic terminology, are almost impossible to derive for compacted sediments and rocks. Their packing must be described in other less precise terms, partly because the packing of natural grains is seldom regular to any appreciable extent and partly because of cementation.

The porosity of regular packing configurations is fixed and directly related to the geometric arrangement of the pack. Because the sorting of grains of the six types of packing is regular, the sorting of their pores is also regular. Graton and Fraser (1935) made extensive determinations of the geometry of the pore space, including serial sections of the pores in the regular packs (Figures 3A-B).

Figure 1: Plan View of two types of regular packing layers. A simple square layer and B simple rhombic layer

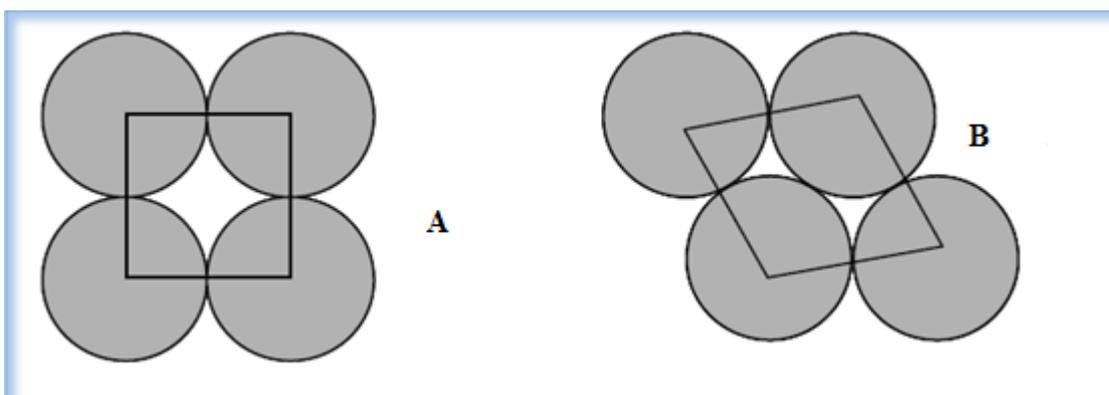


Figure 2: Six regular pack configurations of uniform spheres. Cases A-C are arrangements of square layers, Cases D-F represents similar offset of stacks of rhombic spheres.

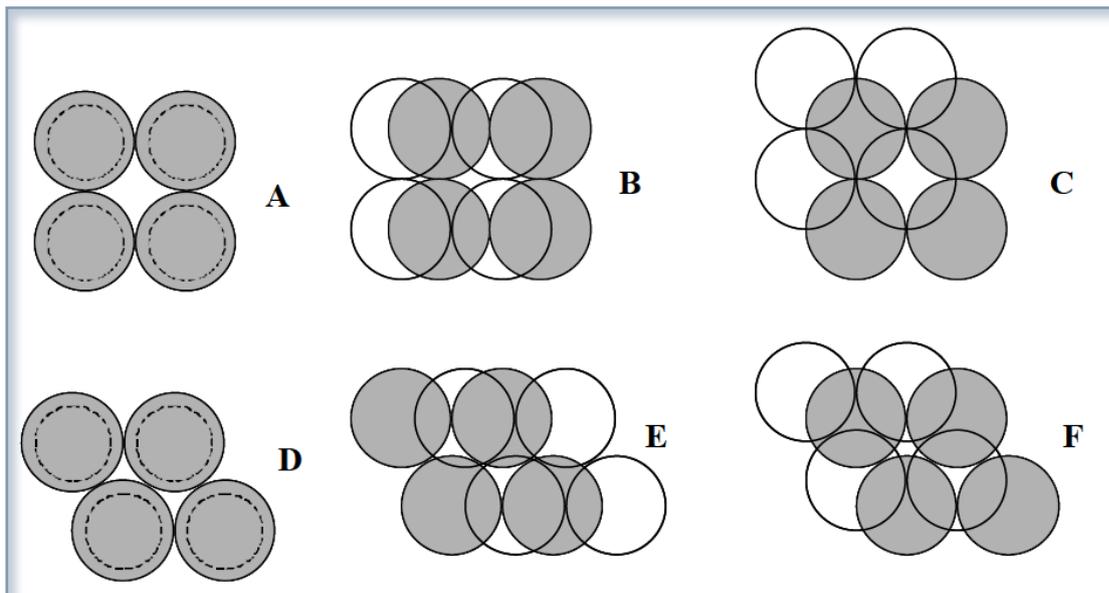


Figure 3: Geometry of pore space in cubic and rhombohedral packing, seen as though the solid spheres were removed. Right – hand figures represent different cross sections.

It is clear that the space in rhombohedral packs is not only less (25.9% porosity versus 47.6% for cubic packs), but the geometry of the pore space is markedly different. In rhombohedral packs there is less grain surface area exposed to wetting fluids and the capillary pressure and surface tension for the whole pack are higher. All of these characteristics affect the subsequent compactive forces as they relate to solution of the grains under pressure and the maintenance of pore pressure.

### Packing heterogeneities

Small-scale packing heterogeneities have been investigated by Morrow (1971) in terms of the distribution of pore sizes, which is indicative of grain size heterogeneities in sediments without clay or cement. Packing heterogeneities occurs where there are variations in particle size or packing in different areas of the rock. Capillary pressure drainage curves can be used to characterize packing heterogeneities in rock, because the slope of the curve reflects the pore size distribution of porous sand. In addition, larger interconnected pores tend to drain faster than smaller ones (Figure 4A).

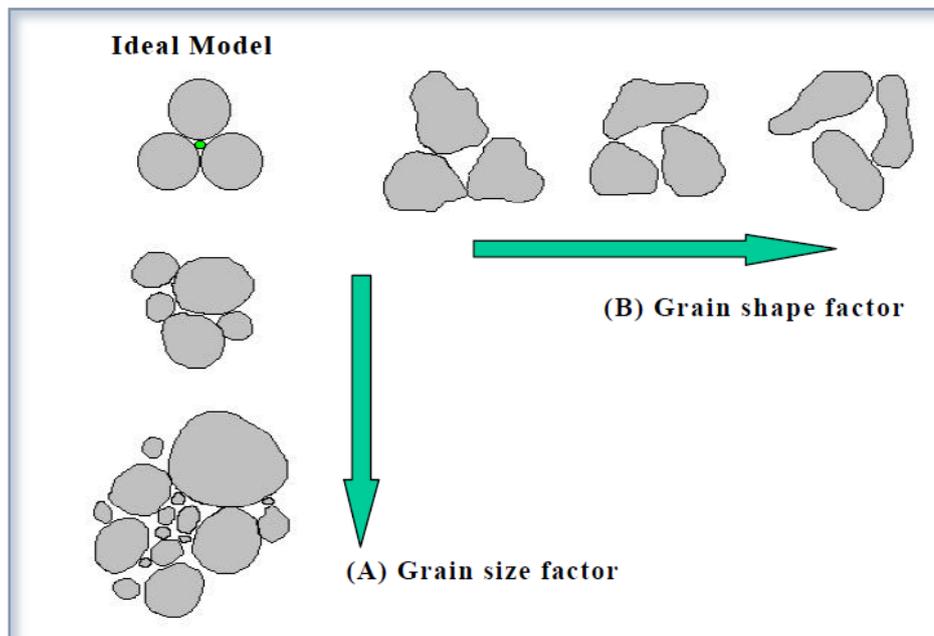


Figure 4: Effect of random packing heterogeneities (A) Size, (B) Shape.

### Random packing of irregular grains

The shape of sedimentary grains is probably never spherical, not even in politic sands, and these irregularities in shape should result in a larger possible range of grain percentages in sediments, because irregular grains theoretically may be packed either more tightly or more loosely than regular packed spheres. The shape of marine sand grains is reported to be fairly uniformly disk shaped and may be packed more tightly to the third dimension, with flat sides together, which would allow for higher grain volume percentage. The grain volume percentage for beach sand does not differ widely from that on spherical grains (Figure 4B).

### Experimental

Three types of porous media were prepared for SEM-BSE observation. Resin impregnated flat and polished casts of non-consolidated and consolidated sandstone, and one fragment of aloxite ceramic, provided the raw digital images that were processed and analyzed to get information on pore body and pore throat size distribution and also information on pore connectivity and pore shape. All these attributes are explained in detail on each example.

Consolidated sample images (aloxite, consolidated sandstone) show a less disturbed pore geometry that can be visualized in 3-D using original 2-D images as input. This practice gives a clear picture of how tortuosity would be and how pore throats can be related to restrictions of flow path. Non-consolidated samples unfortunately are affected by confining pressure conditions that change from bottom hole to surface. Handling of this kind of sample (freezing, trimming, and cutting) alters original spatial grain arrangements.

## Results and Discussion

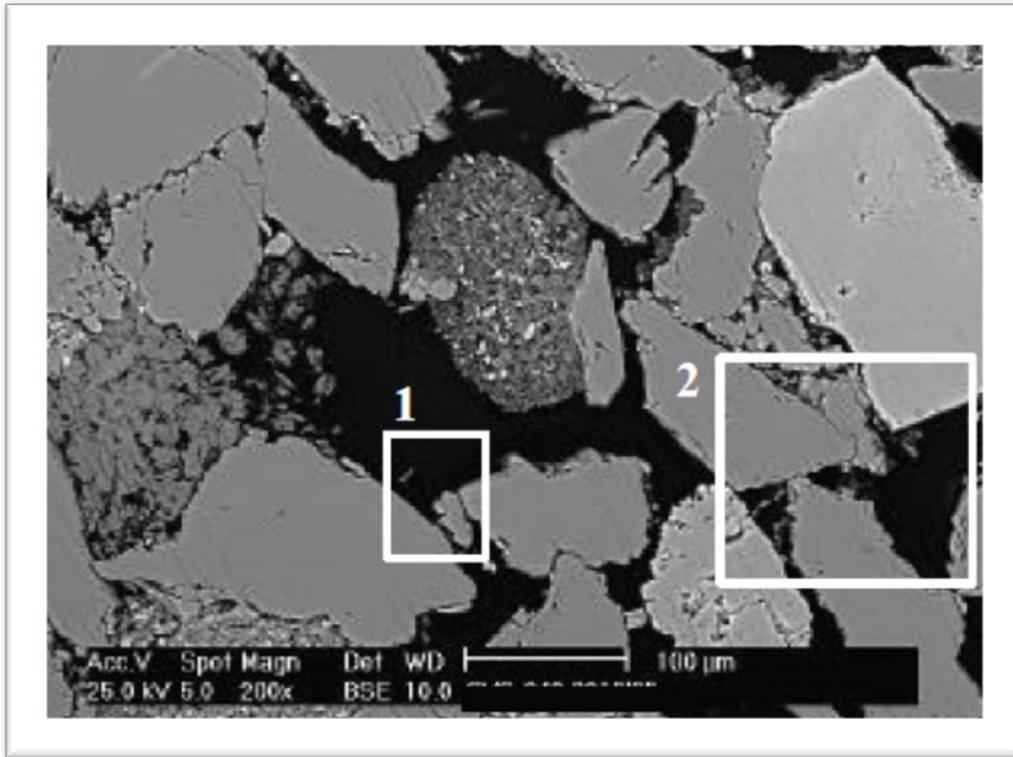


Figure 5: 3.D Conversion from 2-D rock image, defining pore throat, pore body and pore connectivity

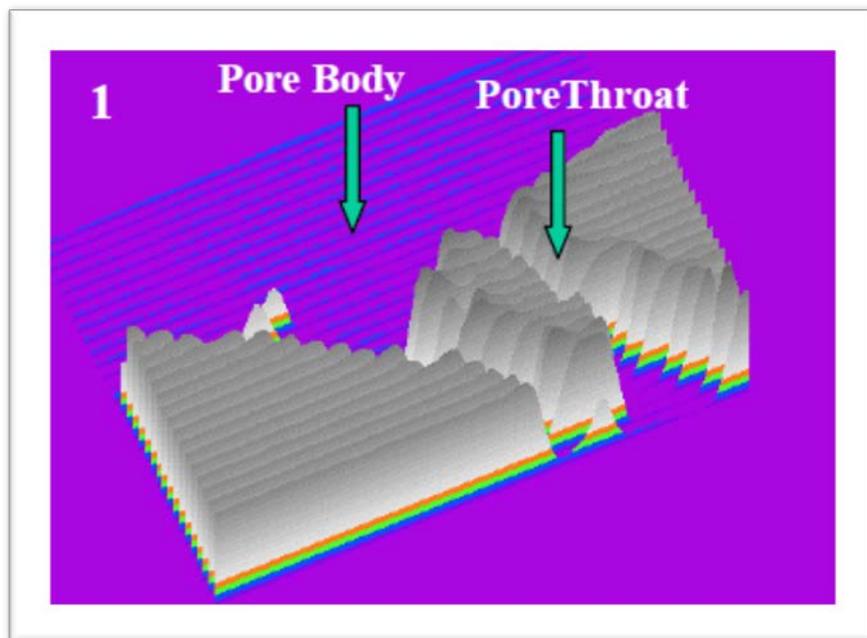


Figure 6: Defining pore throat, pore body and pore connectivity

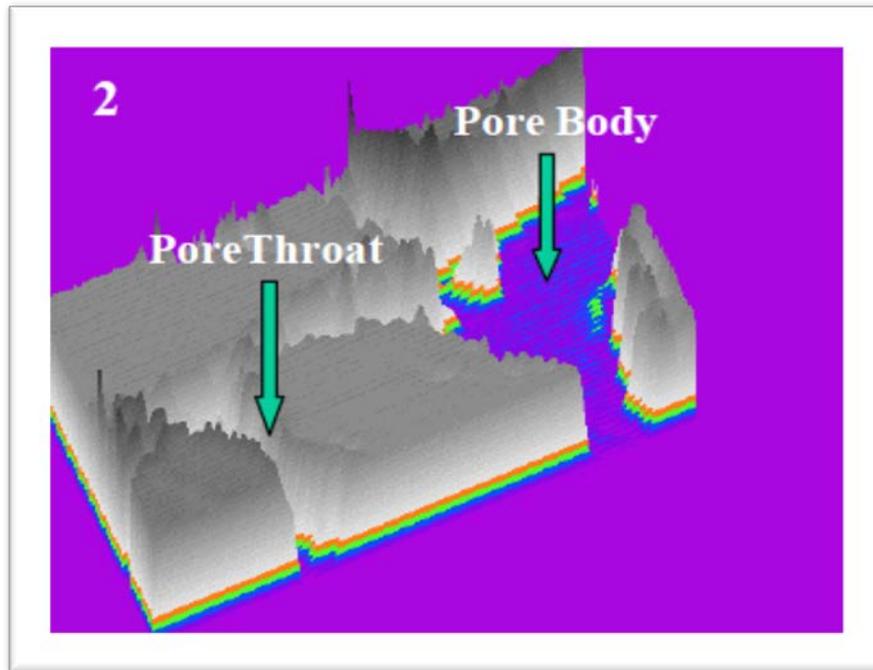


Figure 7: Defining pore throat, pore body and pore connectivity

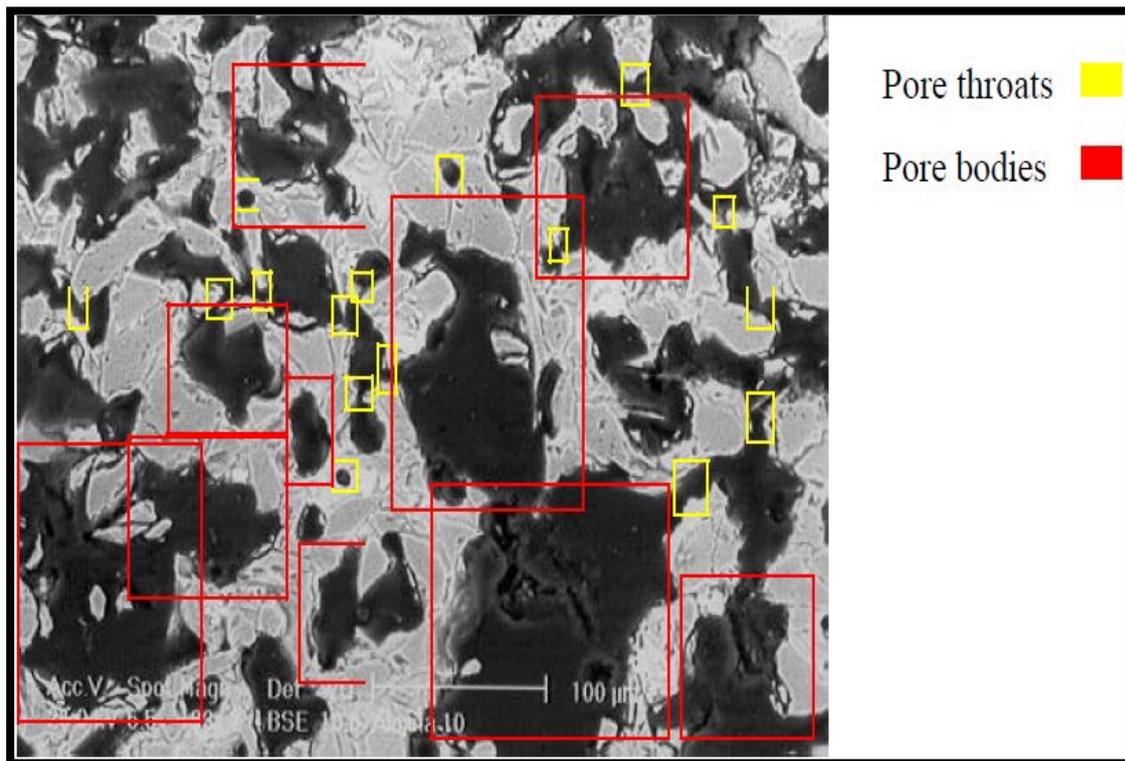


Figure 8: Synthetic Porous Media (aloxite ceramic – 10  $\mu$ m)

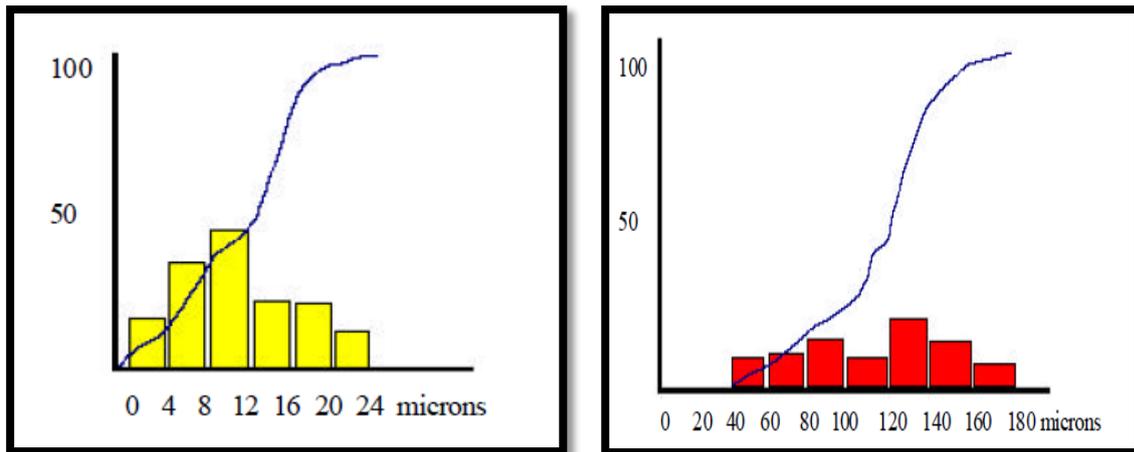
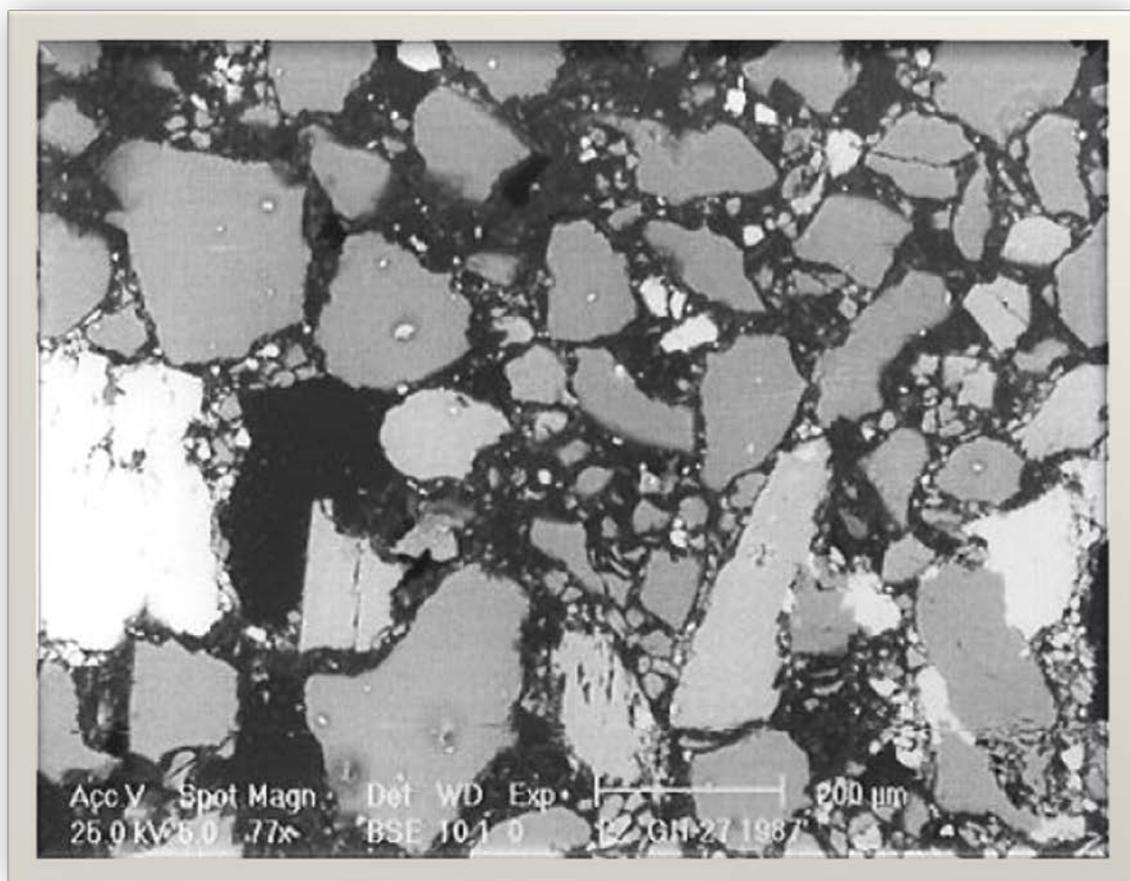


Figure 9: Non-consolidated sandstone (bitumen)

Picture bar scale is 100 microns. Black tone is resin filled pore space. Size distribution is given for both pore bodies and throats. This synthetic media shows high connectivity between pores with irregular shapes. Pore throat size distribution is narrow and gives a mean value of 11 microns.

Figure 10: Non-consolidated sandstone (bitumen)



The manufacturer reports 10 microns as the mean value. Pore body size distribution is broad with a mean value of 110 microns. With these numbers this porous media can be subjected to filtration tests selecting the optimum particle size distribution of bridging agent.

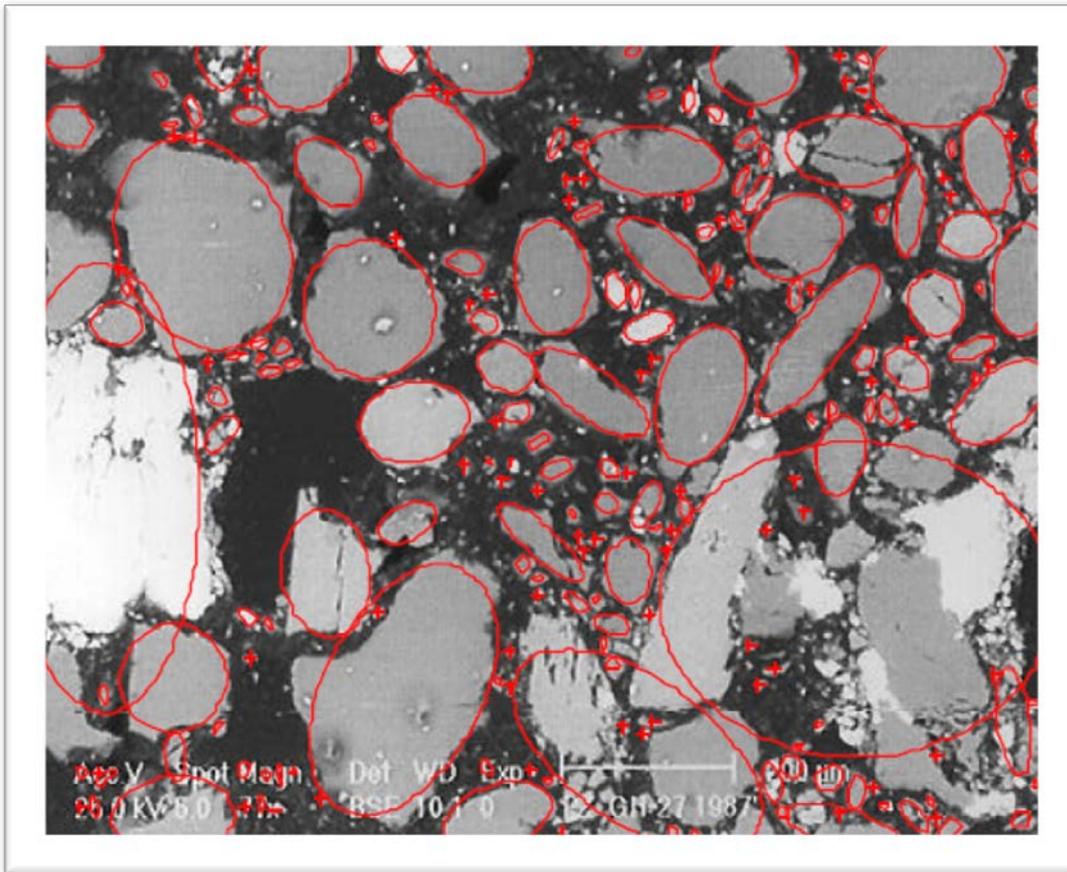


Figure 11: Non-consolidated sandstone (bitumen)

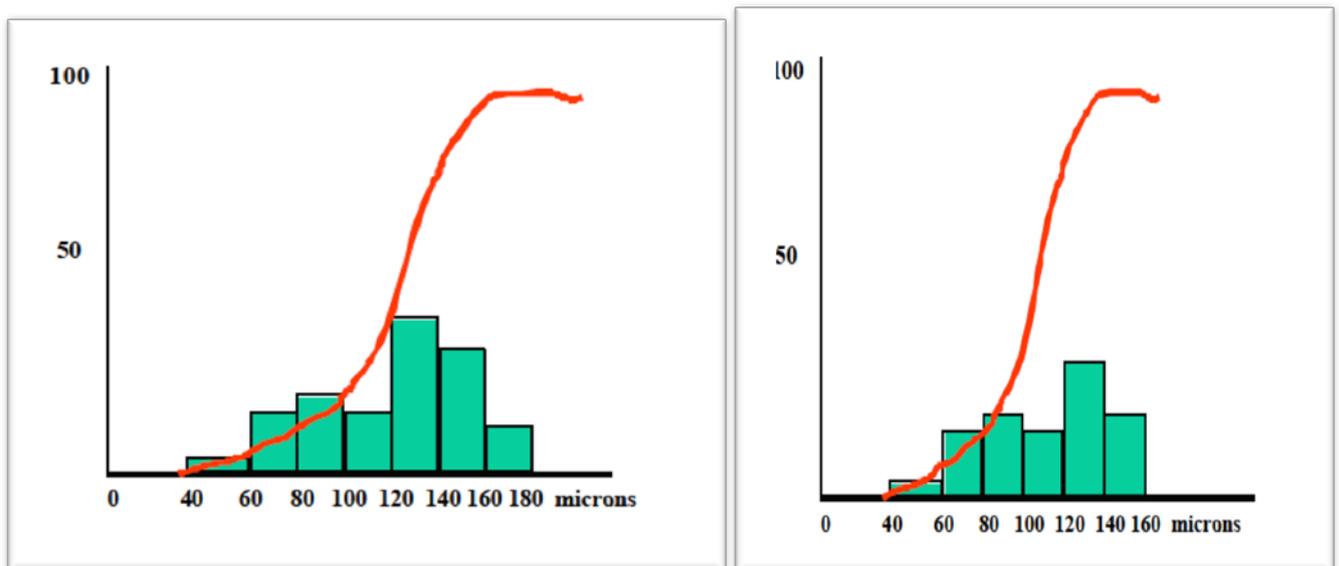


Figure 12: Non-consolidated sandstone (bitumen)

Clastic grains are computer measured to resemble an ellipse, with equivalent average diameters. Two big ellipses include several grains and are not considered for actual calculations. The histogram presented represents a visual granulometry with a mean (D) of

130 microns. Grain shapes are quite irregular in some cases where prismatic habit dominates (potassium feldspar) and also the effect of cementing material is observed (siderite). If the expression  $d = 0.155 (D)$  is used, an equivalent pore throat for a rhombohedral arrangement is about 20 microns, and for a cubic arrangement would give an equivalent pore throat of  $d = 0.414 (D)$ , or 54 microns.

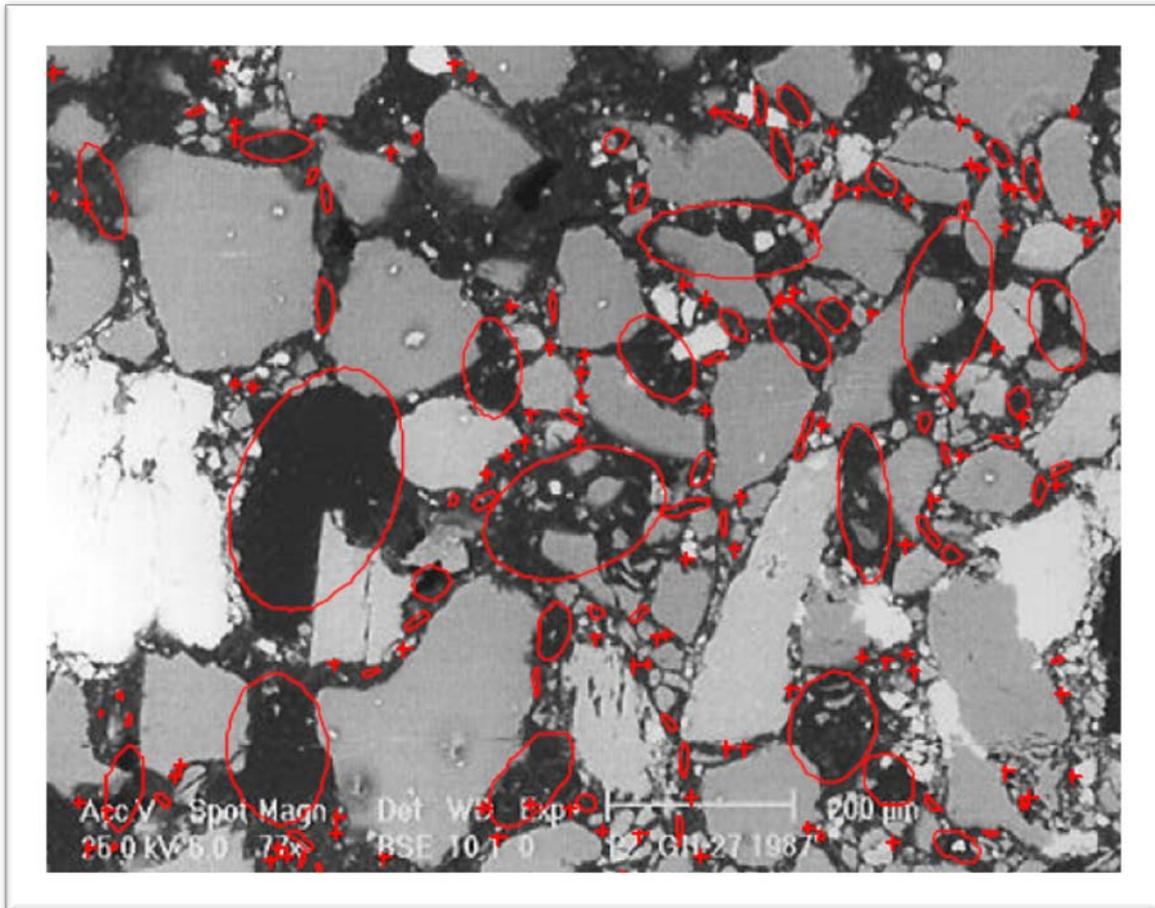


Figure 13: Non-consolidated sandstone (bitumen)

As an exercise, the computer program considers the open pore space for equivalent ellipses. Values range from 15 to 200 microns pore bodies, with a mean value of 38 microns. Bitumen holds the grains in this sample. In non-consolidated sandstones for gas or condensates, this type of structure will tend to collapse and lose its original packing arrangement. Therefore a higher degree of error is introduced when working with nonconsolidated rocks as compared to consolidated rock samples.

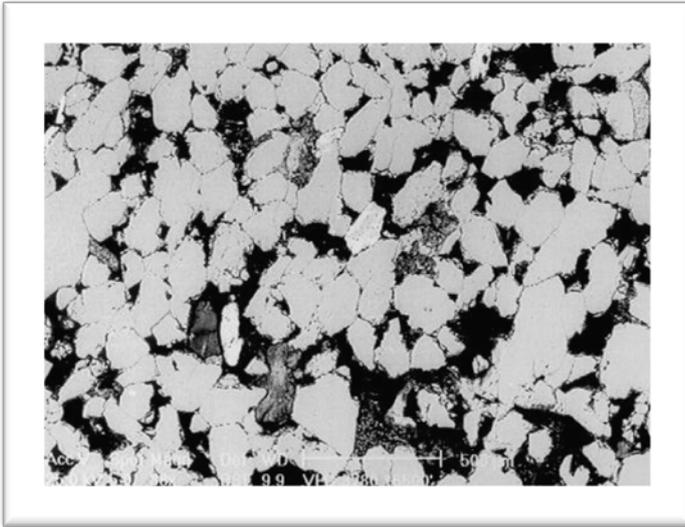


Figure 14: Consolidated Sandstone

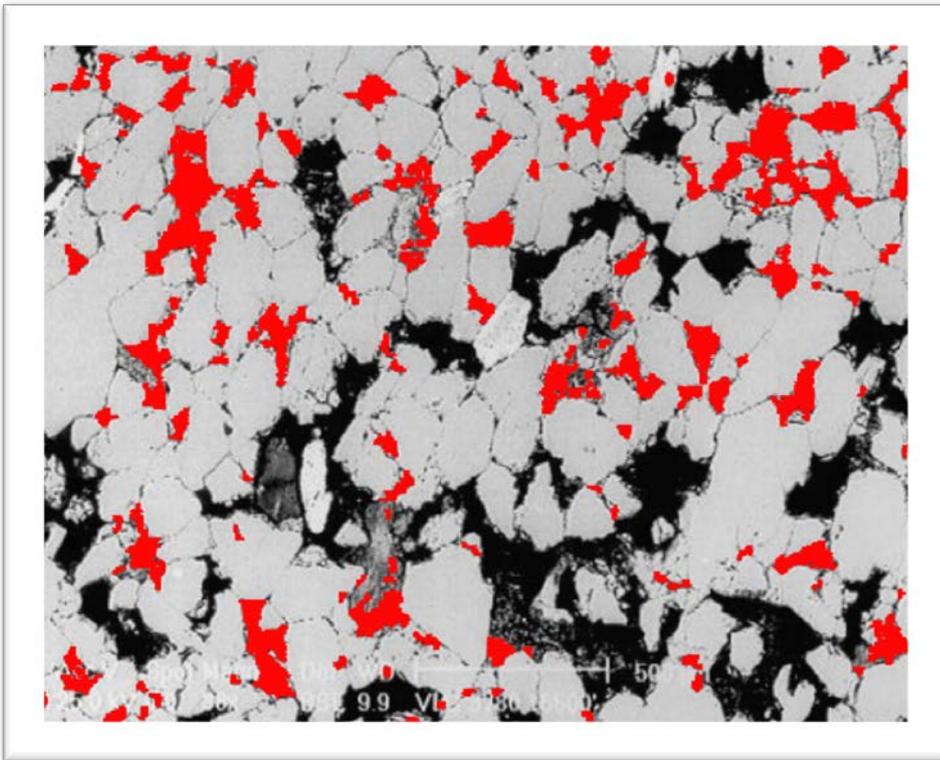


Figure 15: Consolidated Sandstone

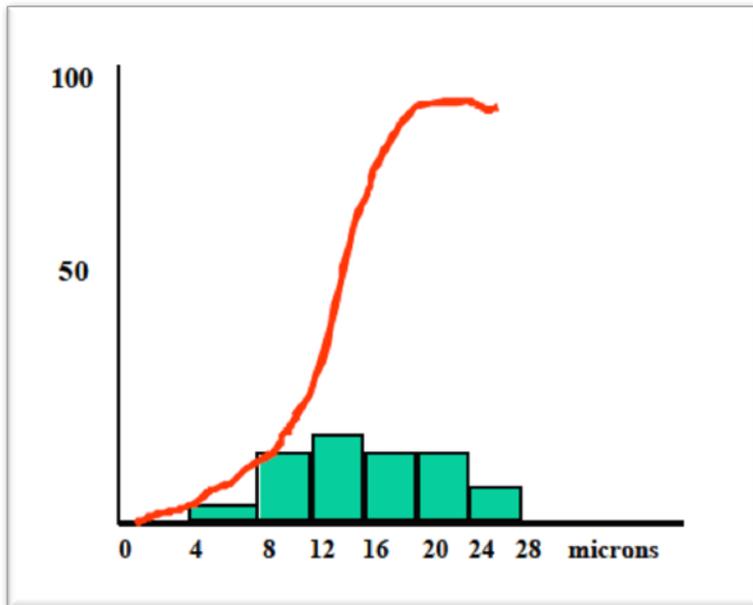


Figure 16: Consolidated Sandstone

Consolidated rock samples have the advantage of providing direct pore geometry measurement. On the example above, the range of pore throat sizes is between 6 and 30 microns, with a mean value of 16 microns.

### Conclusion

In consolidated porous media (aloxite/consolidated formation) pore throats or flow path restrictions can be measured using the minimum diameter size distribution from the computer program. Pore body measurement presented a broader distribution, which might not provide a valid statistics.

In non-consolidated porous media, grain size distribution as well as its shape provides a more representative statistics than the direct measurement of pore bodies and throats due to a highly irregular spatial arrangement that depends on the original confining pressure, so original pore geometry might be lost during handling and sampling.

Permeability should not be a parameter to compare rock formations in terms of how bridging agents can create a seal. Different pore geometries can have the same permeability but not the same filtration properties. This means, a test failure when assuming that permeability can give a representative average pore throat size.

If rock pore geometry information can be provided before any drill-In or completion fluid is designed, the probability of success would be higher. Sidewall core samples and even drill cuttings from consolidated formations could be useful to get this information.

Computer programs on image processing and analysis are a valuable tool that makes simple the interpretation of pore geometry attributes in formation material.

### Acknowledgements

I wish to thank the management of Shell Oil Company – Sarawak – Miri for permission to publish this work. Special thanks to Mr. Dr. Abdullah Said Al Abri, leader of the Formation Evaluation Group for his comments and advice on the subject.

### References:

Russ, J.C. "Practical Stereology", 1991. Plenum Press, New York

Graton, L.C. and Fraser, H. J. "Systematic packing of spheres with particular relation to porosity and permeability". J. of Geol., 1935, Vol. 35. pp 785-909.

Morrow, N. R. "Small scale packing heterogeneities in porous sedimentary Rocks" Bull. Am. Assoc. Pet. Geol., 1971, Vol. 39. pp 514-522.

# EXAMINATION OF THE EIGENVALUES LORENZ CHAOTIC SYSTEM

*Ercan Kose, PhD*

*Azize Akcayoglu, PhD*

Mersin University, Mersin/Turkey

## Abstract

In this paper, Classical Lorenz Equations are simulated using MATLAB/Simulink, by getting the graphical outputs performances of the equations are studied. The butterfly effect was seen in the expected output graphs. Classical Lorenz Equations were linearization and then Jacobian matrix was obtained by MATLAB software in embedded system and eigenvalues calculated. The numerous eigenvalues poles were seen on the right axis side of the complex plane. These poles are causes the unstable behaviors.

**Keywords:** Lorenz Equation, Chaos, Stabilite, MATLAB, Simulink

## Introduction

Chaos is a well-known nonlinear phenomenon, and it is the seemingly random behavior of a deterministic system that is characterized by sensitive dependence on initial conditions. Besides, chaos is occasionally preferable, but usually intrinsically unpredictable as it can restrict the operating range of many physical devices and reduce performance (Hsiao, 2013).

Chaos theory was appeared as a scientific discipline at 1960's with Edward Lorenz, who has studied to model meteorological systems with Lorenz Equations in computer environment by using the data he collected to estimate the weather forecast (Uyaroğlu, 2009).

Chaos, a nonlinear phenomenon, has been intensively investigated in medical science, biology, and physics (Ma, 2011).

In these days, Chaos theory has successful applications in the fields such as secure communication, automatic control systems, laser physics and financial modeling (Uyaroğlu, 2009).

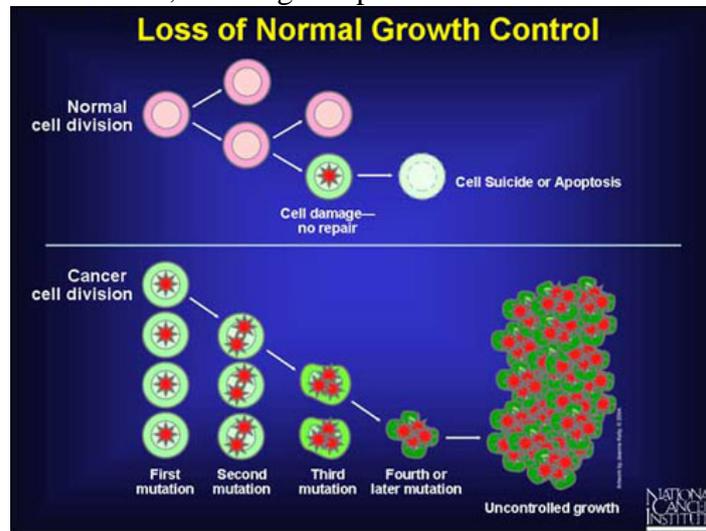
The problem of controlling chaos has recently attracted the attention of many investigators. Though chaos is a beneficial feature in some chemical or heat and mass transport processes (Ottino, 1989).

Many researchers have endeavored to find new ways to suppress and control chaos more efficiently. So far, many researchers have presented different types of controllers and control methods, e.g., linear state error feedback control (Uyaroğlu, 2013) (Wu, 2007), sinusoidal state error feedback control (Chai, 2007), variable substitution control (Wu, 2006), variable structure control (Yan, 2007), nonlinear feedback control (Chen, 2004), active control (Thang, 2009), and adaptive control (wei, 2007) have been successfully applied to chaotic systems (Uyaroğlu, 2013).

For the study of chaos theory and application of new or existing chaotic attractors reveal the chaotic systems and improve the dynamics of topological structure, besides the current system has an important place in terms of applicability (Uyaroğlu, 2009).

The chaos studies consist of the processes to improve the terminated chaotic behaviors or chaos behavior of systems to stabilize the structure, systems and methods for more efficient use of areas. For example, the behavior of cancer cells shows a chaotic structure in a shown Picture 1. The disease cancer occurs due to a group of cells exist differentially in the body, as

a result of excessive and uncontrolled proliferation. Normally, the growth and proliferation of cells is a normal regime. Accordingly, tissues and organs are able to do their duties as normal. However, these cells start to grow and replicate abnormally, this process give rise to the formation of masses called tumors (novartisonkoloji ). Here, the chaotic behavior should be terminated and the cell structure, showing cell proliferation must be stabilized.



**Picture 1:** Cancer Cell Division (Cancer)

In another example, a dishwasher water distribution nozzles engaging movement in the structure behaves as a dynamical chaos ensuring more efficient washing of the dishes has been provided (Chau, 2011).

In this study, taking advantage of the chaotic behavior of Lorenz equations with the help of MATLAB/Simulink simulation studies were obtained. The changes of variables was examined by obtaining the eigenvalues.

### Lorenz Systems

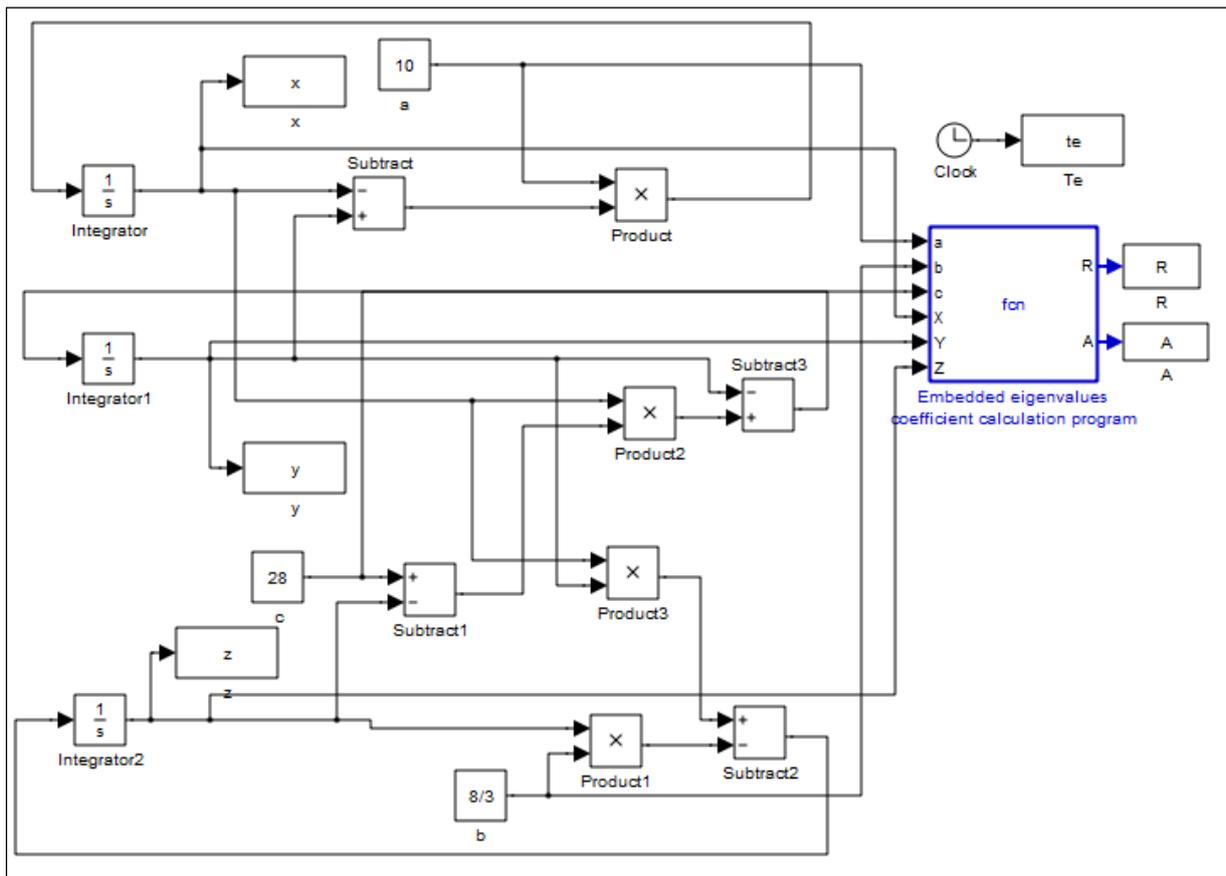
The Lorenz systems is described by the following nonlinear differential equations where  $x$ ,  $y$  and  $z$  are state variables, and  $a$ ,  $b$  and  $c$  are positive constant parameters when the typical parameter values for a Lorenz System are  $a=10$ ,  $b=8/3$  and  $c=28$ ;

$$\begin{aligned} \dot{x} &= a \cdot (y - x) \\ \dot{y} &= x \cdot (c - z) - y \\ \dot{z} &= x \cdot y - b \cdot z \end{aligned} \tag{1}$$

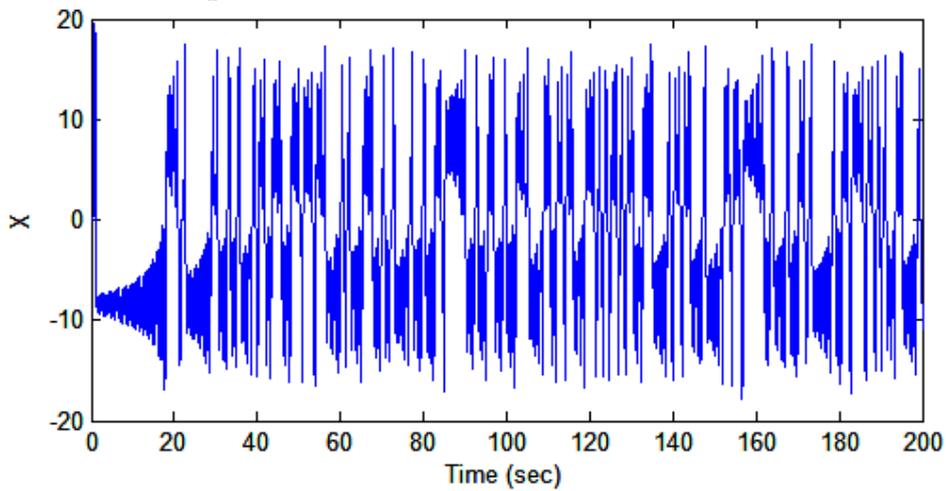
The Lorenz systems is described by

$$\begin{bmatrix} \dot{x} \\ \dot{y} \\ \dot{z} \end{bmatrix} = \begin{bmatrix} -10 & 10 & 0 \\ -28 & -1 & 0 \\ 0 & 0 & -8/3 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} + x \cdot \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & -1 \\ 0 & 1 & 0 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} \tag{2}$$

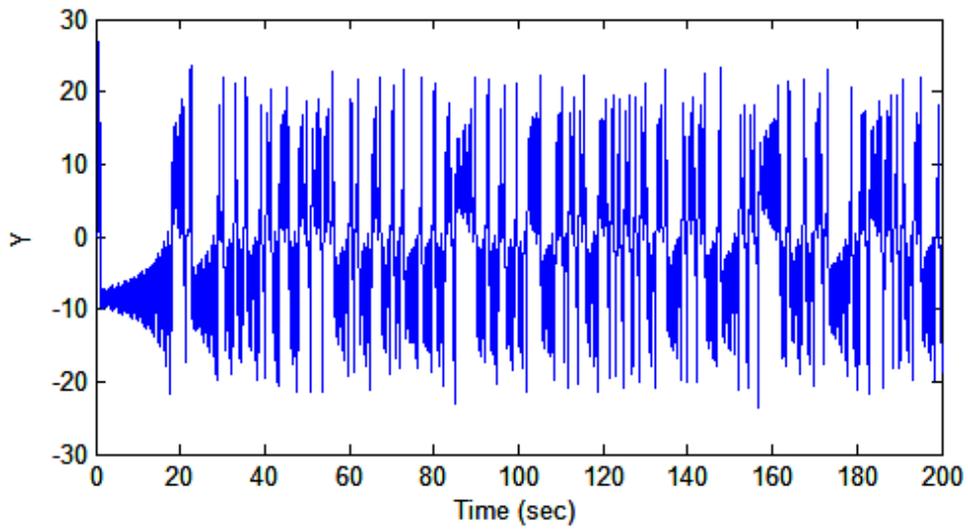
Using a MATLAB/Simulink model, as shown in Figure 1., the time series of the Lorenz chaotic system are shown in Figure 2, Figure 3 and Figure 4., the  $xy$ ,  $xz$ ,  $yz$  and  $xyz$  phase portraits are showing in Figure 5, Figure 6, Figure 7 and Figure 8 When  $x_0=0.001$ ,  $y_0=0.001$  and  $z_0=0$ .



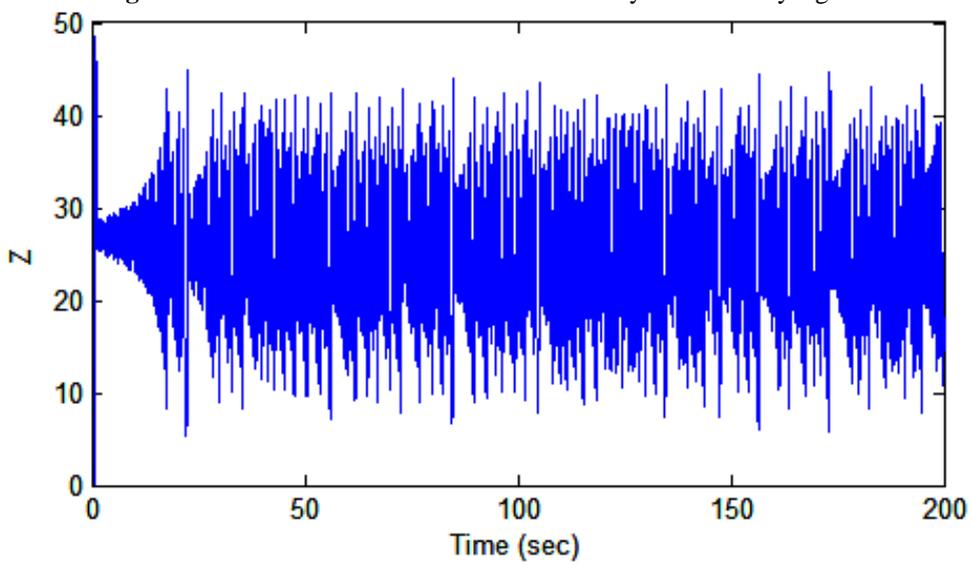
**Figure 1:** Lorenz MATLAB/SIMULINK chaos model



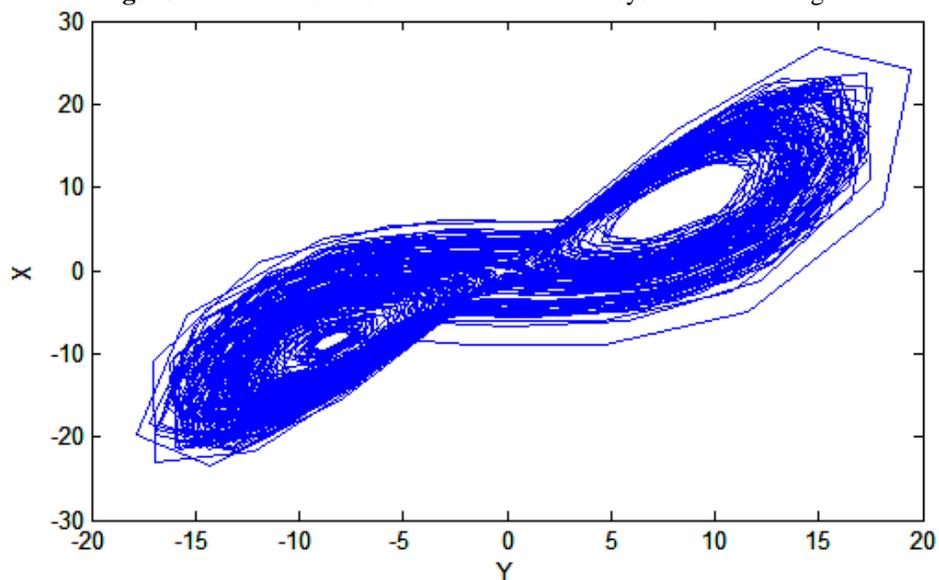
**Figure 2:** The time series of the Lorenz chaotic system for the x signal



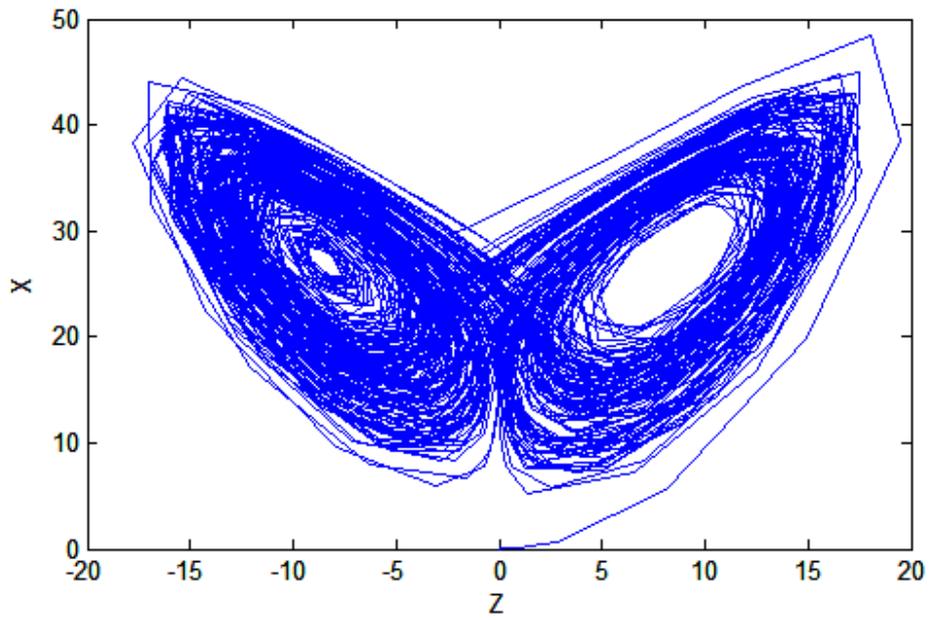
**Figure 3:** The time series of the Lorenz chaotic system for the y signal



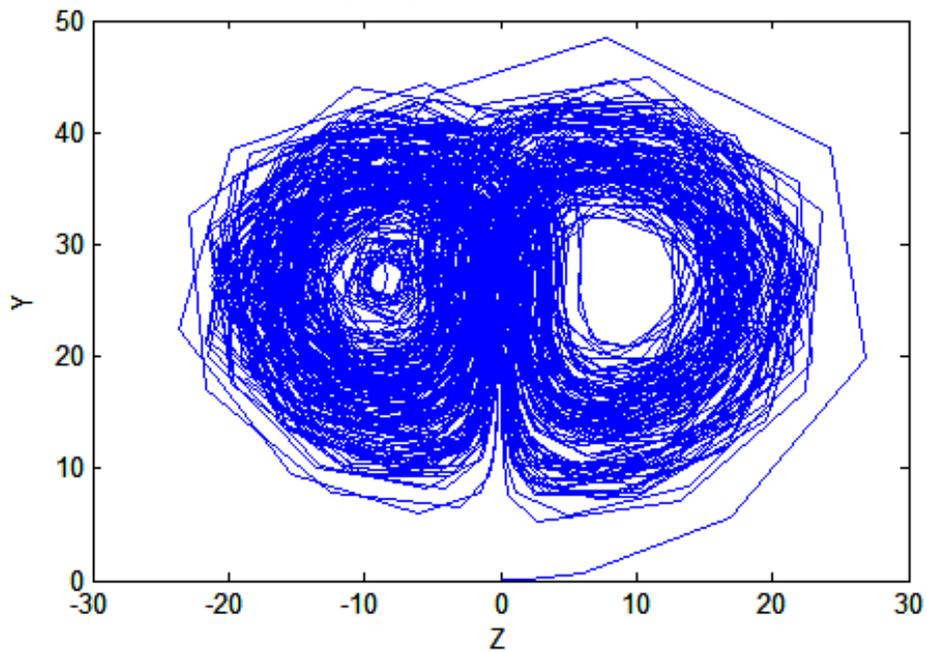
**Figure 4:** The time series of the Lorenz chaotic system for the z signal



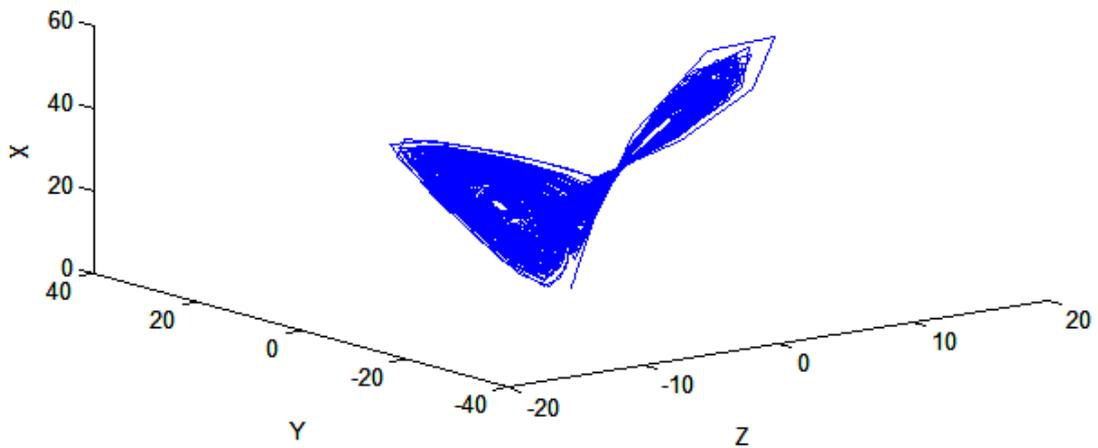
**Figure 5:** xy phase portait of the Lorenz Systems



**Figure 6:** xz phase portait of the Lorenz Systems



**Figure 7:** yz phase portait of the Lorenz Systems



**Figure 8:** xyz phase portait of the Lorenz Systems

Phase portraits are showing in Figure 5, Figure 6, Figure 7 and Figure 8. The butterfly effect was seen in the expected output graphs.

The stable and unstable points of the system variables was examined by obtaining the eigenvalues. The system is linearization to accomplish eigenvalues and then the Jacobian Matrix is obtained by using the first terms of linear elements.

$$\begin{aligned}
 f_1 &= \dot{x} = a \cdot (y - x) \\
 f_2 &= \dot{y} = x \cdot (c - z) - y \\
 f_3 &= \dot{z} = x \cdot y - b \cdot z
 \end{aligned}
 \tag{3}$$

$$J = \begin{pmatrix} \frac{\partial f_1}{\partial x} & \frac{\partial f_1}{\partial y} & \frac{\partial f_1}{\partial z} \\ \frac{\partial f_2}{\partial x} & \frac{\partial f_2}{\partial y} & \frac{\partial f_2}{\partial z} \\ \frac{\partial f_3}{\partial x} & \frac{\partial f_3}{\partial y} & \frac{\partial f_3}{\partial z} \end{pmatrix} = \begin{pmatrix} -a & a & 0 \\ c - z & -1 & -x \\ y & x & -b \end{pmatrix} = \begin{pmatrix} -10 & 10 & 0 \\ 28 - z & -1 & -x \\ y & x & -8/3 \end{pmatrix}
 \tag{4}$$

The eigenvalues are found by solving the characteristic equation,

$$A = |\lambda I - J| = \begin{vmatrix} \lambda + 10 & -10 & 0 \\ -28 + z & \lambda + 1 & x \\ -y & -x & \lambda + (8/3) \end{vmatrix} = 0
 \tag{5}$$

Using eig(A) MATLAB code for eigenvalues of Lorenz chaos system.

Initial eigenvalues of  $\lambda_1 = 22.8277$ ,  $\lambda_2 = -11.8277$ ,  $\lambda_3 = 2.6667$  for  $x_0=0.001$ ,  $y_0=0.001$  and  $z_0=0$ . Initial eigenvalues are shown in Figure 9 (a, b, c.). All of eigenvalues are shown in Figure 10.

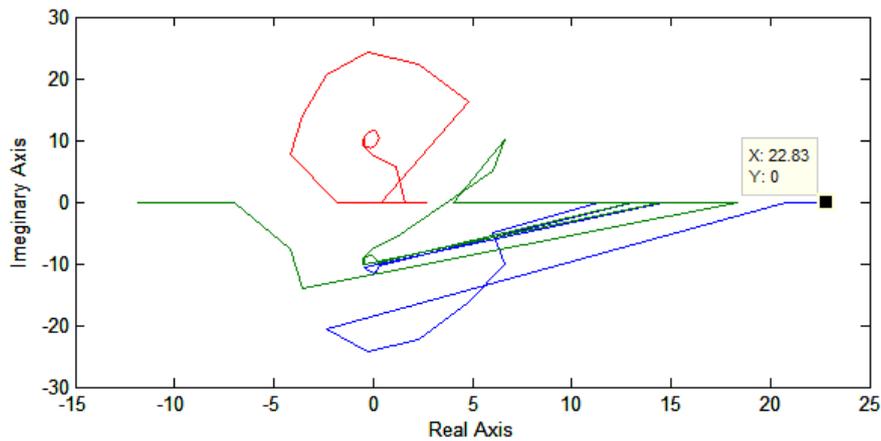


Figure 9(a): Eigenvalues coefficients in complex plane

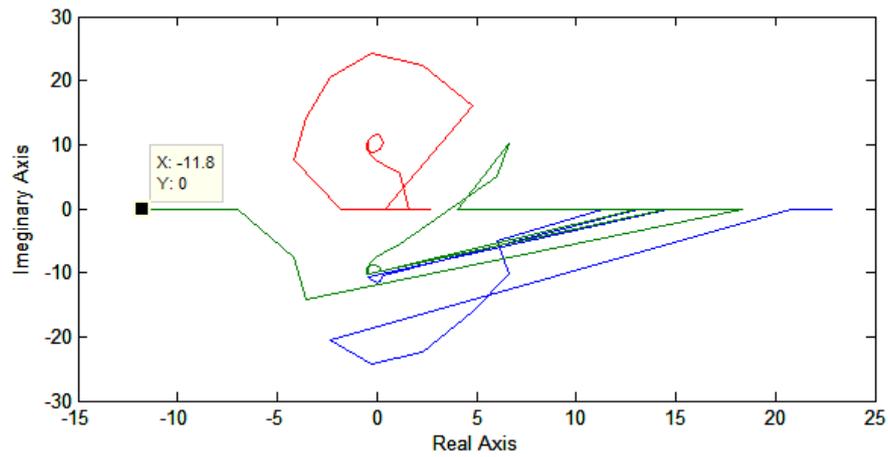


Figure 9(b): Eigenvalues coefficients in complex plane

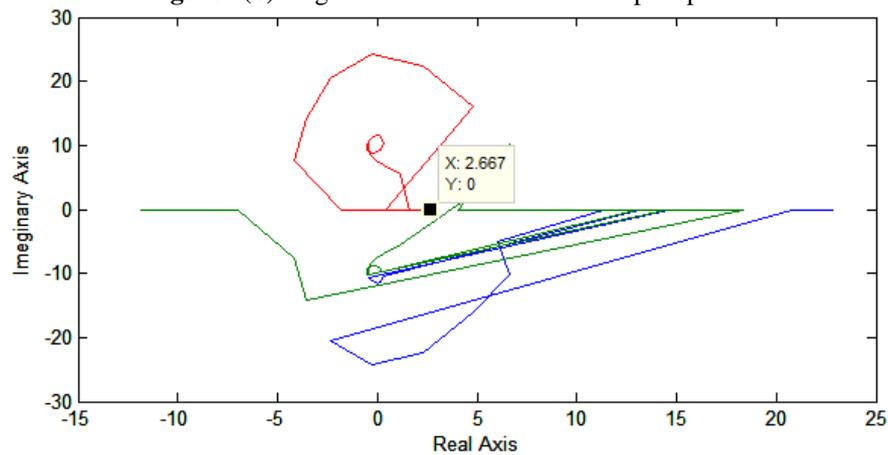


Figure 9(c): Eigenvalues coefficients in complex plane

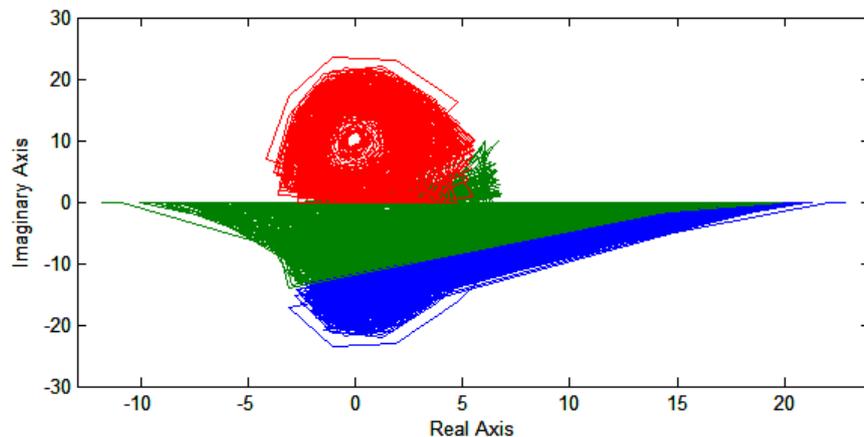


Figure 10: Eigenvalues coefficients in complex plane

## Conclusion

The aim of this paper is to investigate the stable of the Lorenz chaotic systems. It is seen in Figure 10 that the eigenvalues coefficients in complex plane are located on the right side of the complex plane axis. As a result of unstable of the system is causes the nonlinear behaviors. The eigenvalues of the system is show in Figure 9(a,b,c). The eigenvalues given reference 5 were achieved same values that in Figure 9(a,b,c). The various of eigenvalues coefficients in compex plane are revealed a chaotic behavior. In addition the butterfly effect was seen in the output graphs.

**References:**

- Hsiao, F. H. (2013) Robust  $H_{\infty}$  Fuzzy Control of Dithered Chaotic Ssystems. *Neurocomputing* Vol: 99, pp.509-520.
- Uyaroğlu, Y. Gündüz, S., Yiğın, İ. H. and Keskin, H. (2009) Simulation and Characterizaion of Lorenz Equations in Matlab and Simulink Enviroment at Chaos Theory. 5. *Uluslar arası İleri Teknolojiler Sempozyumu (IATS'09)*, 13-15 Mayıs, Karabük, Türkiye.
- Ma, C. Y., Liu, J. H. and Wang, C. L. (2011) Chaos of a Power System Model and its Control. *Journal of Vibration and Control*, Vol: 18(14), pp. 2176–2185.
- Ottino, J. M. (1989) Kinematics of Mixing: Stretching, Chaos and Transport, *Cambridge University Press*, Cambridge.
- Uyaroğlu, Y. and Cevher, B. (2013) Chaos control of Single Time-Scale Brushless DC Motor With Sliding Mode Control Method. *Turk J Elec Eng & Comp Sci.*, Vol: 21, pp.649 – 655.
- Wu, X., Chen, G. and Cai, J.(2007) Chaos Synchronization of the Master-Slave Generalized Lorenz Systems Via Linear State Error Feedback Control. *Physica D: Nonlinear Phenomena*, Vol. 229, pp. 52–80.
- Cai, J.P., Wu, X.F. and Chen, S.H. (2007) Synchronization Criteria for Non-Autonomous Chaotic Systems via Sinusoidal State Error Feedback Control. *Physica Scripta*, Vol. 75, pp. 397–387.
- Wu, X.F. and Wang, M.H. (2006) Robust Synchronization of Chaotic Lur'e Systems Via Replacing Variables Control. *Interna-tional Journal of Bifurcation and Chaos*, Vol. 16, pp. 3421–3433.
- Yan, J.J., Hung, M.L., Lin, J.S. and Liao, T.L. (2007) Controlling Chaos of a Chaotic Nonlinear Gyro Using Variable Structure Control. *Mechanical Systems and Signal Processing*, Vol. 21, pp. 2515–2522.
- Chen, M., Zhou, D. and Shang, Y.(2004) Nonlinear Feedback Control of Lorenz System. *Chaos, Solutions and Fractals*, Vol. 21, pp. 295–304.
- Tang, R.A., Liu, Y.L. and Xue, J.K. (2009) An Extended Active Control for Chaos Synchronization. *Physics Letters A*, Vol. 373, pp. 1449–1454.
- Wei, D.Q., Luo, X.S., Wang, B.H. and Fang, J.Q. (2007) Robust adaptive dynamic surface control of chaos in permanent magnet synchronous motor. *Physics Letters A*, Vol. 363, pp. 71–77.
- [http://www.novartisonkoloji.com.tr/Default.aspx?sayfa=hasta\\_kanser\\_nedir](http://www.novartisonkoloji.com.tr/Default.aspx?sayfa=hasta_kanser_nedir).
- <http://www.cancer.gov/cancertopics/cancerlibrary/what-is-cancer>.
- Chau, K.T. and Wang, Zheng (2011) Chaos in Electric Drive Systems Analysis. *Control and Application. John Wiley&Songs (Asia) Pte. Ltd.*

# STUDY OF BUILDING FIRE EVACUATION AND GEOMETRIC MODELING BASED ON CONTINUOUS MODEL FDS+AVEC

*Aristides Lopes da Silva, PhD Student in Computer Science -  
Computing Graphic, Researcher Wuhan University of Technology, China ,  
University of Cape Verde*

---

## Abstract

It is true that high buildings under fire accident, many people begin to shock against each other due to the failure evacuation opportunity in the reduction of visibility due to the spread of smoke and other factors. Therefore causing a huge loss of life and property. Along with the evolution of hardware and software, the technique of numerical simulation has been widely applied in the simulation of reconstruction of fire, making it useful in the analyzes of the characteristics in the project to improve the speed of evacuation of occupants. So this article has in its focal point to interpret geometric modeling techniques suitable for future 3D simulations of the dynamics of the fire with a case study applied to a building of 20 floors in China with an area of 2060m<sup>2</sup> (Technological Department of Wuhan University of Technology - Hubei, China) and the state of the art of this research topic. Some examples of geometric modeling scenarios for fire are vividly described, so as to introduce the study of the evacuation of fire in buildings based on the continuous model FDS+Evac.

---

**Keywords:** continuous model, building fire, FDS+Evac, evacuation simulation

## Introduction

Along with the growing number of high-rise buildings, all types of hidden dangers of accidents are also increasing, especially building fires, which are at great risk to strike. In order to obtain the relevant experimental parameters in a fire process, traditional experimental method of study and predict fire uses real size and characteristics to obtained data that is generally accurate. However, because of the large-scale of modern building, this sort of approach is clearly neither practical nor economical. This has to do with its small inputs, short period of simulation, and the trouble in the adaptation to complement of model experiments, it is being increasingly applied to the actual project [1, 2]. Thus, Fig. 1 shows the actual building modeling under test, and its location in accordance with *GoogleMaps*.

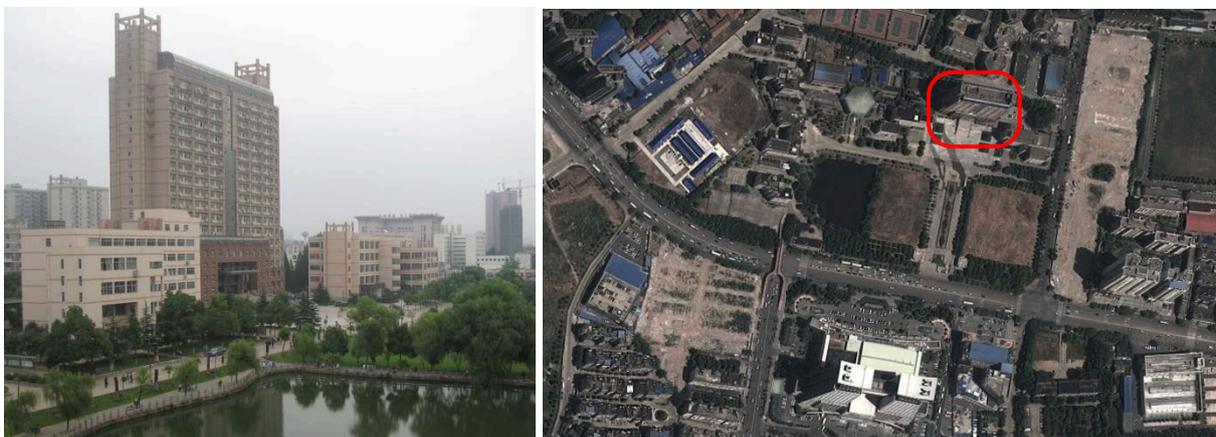


Fig. 1 – Technological Department of Wuhan University of Technology: Hubei, China

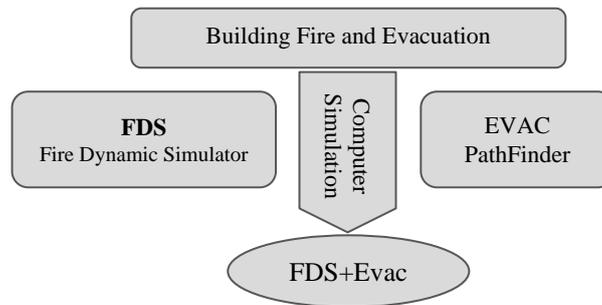


Fig. 2 – Simulation software system diagram

In the design of building safety, evacuation is critical, it directly affects whether personnel and substances can move quickly and safely under the sudden strike of fire and other unexpected events. The existing evacuation research, if divided by focus, mainly includes the focus on evacuation time research and the focus on law of evacuation behavior research. Among them, the timeliness of evacuation is first to be paid attention to. The study of calculating the time people used to reach the safety zone was carried earlier and more generalized. While due to the constrain of objective conditions, evacuation behavior study is limited to the investigation of survivors in the disaster, until 1900s, with the rapid progress of computer technology, a large number of evacuation models have emerged, research in this field began to enter a new stage [3], in which the United States National Institute of Standards and Technology (NIST), and VTT Technical Research Center on Finland jointly developed fire important practical value.

**Fire Dynamics Simulator**

FDS is a kind of fire simulation software developed by Building Fire Research Laboratory of NIST. FDS program is geared to the development of eddy simulation. Thanks to its unique fast algorithm and an appropriate mesh density, it can quickly and accurately analyze three-dimensional fires. FDS program can make use of other three-dimensional modeling software and grid generation tool to deal with complex geometric scenes. It can help resolve the, process of fire and smoke development and spread, besides, FDS includes an analysis of fire detectors and water-spraying fire-extinguishing system function modules (see tab. 1), which can be used to study the influence of safety installations to fire development. At the same time, FSD has an open program structure, good post-processing ability. Its results have been validated by lots of experiments. So it’s widely used in the field of fire safety engineering [4].

	Smoke_detector	Heat_detector	Sprinkler_pendent
inactive			
active			

Tab. 1 – Fire detectors, smoke and spray model

FDS	Set spatial region and simulation time
	Set grid and fire source
	Set flat sheet and detection point
	Calculate and display the results
	Establish calculation model

Tab. 2 – FDS, Operating structure of the basic steps

Thunderhead Engineering PyroSim is a kind of simulation software for fire-fighting. PyroSim graphical user interface can be used as Fire Dynamic Simulator (FDS). PyroSim is used to create fire protection simulation, accurately predict and analyze fire and smoke movement, temperature, and gas concentrations. PyroSim 2008 graphical user's interfaces for FDS<sub>version5</sub> and SMV (SmokeView).

PyroSim 2008's key features include:

- The use of floor plans, right-angle walls, and other powerful tools for two-dimensional and three-dimensional interactive geometry editor;
- Integration implementation of the FDS and SmokeView;
- One – to run the multi-CPU simulation
- Can import the existing FDS4 and FDS5 Model
- Can converted FDS4 format file to FDS5
- Directly introduce AutoCAD's DXF file, or as a Background image
- Smoke layer height calculation
- Support additional types of FDS



Fig. 3 – FDS, model building under study

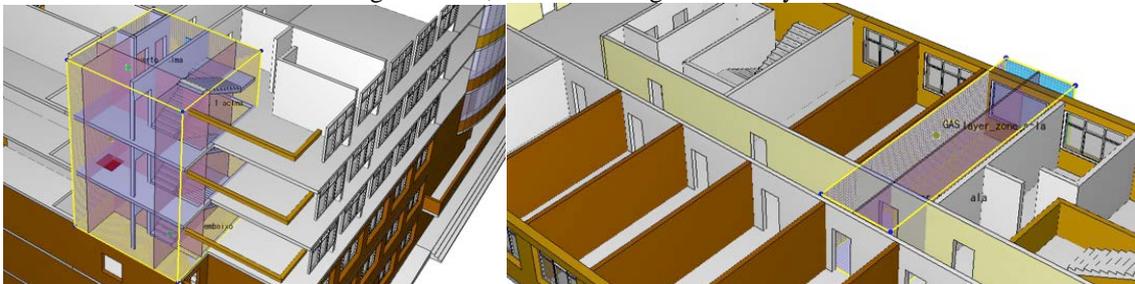


Fig. 4 – FDS, working with computational meshes

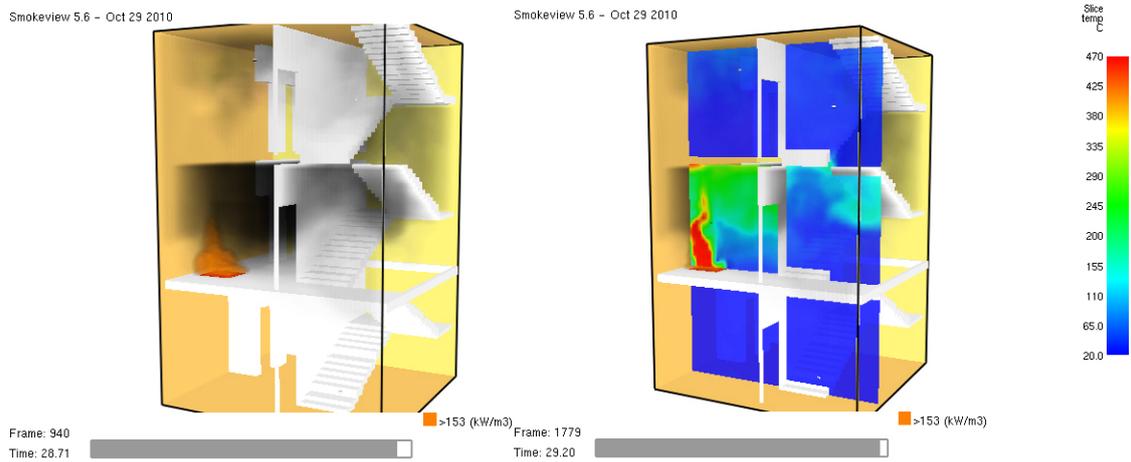


Fig. 5 – FDS&SMV, development fire, spread of smoke and stair temperature slice

## Evacuation Simulator Current Research

At present, there are more than 20 kinds of commonly used international personnel evacuation model. According to the basic principles of the model, those evacuation models can be divided into 3 categories:

*Optimization model:* ignore the surrounding asylum officers and non-related behavior, assuming that people evacuate in the most effective way, viewing personnel as a whole of common characteristics. Such as: EVACNET+, TAKAHASHI'S MODEL.

*Simulation model:* present the status of evacuation behavior and actions, not only to achieve the correct results of the assessment, but also to adopt the situation close to the real refuge-taking path. Such as: BGRAF, EXITT, EGRESS, E-SCAPE, EVACSIM, EXIT89, EXODUS, PAXPORT, SIMULEX, VEGAS.

*Risk assessment model:* identify dangers or incidents related to evacuation in fire, and quantify the final risk. Through multiple calculations, it will assess the effect of changing fire protection district to as well as fire safety measures. Such as: CRISP, WAYOUT.

In evacuation simulation, personnel behavior is the most crucial factor and it is the most important object of study. According to its consideration for the movement manner, models can be divided into 2 categories:

*Model that only takes people's movement into account:* only consider the evacuation capacity of building and its various parts, often referred to as environment-determinant model, or 'Ball' model. It views everyone as an unconscious object, automatically respond to external signals, evacuation direction and speed of the evacuation are decided only by physical factors, such as population density, the evacuation ability of exit, the evacuation will be regarded as a whole movement, like EVACNET+, TAKAHASHI'S MODEL, etc.

*A comprehensive account of the relationships between human movement and behavior model:* this model not only takes into account the physical characteristics of the building, but also view every single person as an active factor, considering people's response and individual behavior to a fire signal: individual response time, how to choose exit, such as EGREE, E-SCAP, EXIT98, EXODUS and other models.

Behavioral description method used in existing models mainly includes the following 5 kinds:

*No rules of conduct model:* rely solely on the physical expression of movement and geometric shapes to influence the evacuation, and to predict their judgments.

*Function simulated behavior models:* the equation or equations completely determined staff behavioral responses, and applied to the entire group.

*The complex behavior model:* It doesn't clearly decide the behavior of the criteria, but with the help of complex indirect physical methods they may be mainly based on secondary data applications, including psychological or social impact.

*Based on the rules of conduct model:* a clear recognition of individual behavioral characteristics, pre-set rules of the mechanism, using rule based method for determining behavior.

*Model based on artificial intelligence:* the empowerment of the individual analysis capabilities to enable it to make decision based on the intelligent analysis of the environment.

In evacuation study, 3 kinds of interactions are usually considered:

*People-people, people-buildings and people-environment:* these interactions will affect the officer's action and decision-making process. They are not only related to the objective physical conditions, but also, to a greater extent, depends on staff's own physical, psychological and social factors.

Helbing proposed the 'social force' model, borrowed from Newton's second law, taking into account 3 kinds of social force:

*Self-driving force, repulsion and attraction:* to simulate phenomena like lane forming, block, arching, quick is just slowness and opposite flow of 'oscillatory' and so on [3].

### EVAC model

EVAC is a kind of evacuation simulation software developed by Technical Research Center of Finland (VTT) based on a continuous space model. The first version EVAC1.0, separately 2006, the second version EVAC1.1 integrated in FDS5.0, released in 2007.10.1 FDS5.0 is also known as the FDS&EVAC, simulation results can be presented animatedly with the FDS own visualization software Smokeview [5].

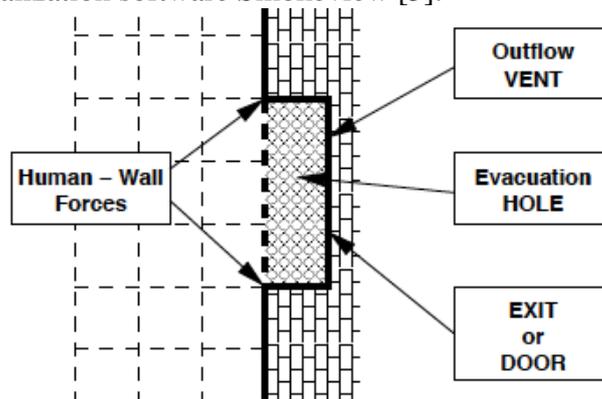


Fig. 6 – Making a door

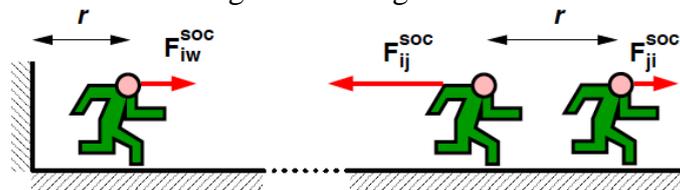


Fig. 7 – Concept of the social force

EVAC, movement control equation of personnel  $i$  is as follows:

$$m_i \frac{d^2 x_i(t)}{dt^2} = f_i(t) + \varepsilon_i(t)$$

Where  $X_i(t)$  is the position of the agent  $i$  at time  $t$ ,  $f_i(t)$  is the force exerted on the agent by the surroundings,  $m_i$  is the mass, and the last term,  $\varepsilon_i(t)$  is a small random fluctuation force. The velocity of agent  $i$  is given by  $v_i(t) = dx_i/dt$  [5].

### Example of EVAC

Next figure is an example of FDS+Evac evacuation in the two-layer classroom, a total of 140 people.

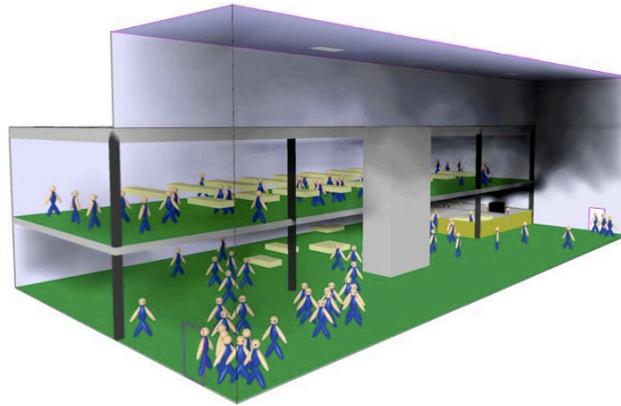


Fig. 6 – FDS+Evac, evacuation fire of two room

In EVAC, body injury model is  $N$  gas model proposed by NIST, using the models to predict smoke toxicity of a fire. On the assumption the most of the burning toxicity in fires this assumption has been proved by a lot of experiments.

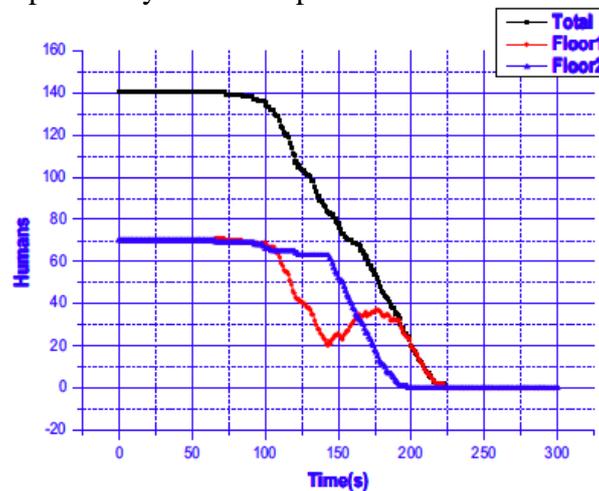


Fig. 7 – The curve of number and evacuation time

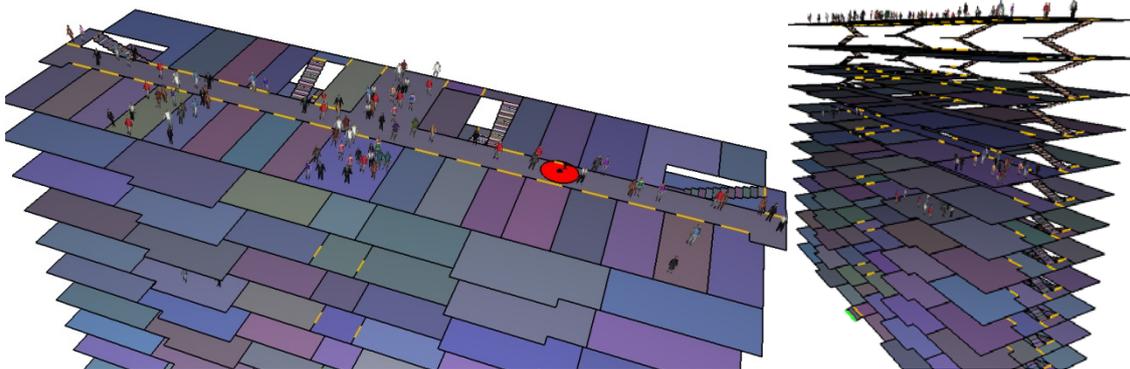


Fig. 8 – PathFinder, Building evacuation model

Using game theory to build exit routes selection model, the model assumes that: each person is able to observe the locations and actions of others person, everyone will choose the quickest evacuation route, then the exit-choosing becomes an optimal decision-making problem. Everyone attempts to choose the shortest evacuation time line. The estimated evacuation time consists of the: estimated walking time, and the estimated waiting time.

Estimated waiting time is the function of other people's positions and actions, the model assumes that people will change the course of action only when there is an obviously

better evacuation routes than the current program. In addition to other people’s actions and location, there are other factors which will affect people’s decision-making progress, including:

- fire-related environment,
- people’s familiarity to exit,
- exit’s visibility,
- evacuation decision-making,

These factors are classified as constrain conditions for solving minimum evacuation time problems.

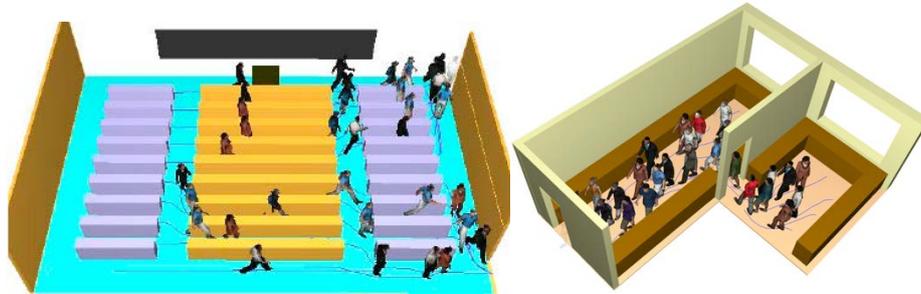


Fig. 10 – Evacuation model of classroom and laboratory

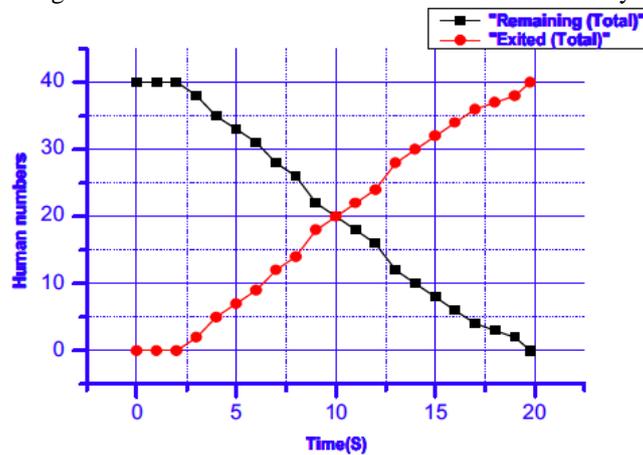


Fig. 11 – Evacuees number with the evacuation time

### Conclusion

This research introduces the applications of fire dynamics software FDS&EVAC in fire evacuation simulation by using a large number of building’s fire evacuation simulation examples. The FDS&EVAC software obviously shows its high potential in the building fire evacuation environment safety assessment because it can applied to high-rise buildings, large stadiums, supermarkets, shopping malls, and other public places evacuation simulation. Furthermore, the software can also be used in large-scale models of transports such as ships and trains. The FDS + EVAC can simulate approximately up to 10,000 people in fire situation in its main evacuation grid, and this is sufficient for most fire evacuation studies. However, the software presents some deficiencies in the following areas:

- Geometric modeling limitations
- Gas toxicity calculation limits
- Restrictions on the exit route choices
- Detection and lift model restrictions
- Staircase model and lift model restrictions
- Characteristics of human body size constraints

Though, it is far from perfect, FDS would still be a good fire evacuation simulation software under the different conditions of fire. The software is not only free, but it is also opens source. FDS&EVAC simulation results do not depend entirely on the software itself,

but also depends on the user's experience, experimental verification, as well as the contrast with other software. FDS is currently the most advanced numerical simulation software in fire safety field, while the EVAC takes the advantage of this influential FDS platform [6]. Therefore, it's well-reasoned to believe EVAC will be developed and improved in all aspects, and what we need to do is to verify its accuracy through the comparison of simulation and experiment, thereby enhancing the reliability of evacuation.

In short, the evacuation of personnel is still most complex and difficult action to simulate, so far there is no one model which can completely solve the various aspects of evacuation behavior. However, we can anticipate that the future evacuation model will contain more details, moving towards in the direction of predicting individual behavior, simulating large populations and complex features, handling the complex interrelationships between building structure, environment and human behavior.

### **Future Work**

Future work will further validate the model by comparing this experimental data and calculated results, including a model of evacuation with more behavioral details, including dilution measure, natural ventilation and pressurization zones of higher flow evacuation simulating large populations and relationships with the building structure under study.

### **Acknowledgements**

This research is supported by the following grants: China Scholarship Council (CSC) enrolled under the n<sup>o</sup> 2011132001, under project of investigation NSFC n<sup>o</sup> 61170202 of the School of Computer Science and Technology of the Technology Department of Wuhan University of Technology \_ Hubei-China and by Department of investigation (CAMI) of the University of Cape Verde.

### **References:**

- XU You-ping, ZHOU Biao, ZHANG Teng. *Application of Fire Dynamics Simulator in Industrial Fires*. J. Industrial Safety and Environmental Protection. 2008, p60-61.
- SHAO Gang, YANG Peizhong, JIN Xianlong. *Automatic Modeling for Tunnel with Non-rectangular Wall in FDS*, J. Computer Engineering and Applications. 2005, p213-216.
- LI Jian. *CA Simulation & Experiment on Occupant Evacuation Involving Environment Information & Individual Characteristics* {D}. Hefei University of science and technology of China, 2008, p82-97.
- KEVIN Mc Grattan. *Fire Dynamics Simulation (Versao 5 User's) Guide*. M. NIST Special Publication 1019-5. 2009, p53-78
- Fire Dynamics Simulator with Evacuation: *FDS Technical Reference and User's Guide* {M}. VTT Technical Research Centre of Finland. 2009, p28-52.
- YAN Chunping. *Evacuation simulation software for theoretical analysis and actual combat skills*. J. Fire Technique and Products Information. 2008, p8-12.

# OPTIMUM DISTANCE BETWEEN VORTEX GENERATORS USED IN MODERN THERMAL SYSTEMS

*Azize Akcayoglu, Ph.D*

*Cenap Ozgun, M.Sc*

Mersin University, Mersin/Turkey

*Celal Nazli, M.Sc*

*Fuat Yilmaz, Ph.D*

Gaziantep University, Gaziantep/Turkey

*Ali Pinarbasi, Ph.D*

Yildiz Technical University, Istanbul/Turkey

---

## Abstract

Modern thermal systems in which hydrodynamics and thermal fields are strongly related to each other involve compactness and effective heating/cooling performance. Triangular ducts, having delta-wing type vortex generators (VGs) mounted on the duct's slant surfaces, are widely used in modern thermal systems including gas turbines and electronics cooling applications. Due to the existence of completely opposite results obtained in terms of performance of the two types of VG configurations –namely “flow up” and “flow down”-, in the open literature, in the present study, both hydrodynamics and thermal fields together with the secondary flows induced by the VGs have been analysed extensively to understand which configuration has the better thermo-hydraulic performance. The results show that one configuration has a 19% higher thermo-hydraulic performance over 32 different VG configurations -containing “flow-up” and “flow-down”- for hydraulic diameter based Reynolds number,  $Re=5000$ . The angle of inclination of each VG made with the flow direction is set to  $30^\circ$  and the inclined surface's wall temperatures are set to  $80^\circ\text{C}$ . Based on the current results, the optimum distance between successive VGs has been determined as 0.385 of the hydraulic diameter. The present CFD results have been validated against the PIV data.

---

**Keywords:** PIV (Particle Image Velocimetry), CFD (Computational Fluid Dynamics), vortex generator (VG), thermo-hydraulic performance.

## Introduction

As it is well known, hydrodynamics and thermal fields are vitally related to each other in modern thermal systems such as electronics, gas turbines, heat exchangers, aerospace, nuclear and biomedical applications. In these applications, increased efforts have been made to obtain more efficient heat transfer surfaces for non-circular flow passages. Among these passages, triangular ducts are preferred due to their compactness in terms size and volume. As it is stated in (Zhao & Liao, 2002), (Leung & Probert, 1997), (Shah & London, 1978) and (Zhang et al., 2008), maximum convective heat transfer is provided by the equilateral triangular shaped ducts, among other duct shapes, since these ducts can reduce thermal resistance and increase heat transfer coefficient. In addition, when the inner surfaces of the triangular ducts are equipped with the VGs, the heat transfer reached up to 110% (Joardor & Jacobi, 2005) and (Joardor & Jacobi, 2008). The wing-type vortex generators (VG), which have been intensively investigated by Jacobi and Shah (1995) and (Torii, Nishino & Nakayama, 1994), can generate a continuous irregularities on the viscous sub-layer and can

increase the heat transfer effectively (Incropera & DeWitt, 1996) and (Biswas, Torii, Fujii & Nishino, 1996). This is achieved by using different VG configurations, namely “flow up” and “flow down”– if the distance between leading edges of the VG pair is more than that of the trailing edges, then the configuration is called “flow up” (Fig. 1a); conversely, if it is less, then it is called “flow down” (Fig. 1b)–(Torii, Kwak & Nishino, 2002) and (Allison & Dally, 2007). Torii et al., Allison and Dally (2007) compared both “flow up” and “flow down” configurations and obtained that “flow up” configuration shows better heat transfer characteristic. However, Kim & Yang (2002), (Fiebig, Valencia & Mitra, 1993) and (Biswas, Mitra & Fiebig, 1994) obtained opposite results. Therefore, the present authors performed extensive studies to find out the best configuration in terms of thermohydraulic performance generated in the equilateral triangular ducts. Thermohydraulic performance is a parameter showing the performance of the modern thermal systems corresponding to maximum heat transfer be obtained by minimum pressure loss to achieve minimum energy consumption (Akçayoglu, Cebeci & Nazli, 2014). In the present investigation, a Computational Fluid Dynamics (CFD) study has been employed to obtain flow and temperature fields in the triangular ducts with 32 different VG configurations. The present simulation results have been validated against the Particle Image Velocimetry (PIV) data of Akçayoglu (2011).

### Geometry, Mesh and Numerical Details

The equilateral triangular ducts equipped with VGs studied in this research are shown in Fig. 1a,b,c and d. Each duct is  $25.73D$  long and  $1.49D$  high, where  $D$  is the hydraulic diameter of the duct, as shown in Fig. 1. The dimensions, orientations and the locations of VGs are also illustrated in Fig. 1 as Model A, B, C and D. In Fig. 1, b is a varying parameter indicating the distance between successive VGs ( $0 \leq b \leq 4.62D$ ). All the dimensions are selected from the literature Akçayoglu (2011), (Vasudevan, Eswaran & Biswas, 2000) and (Lin, Liu & Leu, 2008) representing the applications in modern thermal systems.

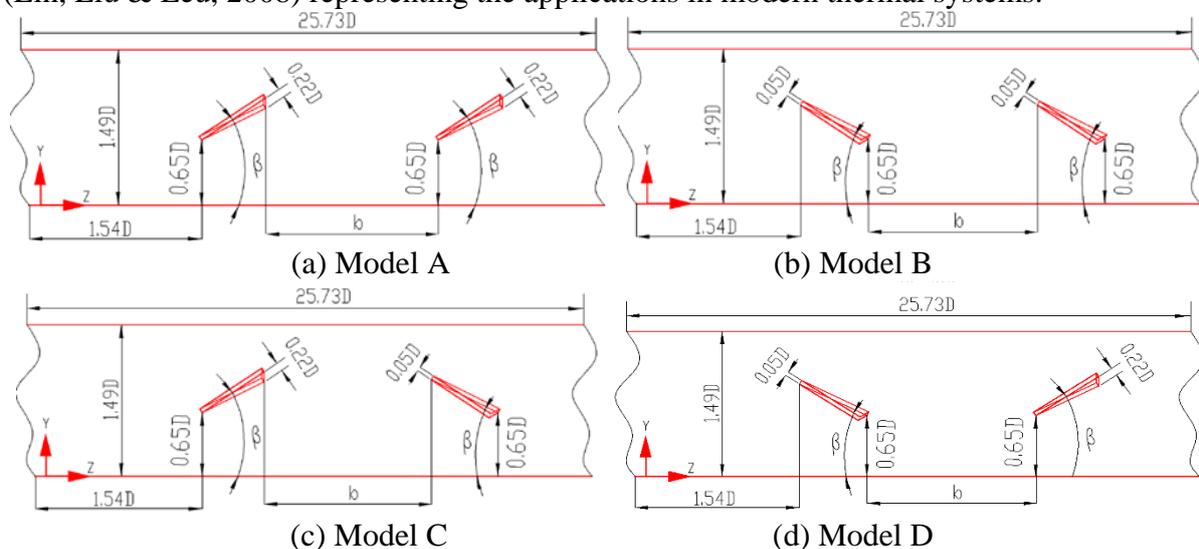


Figure 1. Geometrical configurations and locations of VGs.

In the present study, several grid types including different mesh distributions and element sizes are tested and compared with the experimental data to find the best solution. Figure 2 shows four numerical simulation results and an experimental data Akçayoglu (2011) and Akçayoglu et al. (2014) obtained on a line parallel to the x-axis at ( $y=0.62D$ ,  $z=4.43D$ ) location. As it is clearly seen from Fig. 2, the results become grid-independent and also are consistent with the experimental data after the element size becomes greater than or equal to 7 million. Therefore, the rest of the simulations are performed using the mesh distribution containing 7 million elements.

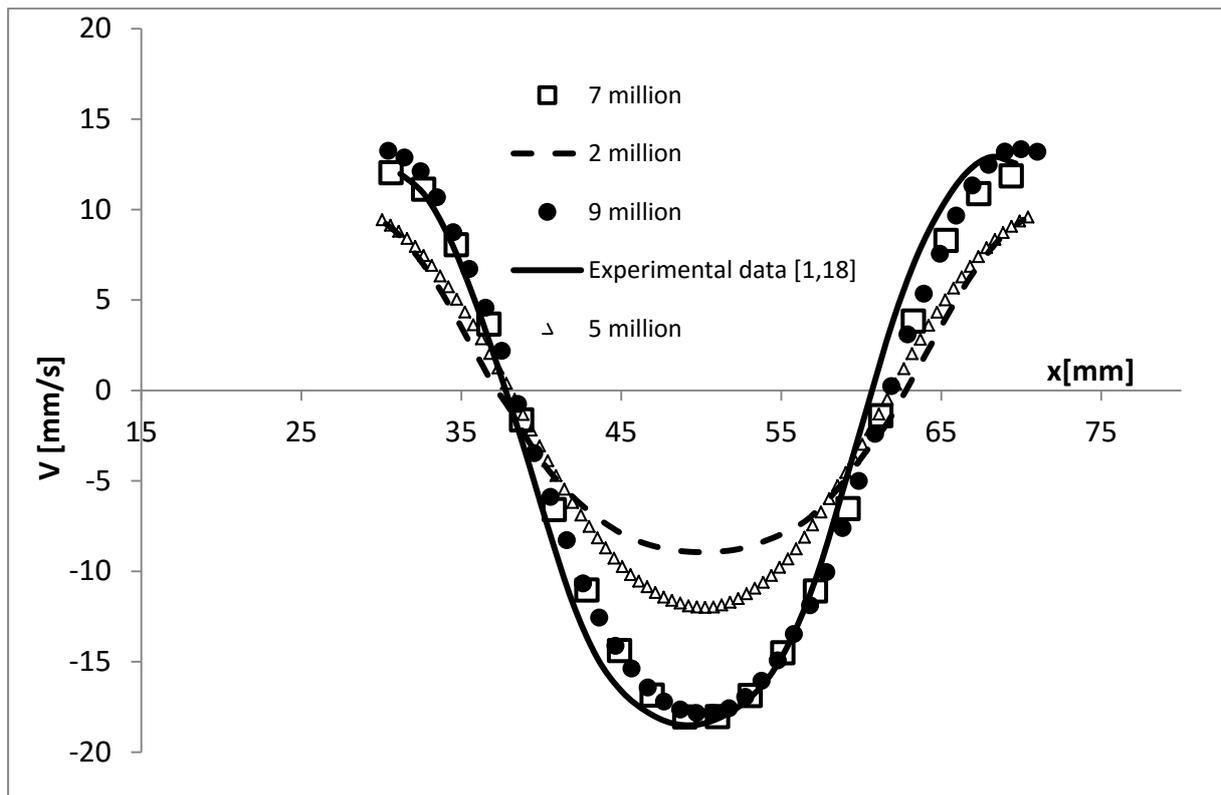


Figure 2. Velocity distribution along x-axis at  $(y=0.62D, z=4.43D)$  line [1].

Numerical simulations are carried out by using a finite volume code, ANSYS FLUENT V.14.5. In all simulations, the flow Reynolds number based on the hydraulic diameter of the duct is set to 5000. All fluid properties- including density, viscosity, specific heat and thermal conductivity- are assumed constant. Boundary conditions include “Velocity Inlet” at the duct inlet and “Pressure Outlet” at the duct outlet. A fully-developed velocity profile obtained from experimental results data Akcayoglu (2011) and Akcayoglu et al.(2014) is imposed at the inlet boundary of the domain. The duct base, slant surfaces and VGs are defined as “Wall” boundary condition. The slant surfaces and the VGs are assumed to have constant wall temperature of  $80^{\circ}\text{C}$ . “Shell conduction” option is enabled in order to compute heat conduction within the walls, to satisfy experimental wall thickness, which is 3 mm data (Akcayoglu, 2011) and (Akcayoglu et al., 2014). In the present study, several turbulence model simulations have been performed for various mesh distributions and the best model has been chosen as “RNG  $k-\epsilon$ ” turbulence model -with “enhanced wall treatment” option- based on the comparison with the experimental data. The continuity, momentum and energy equations are solved to resolve flow and temperature fields within the computational domain. One can refer to ANSYS Inc. (2014) for flow, temperature and model equations. To calculate the thermo-hydraulic performance, the following formulations are used (Webb, Eckert & Golgstein, 1971).

$$\text{THP} = (\text{Nu} / \text{Nu}_s) / (f / f_s)^{1/3}$$

(1)

$$\text{Nu} = (hL) / k$$

(2)

$$h = ((\dot{m} c_p (T_{\text{outlet}} - T_{\text{inlet}})) / (A_{\text{lateral}} (T_{\text{surface}} - T_{\text{average}})))$$

(3)

$$f = (2\Delta P / (\rho U^2)) (D/L)$$

(4)

$$\Delta P = P_{\text{inlet}} - P_{\text{outlet}}$$

(5)

$$D = 4A_{\text{cross-sectional}} / p$$

(6)

$$\dot{m} = \rho A_{\text{cross-sectional}} U$$

(7)

$$T_{\text{average}} = \frac{1}{2} (T_{\text{outlet}} + T_{\text{inlet}})$$

(8)

where;  $f$ : Friction factor,  $\Delta P$ : Pressure loss,  $\rho$ : Density,  $U$ : Mean velocity at the inlet,  $D$ : Hydraulic diameter,  $L$ : Duct length,  $p$ : Perimeter,  $P_{\text{inlet}}$ : Pressure at inlet,  $P_{\text{outlet}}$ : Pressure at outlet,  $h$ : Heat transfer coefficient,  $\dot{m}$ : Mass flowrate,  $c_p$ : Specific heat capacity,  $T_{\text{outlet}}$ : Average temperature at outlet,  $T_{\text{inlet}}$ : Average temperature at inlet,  $A_{\text{lateral}}$ : Total area of lateral surfaces,  $T_{\text{surface}}$ : Average temperature of the heat transfer surfaces,  $T_{\text{average}}$ : Average temperature between inlet and outlet,  $Nu$ : Nusselt number,  $k$ : Coefficient of thermal conductivity,  $Nu_s$ : Nusselt number of smooth duct,  $f_s$ : Friction factor of smooth duct,  $THP$ : Thermohydraulic performance,  $A_{\text{cross-sectional}}$ : Cross-sectional area of the duct.

## Results

Streamlines are defined as family of curves that are instantaneously tangent to the velocity vector of the flow field studied. When the streamlines are disturbed by the physical structure of the domain, they start to rotate in the flow field, causing the flow velocity to become zero at the center of rotation and this center is called as “focus”. Figure 3 shows streamlines obtained on the  $xy$  plane at  $P=18D$  for Model D at different VG distances (b), where  $b$  is the distance between the successive VGs. Each streamline distributions shown contain 4 foci on the specified plane. As shown in Figs. 3a and 3b, foci pairs formed on the upper part are found smaller compared with the foci formed on the lower part. In addition, all the foci centers shown in Figs. 3a and 3b are found closer to the inclined hot walls of the triangular ducts compared with Figs. 3c and 3d. These results reveal that more heat can be transferred from the hot walls towards the inside of the ducts when the distances between VGs are equal to  $b=0$  and  $b=0.385D$ . When  $b$  is increased (Figs. 3c and 3d), the upper foci pairs become more dominant while the lower ones getting smaller.

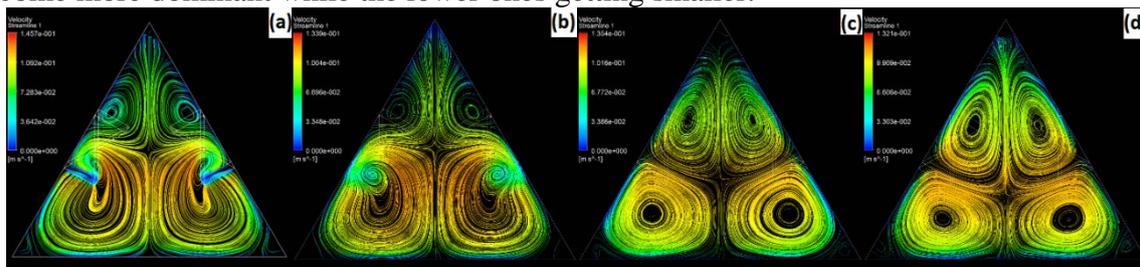


Figure 3. Streamlines obtained on the  $xy$  plane at  $P = 18D$  for Model D;  
(a)  $b = 0$ , (b)  $b = 0.385D$ , (c)  $b = 2.31D$ , (d)  $b = 4.62D$ .

(b)

Figure 4 shows streamlines obtained for four different VG configurations for the same successive VG distances,  $b = 0.385D$ , on the same plane,  $P = 18D$ . It is clear that different streamline distributions are obtained from different VG configurations at  $P=18D$  plane. Four foci are observed for Model C and Model D, while only two foci are observed for Model A and Model B (Figs. 4a, 4b, 4c and 4d). In order to find out which configurations have higher THP over the other configurations, it is decided to include temperature distribution obtained on the inclined surfaces of the triangular ducts studied.

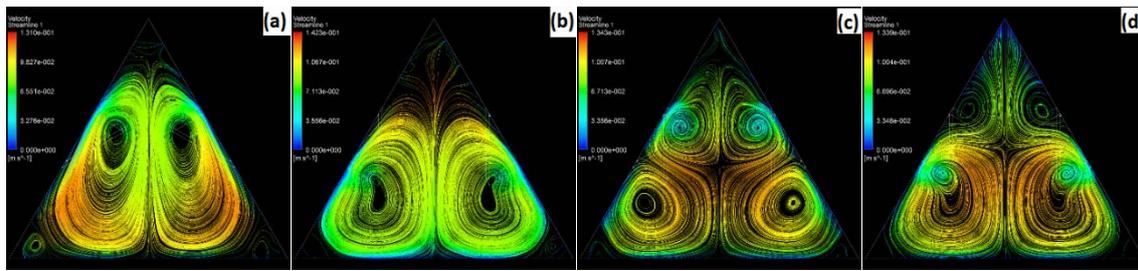


Figure 4. Streamlines obtained for  $b = 0.385D$  at  $P = 18D$  plane;  
 (a) Model A, (b) Model B, (c) Model C, (d) Model D.  
 (b)

Figure 5 shows wall adjacent temperature distributions on the inclined surfaces obtained at different VG distances for Model D. Higher levels of temperature distributions are observed for  $b=0$  and  $b=0.385D$  as shown in Figs. 5a and 5b compared with Figs. 5c and 5d. As a result, it is clear that as the distance between the VGs is decreased, then the temperature distributions become better on the inclined walls.

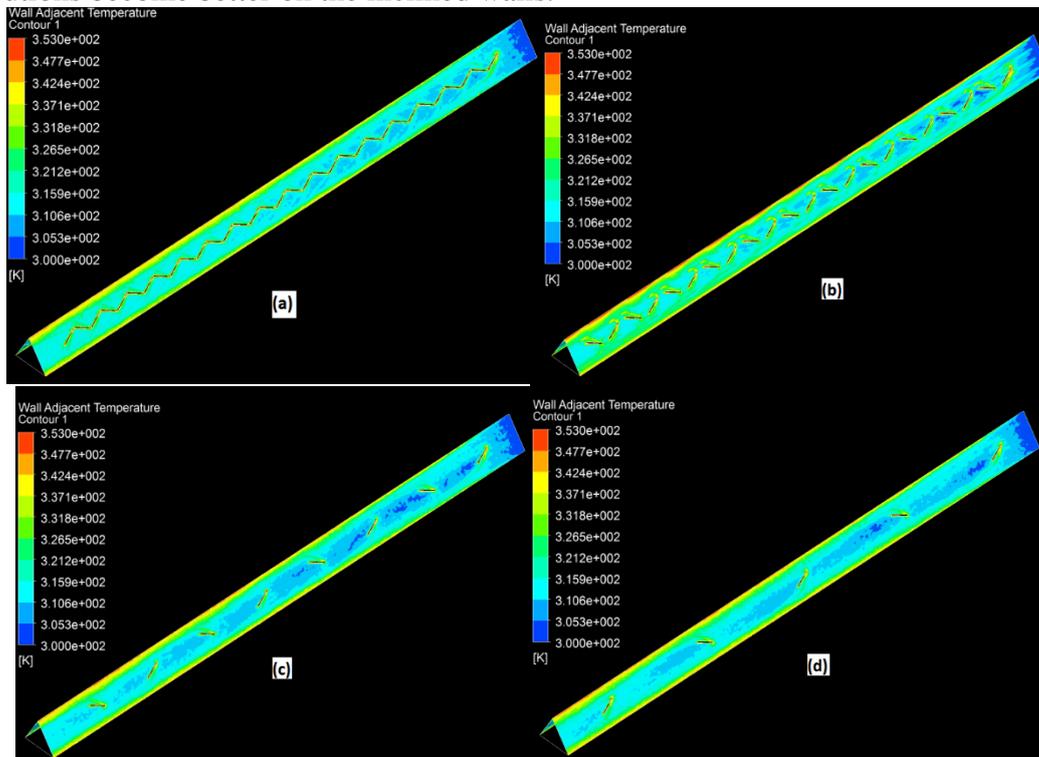


Figure 5. Wall adjacent temperature distribution on the inclined surfaces for Model D;  
 (a)  $b = 0$ , (b)  $b = 0.385D$ , (c)  $b = 2.31D$ , (d)  $b = 4.62D$ .

Wall adjacent temperature contours obtained on the inclined surfaces for each model for  $b = 0.385D$  are illustrated in Fig. 6. It is noted that the temperature field is found highly affected by the type of oncoming VG configuration, as higher temperature regions are observed for Model C and Model D, compared with Model A and Model B (Figs. 6a, 6b, 6c and 6d).

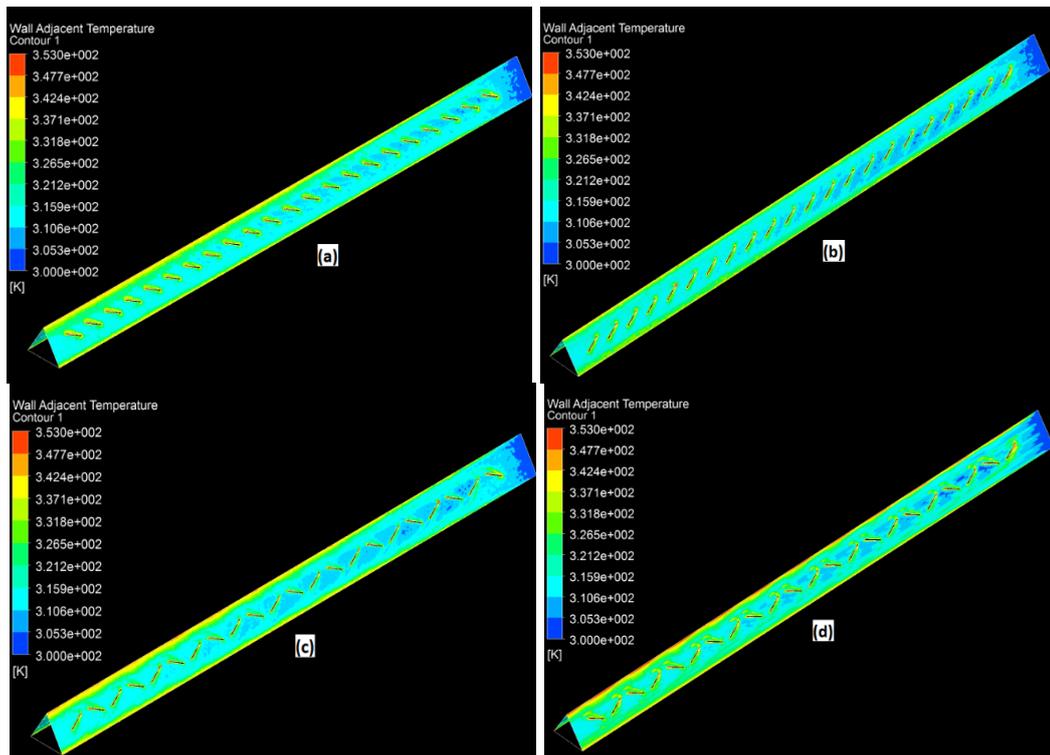
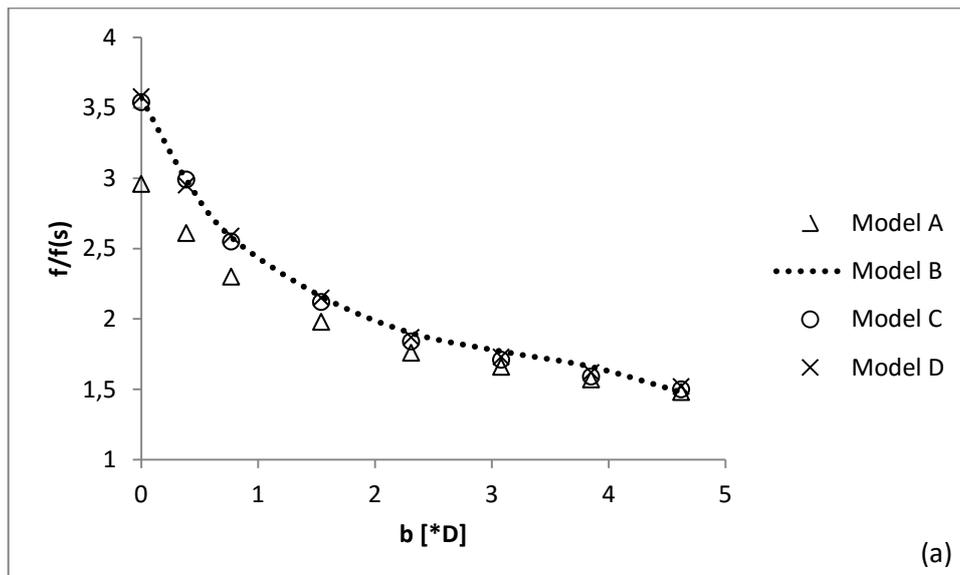


Figure 6. Wall adjacent temperature distribution on the inclined surfaces for  $b = 0.385D$ ; (a) Model A, (b) Model B, (c) Model C, (d) Model D.

It is known that in modern thermal systems, friction factor  $f$  is used as a measure for the pumping power requirement of the system and the Nusselt number is used for the determination of heat transfer of the thermal system. Figure 7a illustrates dimensionless friction factor against distance between successive VGs,  $b$ . It is clearly seen that the friction factor decreases when  $b$  is increased (Fig 7a). Figure 7b shows dimensionless Nusselt number distribution against distance between successive VGs. The highest  $Nu$  is obtained for Model B (Fig. 7b). The smallest values of  $f$  and  $Nu$  are obtained for Model A, as shown in Fig. 7a and 7b.



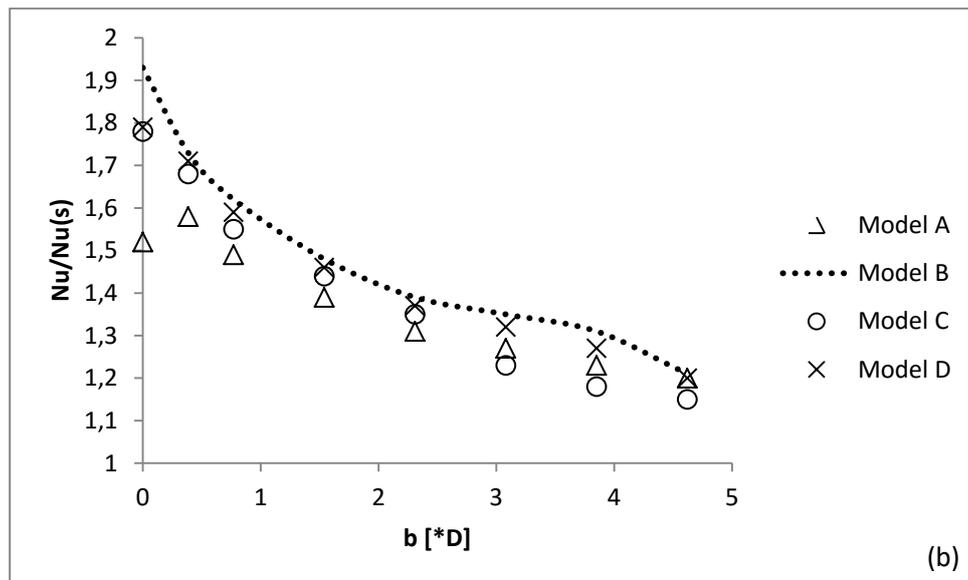


Figure 7. (a) Dimensionless friction factor against distance between successive VGs, (b) Dimensionless Nusselt number against distance between successive VGs.

In order to decide the best VG configuration amongst the cases studied, the thermohydraulic performance (THP) against  $b$  is obtained for 32 configurations and the results are illustrated in Fig. 8. As it is seen in Fig. 8, the maximum THP is obtained for Model B. However, THP continuously decreases as  $b$  is increased, without showing a peak, for Model B. On the other hand, each of the Models A, C and D have a peak at  $b = 0.385 D$ . The maximum peak is obtained for Model D for  $b = 0.385 D$  as shown in Fig. 8.

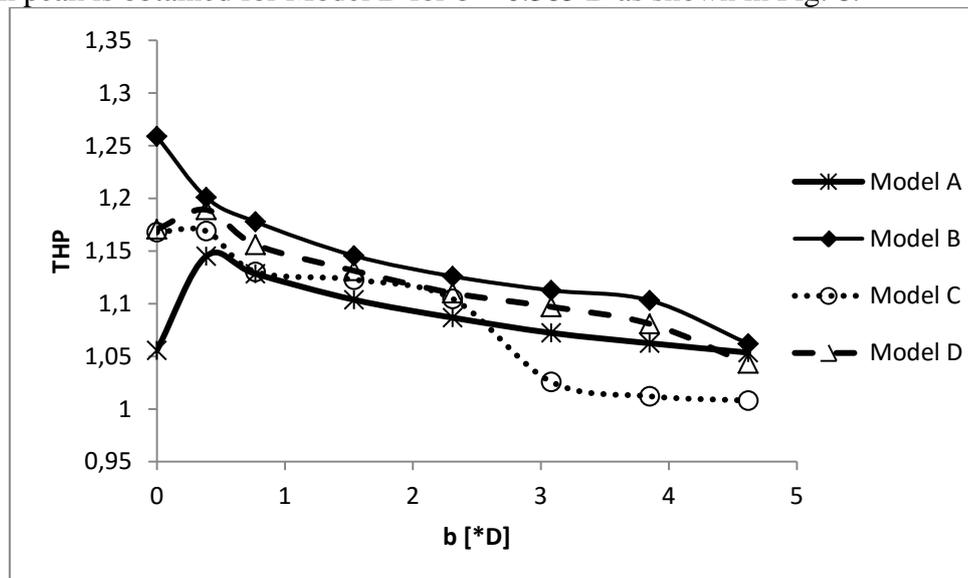


Figure 8. Thermo-hydraulic performance (THP) against distance between successive VGs.

## Conclusion

The present numerical study aimed to investigate the best thermohydraulic performance of VG configurations used in modern thermal systems for  $Re=5000$ . Both flow and thermal fields are observed carefully and the results are presented for  $0 \leq b \leq 4.62D$  where  $b$  is the distance between successive VGs. Present results show that the flow and thermal fields are greatly affected by the orientation of VGs as well as the distance between the successive VGs. Higher temperatures are obtained as the distance between the VGs becomes small and as successive VGs are oriented differently- for example if the VG is oriented as “flow down”, then the oncoming VG should be “flow up”. Moreover, comparing

to the upper foci pairs, if lower pairs of foci becomes greater, then the THP becomes greater. Among 32 different VG configurations tested, the maximum THP is obtained for  $b = 0.385D$  for Model D and is increased 19% in comparison with smooth duct.

### Acknowledgement

The present work has been funded by TUBITAK under contract No: 111M726 and has been performed in Mersin University.

### References:

- Akçayoglu, A., Cebeci, H., Nazli, C. (2014). Thermo-hydraulic performance evaluation of inclined vortex generators, *Advanced Materials Research*, 853, 317-322.  
doi:10.4028/www.scientific.net/AMR.853.317
- Jacobi, A.M., Shah, R.K. (1995). Heat transfer surface enhancement through the use of longitudinal vortices a review of recent, *Experimental Thermal and Fluid Science*, 11, 295-309.
- Torii, K., Nishino, K., Nakayama, K. (1994). Mechanism of heat transfer augmentation by longitudinal vortices in a flat plate boundary layer, *Proceedings of the 10th international heat transfer conference*, 123-128.
- Joardor, A., Jacobi, A.M. (2008). Heat transfer enhancement by winglet-type vortex generator arrays in compact plain-fin-and-tube heat exchangers, *International Journal of Refrigeration*, 31, 87-97  
doi:10.1016/j.ijrefrig.2007.04.011
- Zhao, T.S., Liao, Q. (2002). Theoretical analysis of film condensation heat transfer inside vertical mini triangular channels, *International Journal of Heat and Mass Transfer*, 45, 2829-2842.
- Leung, C.W., Probert, S.D. (1997). Forced-convective turbulent flows through horizontal ducts with isosceles-triangular internal cross-sections, *Applying Energy*, 57(1), 13-24.
- Shah, R.K., London, A.L. (1978). Laminar flow forced convection in ducts, *New York: Academic Press*, 685, 1978.
- Zhang, Y.H., Wu, X., Wang, L.B., Song, K.W., Dong, Y.X., Liu, S. (2008). Comparison of heat transfer performance of tube bank fin with mounted vortex generators to tube bank fin with punched vortex generators, *Experimental Thermal Fluid Science*, 33(1), 58-66.  
doi:10.1016/j.expthermflusci.2008.07.002
- Joardor, A., Jacobi, A.M. (2005). Impact of leading edge delta-wing vortex generators on the thermal performance of a flat tube, louvered-fin compact heat exchanger, *International Journal of Heat and Mass Transfer*, 48, 1480-1493.  
doi:10.1016/j.ijheatmasstransfer.2004.10.018
- Incropera, F.P., DeWitt, D.P. (1996) Introduction to Heat Transfer, USA: John Wiley & Sons, 586.
- Biswas, G., Torii, K., Fujii, D., Nishino, K. (1996) Numerical and experimental determination of flow structure and heat transfer effects of longitudinal vortices in a channel flow, *International Journal of Heat and Mass Transfer*, 39(16), 3441-3451.
- Torii, K., Kwak, K.M., Nishino, K. (2002). Heat transfer enhancement accompanying pressure-loss reduction with winglet-type vortex generators for fin-tube heat exchangers, *International Journal of Heat and Mass Transfer*, 45(18), 3795-3801.
- Allison, C.B., Dally, B.B. (2007). Effect of a delta-winglet vortex pair on the performance of a tube-fin heat exchanger, *International Journal of Heat and Mass Transfer*, 50, 5065-5072.  
doi:10.1016/j.ijheatmasstransfer.2007.08.003
- Kim, E., Yang, J.S. (2002). An experimental study of heat transfer characteristics of a pair of longitudinal vortices using color capturing technique, *International Journal of Heat and Mass Transfer*, 45, 3349-3356.

- Fiebig, M., Valencia, A., Mitra, N.K. (1993). Wing-type vortex generators for fin-and tube heat exchangers, *Experimental Thermal and Fluid Science*, 7(4), 287-295.
- Biswas, G., Mitra, N., Fiebig, K. M. (1994). Heat transfer enhancement in fin-tube heat exchangers by winglet type vortex generators, *International Journal of Heat and Mass Transfer*, 37(2), 283–291.
- Webb, R.L., Eckert, E.R.G., Goldstein, R.J. (1971). Heat Transfer and Friction in Tubes with Repeated Rib Roughness, *International Journal of Heat and Mass Transfer*, 14, 601–617.
- Akcayoglu, A. (2011). Flow past confined delta-wing type vortex generators, *Experimental Thermal and Fluid Science*, 35, 112-120.  
doi:10.1016/j.expthermflusci.2010.08.012
- Vasudevan, R., Eswaran, V., Biswas G. (2000). Winglet-type vortex generators for plate fin heat exchangers using triangular fins, *Numerical Heat Transfer*, 58, 533-555.
- Lin, C.N., Liu, Y.W., Leu J.S. (2008). Heat transfer and fluid flow analysis for plate-fin and oval tube heat exchangers with vortex generators, *Heat Transfer Engineering*, 29, 588-596.  
doi: 10.1080/01457630801922279
- ANSYS Inc. (2014), Documentation. Retrieved from  
<http://www.ansys.com/Support/Documentation>

# EFFECT OF DIFFERENT SHEAR WALL CONFIGURATIONS ON SEISMIC RESPONSE OF A MOMENT-RESISTING FRAME

*Anshul Sud*

*Raghav Singh Shekhawat*

*Poonam Dhiman, Assistant Prof.*

Department of Civil Engineering, Jaypee University of Information Technology,  
Solan (H.P), India

---

## Abstract

Use of shear walls in RC buildings is one of the most commonly used strategies for earthquake mitigation. To avoid torsion in buildings, shear walls must be placed symmetrically in plan. In this paper, a five-storey RC building located in seismic zone-V is considered with four shear walls. Five different configurations of shear walls viz. bare frame, shear wall symmetrically placed at exterior bays (centrally), at core and adjacently placed in exterior of the building, are considered. These frames are analysed for seismic forces to assess performance in terms of base shear, storey drift, member forces and joint displacements. The frame with shear walls at core and centrally placed at exterior bays showed significant reduction of order 29% to 83% in lateral displacement. The reduction in bending moments is approximately 70% to 85% for interior and perimeter columns respectively. Shear and axial forces in columns have reduced by 86% and 45% respectively. Based on such results, the best placement of shear walls in building plan is suggested.

---

## Introduction

Reinforced concrete buildings often have vertical plate-like RC walls is called Shear walls. Shear walls are like vertically-oriented wide beams that carry earthquake or wind loads and transfer them downwards to the foundation. These walls generally start at foundation level and are continuous throughout the building height. Their thickness can be as low as 150mm or as high as 400mm in high rise buildings. Shear walls are usually provided along both length and width of buildings. Most RC buildings with shear walls also have columns. These columns primarily carry gravity loads and shear walls are designed to carry lateral loads. Shear walls provide large strength and stiffness to buildings in the direction of their orientation, which significantly reduces lateral sway of the building and thereby reduces damage to structure and its contents. In this paper, five frames with different placement of shear walls are analysed for their performance in terms of base shear, storey drift, member forces and joint displacements.

## Problem Formulation

A Five-storey RC office building is assumed to be located in seismic zone V on medium soil (as per IS 1893:2002). It is designed as an ordinary moment-resisting frame. Column sections of size 350mm×500 mm, beam sections of size 500mm×500mm, 125 mm thick RCC slab on all floors and shear wall having 300 mm thickness are taken for proposed work. In x-direction (the longer direction in plan) there are 5 bays, each of 4 m width and in z-direction (the shorter direction in plan) there are 3 bays, each of 5 m width. The column height throughout the structure is 3.5 m. Five frames with different shear wall configurations viz.

bare frame (frame 1), shear wall symmetrically placed at exterior bays centrally (frame 3), at core (frame 2) and adjacently placed in exterior of the building (frame 4 and 5) as shown in Fig.1 are taken for the study. These frames are subjected to dead load, imposed load of  $4 \text{ kN/m}^2$  on all floors, imposed load of  $1.5 \text{ kN/m}^2$  on roof (as per IS 875-part 2) and earthquake loads as per IS 1893:2002.

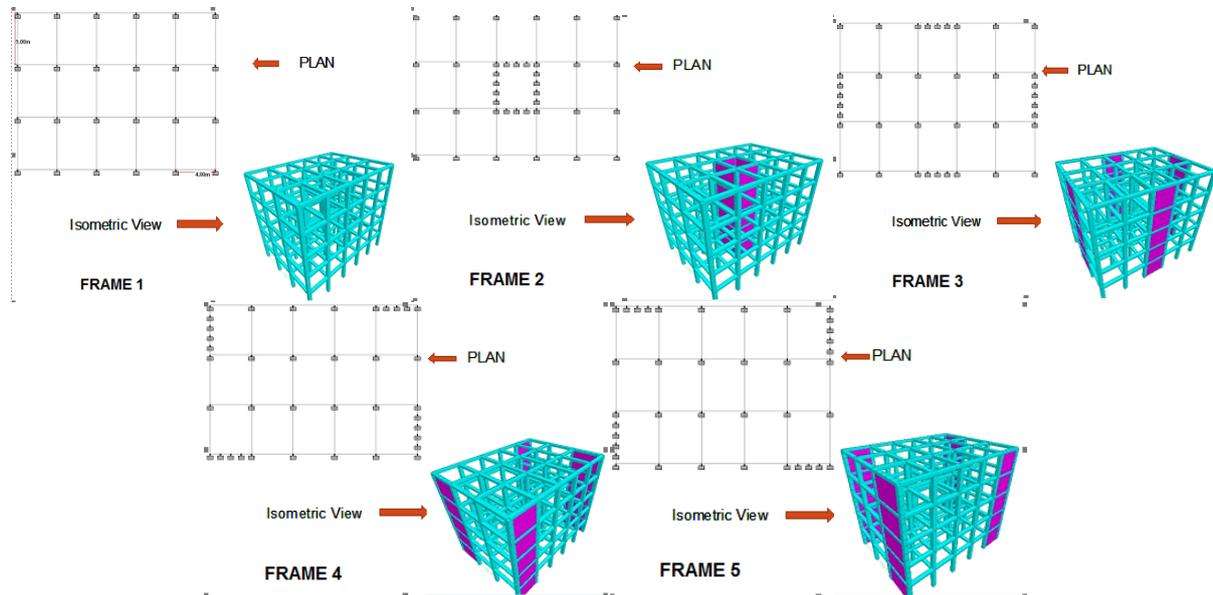


Fig.1: Five Frames showing Plan and Isometric View.

These frames are analysed for load combinations suggested by IS 1893, i.e.,

1.  $1.5(DL + IL)$ ,
2.  $1.2(DL + IL \pm EL)$ ,
3.  $1.5(DL \pm EL)$ ,
4.  $0.9 DL \pm 1.5 EL$ .

For the calculation of base shear, the zone factor 'Z' is taken as 0.36 for seismic zone V, Importance Factor 'I' equal to 1, Response reduction factor 'R' as 3 as it is an Ordinary RC moment resisting frame and fundamental natural period of vibration (T) is calculated as 0.352 seconds for x-direction and 0.406 seconds for z-direction (as per IS: 1893-2002).

## Analysis of Results

### Bending Moment in columns

After carrying out analysis, bending moments (kNm) in bottom storey columns for all frames are taken from output file and are shown in Fig. 2. The maximum value of bending moment both in the case of interior and perimeter columns for ground storey columns are seen in the case of Frame-1 which is the frame with no shear wall which comes out to be 233 and 230 kNm respectively whereas the minimum value for both are seen in the case of Frame-2 where shear walls are placed at the inner core of the building symmetrically which comes out to be 30 and 51.7 kNm. From Fig. 2, it can be concluded that frame-2 have significant reduction in bending moment of ground storey columns.

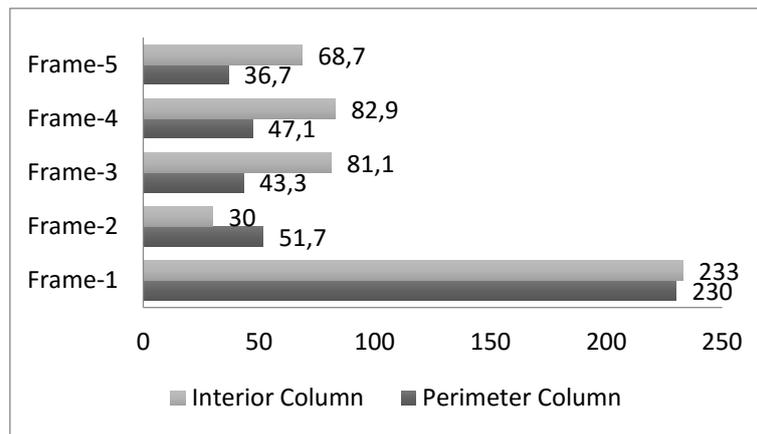


Fig. 2: Bending moment (kNm) in Ground Storey Columns.

Similarly, bending moments in top storey columns are shown in Fig. 3. The maximum value of bending Moment both in the case of interior and perimeter columns for top storey columns are seen in the case of Frame-1 which is the frame with no shear wall which comes out to be 91.9 and 93.2 kNm respectively whereas the minimum value for both are seen in the cases of Frame-2 and Frame-4 where shear walls are placed at the inner core of the building symmetrically and shear wall symmetrically placed at exterior bays (centrally) which comes out to be 62.5, 35.3 and 27.9, 35.3 kNm respectively. It is evident from figure that frame-2 and frame-4 show predominant reduction in bending moment.

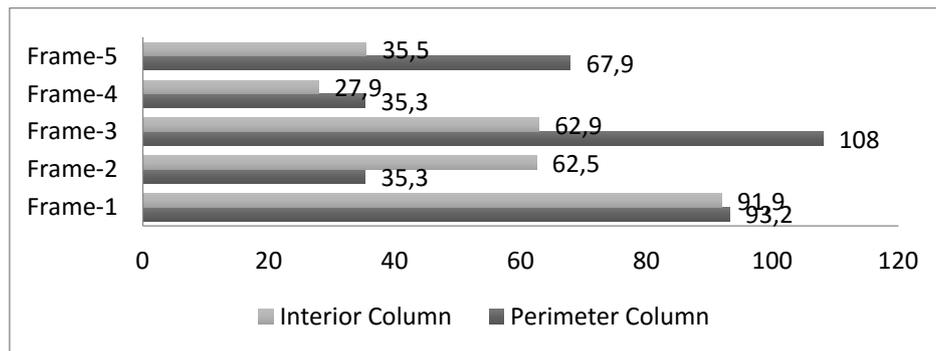


Fig. 3: Bending moment (kNm) in top Storey Columns.

### Shear Force

Shear force is a measure of lateral load borne by columns and shear walls. The maximum value of shear force both in the case of interior and perimeter columns for ground storey columns are seen in the case of Frame-1 which is the frame with no shear wall comes out to be 106 and 104 kN respectively whereas the minimum value for both are seen in the cases of Frame-2 and Frame-5 where shear walls are placed at the inner core of the building symmetrically and adjacently placed in exterior of the building which comes out to be 14.2, 23.2 kN and 26.2, 14.1 kN respectively. Figure 4 shows shear force in ground storey columns for all the frames. It is evident from the figure that frame-2 and frame-5 show significant reduction in shear force on ground floor.

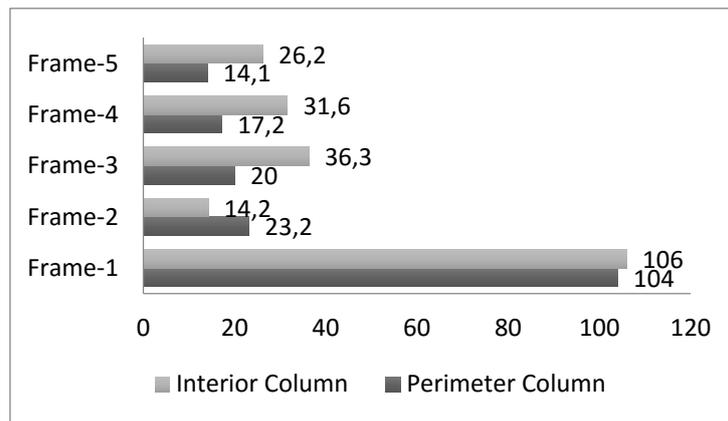


Fig. 4: Shear force (kN) in Ground Storey Columns.

Similarly, shear force in top storey columns is shown in Figure 5. The maximum value of Shear Force both in the case of interior and perimeter columns for top storey columns are seen in the case of Frame-1 which is the frame with no shear wall comes out to be 106 and 104 kN respectively whereas the minimum value for both are seen in the cases Frame-2 and Frame-5 where shear walls are placed at the inner core of the building symmetrically and adjacently placed in exterior of the building which comes out to be 14.2, 23.2 kN and 26.2, 14.1 kN respectively. By looking at the results it can be inferred that frame-2 and frame-5 shows maximum reduction in shear forces in top storey.

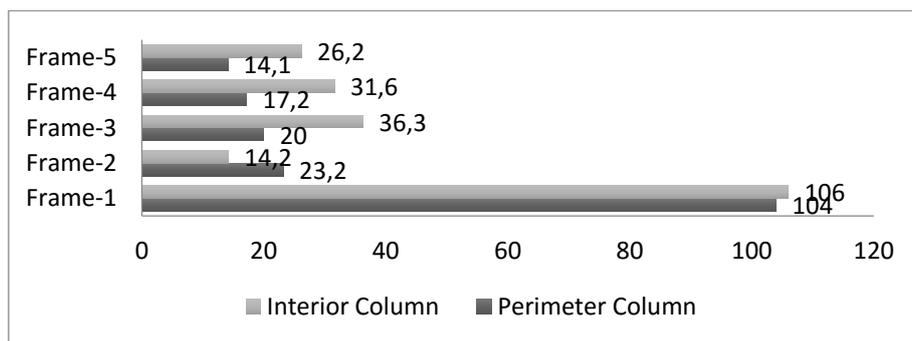


Fig. 5: Shear force (kN) in topStorey Columns.

### Axial Force

The maximum value of axial force both in the case of interior and perimeter columns for ground storey columns are seen in the case of Frame-1 which is the frame with no shear wall comes out to be 1066 and 797 kN respectively whereas the minimum value for both are seen in the case of Frame-5 where shear walls are placed at the adjacently placed in exterior of the building which comes out to be 623 and 442 kN respectively. By looking at Fig. 6, it is evident that the maximum reduction in axial force on ground floor is being experienced in case of frame-5.

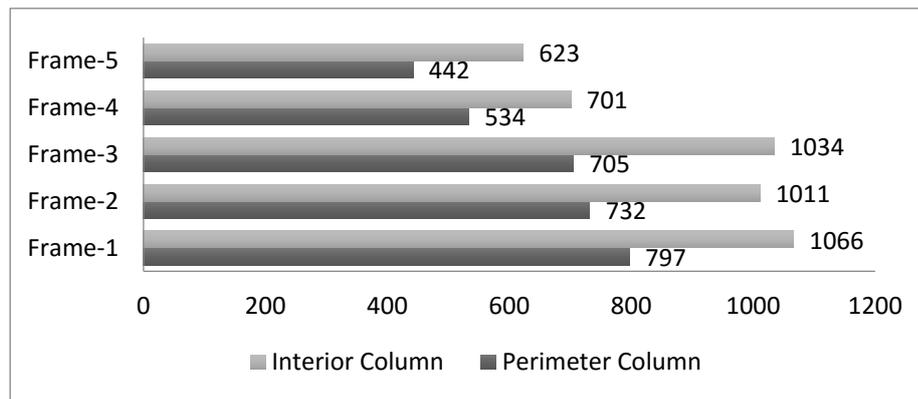


Fig. 6: Axial force (kN) in Ground Storey Columns.

The maximum value of shear force both in the case of interior and perimeter columns for top storey columns are seen in the case of Frame-1 which is the frame with no shear wall comes out to be 152 and 119 kN respectively whereas the minimum value for both are seen in the case of Frame-4 where shear walls are placed at the adjacently placed in exterior of the building which comes out to be 61.2 and 56.7 respectively. By looking at Fig. 7, it is evident that the maximum reduction in axial force on top floor is being experienced in case of frame-4.

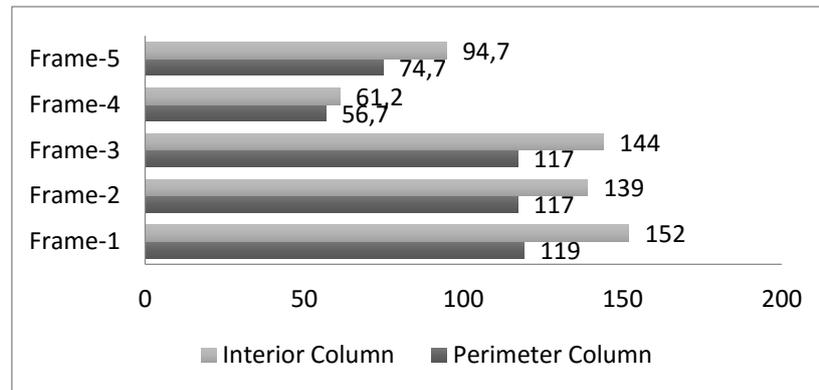


Fig. 7: Axial force (kN) in Top Storey Columns.

### Storey Drift

Values of storey drift in x-direction for all the frames and for each storey are given in Table 1 and plotted in Fig. 8. By analysing these values, it can be concluded that frame-2 in x-direction and frame-3 in z-direction has maximum reduction in storey drift.

Table 1 Storey Drift in x-direction.

Storey	Displacement(mm) in x- direction				
	Frame-1	Frame-2	Frame-3	Frame-4	Frame-5
Fifth	34.813	9.964	12.403	14.998	12.248
Fourth	30.940	8.586	9.494	11.95	9.301
Third	24.122	6.290	6.343	8.192	6.297
Second	15.317	3.728	3.455	4.594	3.558
First	6.040	1.406	1.182	1.507	1.344

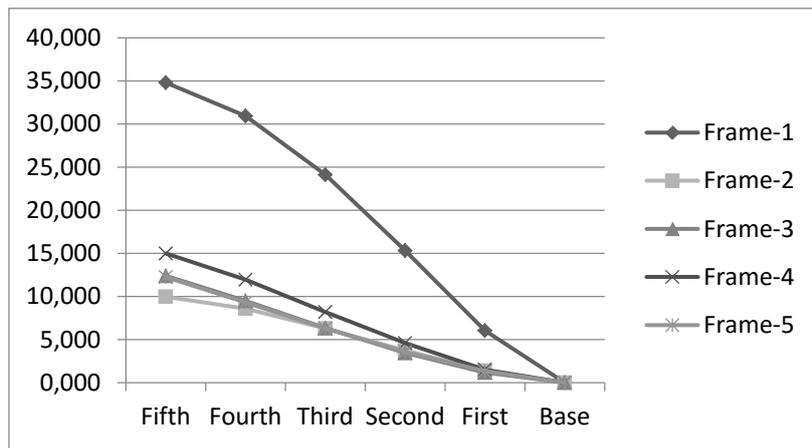


Fig. 8: Storeydrift(mm) in x-direction.

Table2 Storeydrift in z-direction.

Storey	Displacement(mm) in Z direction				
	Frame-1	Frame-2	Frame-3	Frame-4	Frame-5
Fifth	60.911	13.444	10.135	12.917	11.691
Fourth	53.123	11.569	7.689	9.84	8.982
Third	40.622	8.477	5.107	6.729	5.942
Second	24.849	4.922	2.773	3.832	3.183
First	8.944	1.129	0.961	1.621	1.039

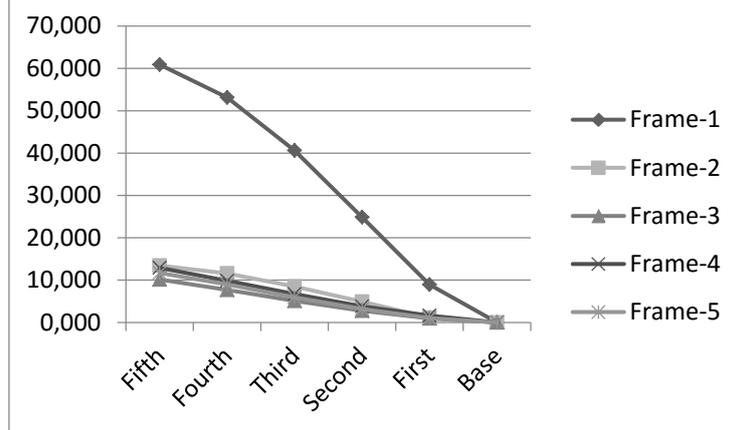


Fig.9: Storeydrift(mm) in z-direction.

## Conclusions

Lateral load resisting capacity of the frame increases significantly in case of shear wall introduction, as is clear from the story displacements in x and z directions.

For frame-2 (shear walls at core), lateral displacements are minimum in x-direction and merely 29% of the displacement of simple frame (from 34.83 mm to 9.96 mm)

The frame with shear walls (frame-3) at mid-sides performs best for earthquake in z-direction. The reduction in response is as high as 83% (60.9 mm to 10.14 mm).

Interstorey drift which is crucial for columns is also reduced appreciably with the introduction of shear wall, minimum being for frames 2 and 3.

As far as bending moments in ground floor columns are concerned, Frame-2 and Frame-3 shows significant reduction in the same as compared to those in simple frame (frame-1). The reduction in B.M. is approximately 70 to 85% for interior and perimeter columns respectively.

Shear force in ground storey columns is also reduced by as high as 86% for Frame-2 and Frame-5. This can be attributed to contribution of shear walls in taking base shear.

Axial force in the columns during earthquake is reduced as much as 45% due to introduction of shear walls. Major reduction is seen for Frame-5.

Similar trend in reduction of bending moments, shear forces and axial forces is seen in for top story columns. Frame-2 and Frame-4 are seen to perform better in this case.

Shear walls are definitely good mechanism for lateral loads mitigation, but the placement of shear walls should be made judiciously. In the present case, the Frame-3 (shear walls at mid-sides) is seen to perform better in major number of cases.

### **Acknowledgement**

The authors would like to pay their sincere gratitude to Mr. Anil Dhiman (Assistant Professor, Department of Civil Engineering) to whom we extend the sincere word of thanks, for his invaluable cooperation and help throughout the research. He acted as constant source of motivation throughout the development stage of the research.

### **References:**

- IS: 875(Part 1) – 1987 (Reaffirmed 2003), *Code of Practice for Design Loads (Other than Earthquake) For Buildings and Structures* (Second Revision).
- IS: 875(Part 2) – 1987 (Reaffirmed 2003), *Code of Practice for Design Loads (Other than Earthquake) For Buildings and Structures* (Second Revision).
- IS: 456-2000(Reaffirmed 2005), *Indian Standard Code of Practice for Plain and Reinforced Concrete (Fourth Revision)*, Bureau of Indian Standards, New Delhi.
- IS: 1893-2002, *Indian Standard Recommendations for Earthquake Resistant Design of Structures*, Bureau of Indian Standards, New Delhi.
- Punmia B C, *Theory of structures*, Laxmi Publishers, 2004.
- Aggarwal and Shrikhande, *Earthquake resistant design of structures*, Phi Learning Limited, 2006.

# THE SPECIFICATION OF A MENU-SELECT INTERACTIVE SYSTEM BASED ON CSP THEORY

*Arslan Enikeev, PhD*

*Mahfoodh Bilal Ahmed Mohammed, MSc*

Kazan Federal University, Russian Federation

---

## Abstract

This paper presents a model for the creation of software systems using the example of a menu-select interaction system based on Communication Sequential Process (CSP) theory. This theory enables the specification and analysis of various patterns of communication between processes. The model includes the specifications of commonly used processes such as 'stoppable', 'resettable', 'backtrackable' and 'coroutine'. Implementation of the model has been carried out on the basis of LISP language and it has been approved in a series of tests.

---

**Keywords:** menu-select interactive system, formal specifications, CSP theory, model

## Introduction

Software systems have significantly increased in complexity and diversity in recent years, requiring the use of new, more efficient technological tools for their development. Most existing tools cannot guaranty high reliability in software products and do not allow their complete analysis. We propose a new model for the study of the properties of these products, starting from the initial description of the problems they are programmed to solve and also examining all stages of their development.

These problems can be solved using formal mathematical models which provide a rigorous approach to software development. However, the experience of software development shows that the use of formal methods in the design of software systems often leads to cumbersome constructions which cause a serious obstacle to the development process. It follows that we need to create an appropriate conceptual apparatus which will make these formal methods more applicable to software development in practice. Considering this problem, of the various tools for creating models available, the most appropriate one seems to be the theory of communicating sequential processes, or CSP (Hoare, 1985), which, by using the conceptualization of sequential processes, enables the specification and analysis of various patterns of communication between processes (including parallelism). The principles of process specification and analysis in CSP are consistent with the top – down method of development, and therefore permit reductions in the complexity of formal methods of software development by abstracting all non-essential parts of the process.

An advantage of using CSP facilities is that they allow the combination of formal methods with the programmer's intuition to create software tools for the computer assisted development of software application. In particular, C.B. Jones, in his monograph (Jones, 1980) proposed in cases of high complexity to replace the formal proof of program correctness by so-called correctness arguments, which can be formulated based on the experience and intuition of the programmer. One of the important stages of a rigorous approach to software development is the construction of a formal model of the application being created based on a suitable mathematical apparatus. In this paper we present the specification of a menu - select interactive system model using CSP.

### Menu-select interaction

By an interactive system we mean a programming system in which interaction between the system and user is realized in the form of a question and answer. The main purpose of interactive systems is an optimization of human-machine interaction when problem solution cannot be completely formalized before execution, or the methods of their solution can be substantially improved by dialogue interconnection. The distinctive feature of this sort of problem is that the subsequent stages of their solution can be changed depending on the results of previous stages and usually cannot be chosen automatically by system programs. The most typical examples of systems intended to provide the above mentioned facilities, are managing, teaching, automatic design, information search and problem solving systems.

The first objective of dialogue interconnection is to prompt, invite and guide the end user to input all the data correctly. End users will particularly need interactive system guidance if they are occasional users, or if the data structure is complex. There are a number of different methods of providing this guidance of which the most appropriate is menus. By menu we mean lists of options from which the user may select by moving a cursor or entering the appropriate keyword. An interactive system based on the menu select interaction principle is called a menu-select interactive system. The most essential benefits provided by a menu select interactive system are the following:

1. Menus help the user to clear the hurdle of getting started.
2. Users do not have to type a syntactically structured request. Instead, they only select from a list of options.
3. The user can go back up to any of the menus used on the previous steps to change the progress of problem solution.

The behavior of a menu-select interactive system can be modeled as a set of sequences of possible responses. This allows description of the menu-select interactive system model using CSP theory. In CSP notation these sequences are called traces. A **trace** is a finite sequence of symbols recording the actual or potential behavior of a process from its beginning up to some moment of time. Each **symbol** denotes a class of events in which a process can participate.

The set of symbols denoting events in which a process can participate defines the **alphabet** of a process. A process is defined by the set of all traces of its possible behavior. From the definition of a trace, it follows that process P with alphabet A;

P0.  $P \subseteq A^*$ , where  $A^*$  denotes the set of all traces with symbols from a pre-defined alphabet A;

P1.  $\langle \rangle \in P$ , where  $\langle \rangle$  denotes an empty trace;

P2.  $st \in P \Rightarrow s \in P$ , for all  $st \in A^*$ , where  $st$  is the concatenation of  $s$  with  $t$

Below we present some important definitions from CSP that will be used subsequently.

If  $s$  is a nonempty trace, we define  $s_0$  as its first symbol, and  $s'$  as the result of removing the first symbol from  $s$ .

Let  $\surd$  be a symbol denoting successful termination of the process. As a result, this symbol can appear only at the end of a trace. Let  $t$  be a trace recording a sequence of events which start when  $s$  has been successfully terminated. The composition of  $s$  and  $t$  is denoted  $(s; t)$ . If  $\surd$  does not occur in  $s$ , then  $t$  cannot start.

If  $s$  is a copy of an initial subsequence of  $t$ , it is possible to find some extension  $u$  of  $s$  such that  $su = t$ . We therefore define an ordering relation  $s \leq t =_{df} \exists u (su=t)$  and say that  $s$  is a *prefix* of  $t$ . For example,  $\langle x,y \rangle \leq \langle x, y, z \rangle$ ,  $\langle \rangle \leq \langle x, y \rangle$ .

The  $\leq$  relation is a partial ordering, and its smallest element is  $\langle \rangle$ .

The expression  $(t \upharpoonright A)$  denotes the trace  $t$  when restricted to symbols in the set A; it is formed from  $t$  simply by omitting all symbols outside A. For example,  $\langle a, d, c, d \rangle \upharpoonright \{a,c\} = \langle a, c \rangle$ .

The expression  $P^0$  denotes the set of first symbols of all traces in process P (initial state of process P). To put it formally:  $P^0 =_{df} \{ c \mid \langle c \rangle \in P \}$ .

Process FAIL =<sub>df</sub> {<>} , which does nothing, process SKIP =<sub>df</sub> {<>, <√>} , which also does nothing, but unlike FAIL it always terminates successfully.

Let  $x$  be an event and let  $P$  be a process. Then  $(c \rightarrow P)$  (called ‘ $c$  then  $P$ ’) describes an object which first engages in the event  $c$  and then behaves exactly as described by  $P$ . The process  $(c \rightarrow P)$  is defined to have the same alphabet as  $P$ ; more formally,  $(c \rightarrow P) =_{df} \{c \rightarrow s \mid c \in \alpha P \ \& \ s \in P\}$ , where  $c \rightarrow s =_{df} \langle c \rangle s$ ,  $\alpha P$  denotes an alphabet of process  $P$ .

Let  $P$  be a process and  $s \in P$  then  $P / s$  ( $P$  after  $s$ ) is a process which behaves the same as  $P$  behaves from the time after  $P$  has engaged in all the actions recorded in the trace  $s$ .

If  $s \notin P$ ,  $P / s$  is not defined; more formally,  $P / s =_{df} \{t \mid st \in P\}$ .

Let  $P$  and  $Q$  be processes. The operation  $P \mid Q$  is defined as following:

$P \mid Q =_{df} P \cup Q$ , where  $\alpha(P \mid Q) = \alpha P \cup \alpha Q$  (the choice between  $P$  and  $Q$ ).

The choice depends on which event from  $(P \mid Q)^0$  occurs. For example, if  $R = (a \rightarrow P) \mid (b \rightarrow Q)$ ,  $R / \langle a \rangle = P$  and  $R / \langle b \rangle = Q$

Let  $P$  and  $Q$  be processes. Sequential composition  $P; Q$  is defined as a process which first behaves like  $P$ ; but when  $P$  terminates successfully,  $(P; Q)$  continues by behaving as  $Q$ . If  $P$  never terminates successfully, neither does  $(P; Q)$ . More formally,  $P; Q =_{df} \{s; t \mid s \in P \ \& \ t \in Q\}$ .

In CSP a menu select interaction can be specified as communicating process  $P$ . The initial menu, with a set of events, is displayed on the screen, represented as  $P^0$ . After the user has selected one of these events, say  $x$  ( $x \in P^0$ ), the subsequent interaction is defined by  $P / \langle x \rangle$  ( $P$  after  $x$ ), i.e.  $(P / \langle x \rangle)^0 \dots$

A set of menus and interactive prompt representations are provided for a set of functions logically used together. Each symbol in the menu denotes a function, invoked after the user’s selection. We will make a distinction between the commonly used functions, controlling the interaction process, and the problem dependent functions, the choice of which can be defined depending on the particular sort of problems.

The most typical commonly used functions of the menu-select interaction are the following:

functions for terminating or quitting a process;

functions allowing the return to any of the previous steps;

switch-functions – for switching to another process, in particular, to use another set of menus or command and data entry, for which the menu technique is less suitable.

The main objective of this paper is the specification of an abstract menu-select interaction on the basis of CSP, concentrating our attention on these commonly used functions.

This paper investigates the following commonly used functions:

‘stop’ – to terminate or quit a process;

2.1. ‘reset’ – to start again from the beginning of a process;

2.2. ‘back’ - to undo the most recent action in a process;

3.1. ‘off’ – to pause a process and switch to another;

3.2. ‘on’ – to restore the action of the most recent process interrupted by the ‘off’ - function.

The model of a menu-select interactive system is based on the specification of these functions, which can be described in CSP. But CSP facilities are not enough to describe a menu-select interaction model completely. Therefore we need to extend CSP facilities with new processes which define the above mentioned functions.

If ‘ $P$ ’ is a process, let’s define the following processes:

2.1. Stoppable ( $P$ ).

Let ‘stop’ be a symbol not in the alphabet  $\alpha P$ . Then a process stoppable ( $P$ ) can be defined as a process which behaves like  $P$ , except that

'stop' is in its alphabet;  
 'stop' is in every menu of stoppable (P);  
 when 'stop' occurs, stoppable (P) terminates successfully

For example:

$\langle a, b, c, \text{stop}, \surd \rangle \in \text{stoppable (P)} \Leftrightarrow \langle a, b, c \rangle \in P$ , where symbol  $\surd$  denotes the event of a successful termination of the process.

2.2. Resettable (P).

Let 'reset' be a symbol not in the alphabet  $\alpha P$ . Define resettable (P) as a process that behaves

like P, except that

'reset' is in its alphabet;  
 'reset' is in every menu of resettable (P);  
 when 'reset' occurs, resettable (P) starts again from the beginning

For example:

$\langle a, b, \text{reset}, c, d \rangle \in \text{resettable(P)} \Leftrightarrow \langle a, b \rangle \in P \ \& \ \langle c, d \rangle \in P$

2.3. Backtrackable (P).

Let 'back' be a symbol not in the alphabet  $\alpha P$ . Define backtrackable (P) as a process that behaves like P, except that

'back' is in its alphabet;  
 back is in every menu of backtrackable (P);  
 backtrackable (P)/s  $\langle x, \text{back} \rangle = \text{backtrackable (P)}/s$  provided  $x \neq \text{'back'}$

The intention is that 'back' will cancel the effect of the most recent action which has not already been cancelled (other than 'back' itself).

For example:

$\langle a, b, \text{back}, d \rangle \in \text{backtrackable (P)} \Leftrightarrow \langle a, d \rangle \in P$

$\langle a, b, c, \text{back}, \text{back}, d \rangle \in \text{backtrackable (P)} \Leftrightarrow \langle a, d \rangle \in P$

2.4. Coroutine (P, Q).

Let  $(\alpha P \cup \alpha Q) \cap \{\text{off}, \text{on}\} = \emptyset$ . Define coroutine (P, Q) as the following:

initially coroutine (P, Q) starts from the process P and then

when 'off' occurs it is switched to the process Q which starts from the beginning, and then

when 'on' occurs it is switched from the process Q to the process P, continuing from the point, at which process P had been interrupted;

the subsequent behavior of 'coroutine (P, Q)' is defined as following:

(2.1) when 'off' occurs it is switched from process P to process Q, continuing from the point at which process Q had been interrupted;

the same as in (1.2).

The behavior of 'coroutine (P, Q)' can be illustrated as following:

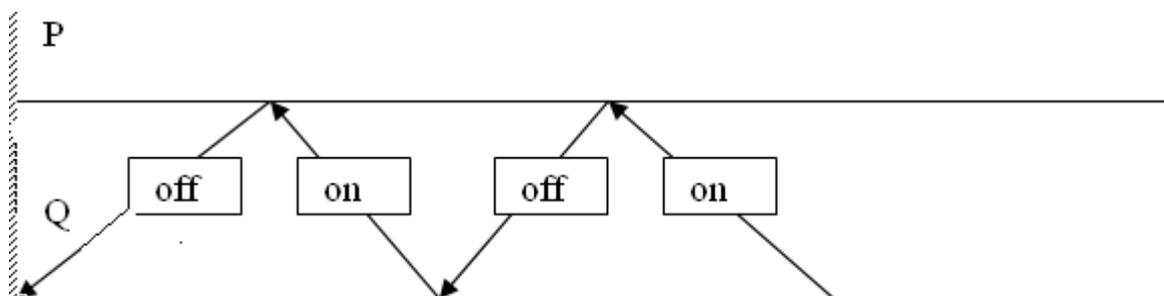


Figure 1.

The coroutine (P, Q) process is an important one, because it permits the description of such well-known processes as lexicographic analysis and parsing in compilers, multiprogramming, time sharing and other important processes.

### The specifications and properties of commonly used operations

Interactive systems are more difficult to specify and analyze than other concurrent systems. This is because they require the conceptualization not only of interactions between their subsystems, but also of the complex interactions between the user and the system. It is clear that the programmer's intuition is not enough, being unreliable in cases of high complexity. One of the important problems in system specification and analysis is the definition of process properties and their proofs using a satisfactory conceptual apparatus. This chapter concerns the specifications and proofs of the properties of the main commonly used processes of menu-select interactive systems using CSP. The 'stoppable', 'resettable', 'backtrackable' and 'coroutine' process operations are considered. These operations introduce new commonly used actions to supplement arbitrary menu-select applications. We stipulate that all processes controlled by the above mentioned commonly used operations are well terminating in the sense that they do not progress towards FAIL process. FAIL process represents a state after the run time errors such as divergence, deadlock and non-termination. A more formal definition is:

$P$  is WTP (Well Terminating Process)  $\Leftrightarrow \forall s \in P. (P/s \langle \rangle \text{FAIL})$

This assumption is important for the implementation of operations.

In this paper we intend to use the following styles of process definition:

a trace based definition, defining a process as the set of its traces;

a derivative definition, defining a process  $P$  by two objects:

a set  $I$ , defining the initial state of process  $P$ , i.e.  $P^0$ ;

a function mapping each member 'c' of  $I$  into a process, defining the subsequent behavior of  $P$ , i.e.  $P/\langle c \rangle$

To prove the relevant properties it is reasonable to use the first definition style. Derivative definitions are useful for the implementation of processes, because they directly define their behavior. Below we formally define the commonly used processes based on the above mentioned styles of process definition.

#### 3.1. Definition of 'stoppable'.

Definition 1 (trace based).

stoppable ( $P$ ) =<sub>df</sub>  $\{st \mid s \in P \ \& \ t \in (\text{stop} \rightarrow \text{SKIP})\}$ , where  $P$  is WTP &  $\text{stop} \notin \alpha P$

Definition 2 (derivative).

$\text{stop} \notin \alpha P \ \&$

$(\text{stoppable}(P))^0 = P^0 \cup \{\text{stop}\} \ \&$   
 $\text{SKIP}, \text{ if } x = \text{stop}$

$(\text{stoppable}(P))/\langle x \rangle = \begin{cases} \text{stoppable}(P/x), & \text{if } x \neq \text{stop} \end{cases}$

The last definition can be adequately implemented in the form of a recursively defined function or procedure.

#### 3.2. Definition of 'resettable'.

Definition 1 (trace based).

resettable( $P$ ) =<sub>df</sub>  $\{s \mid s \in (\alpha P \cup \{\text{reset}\})^* \ \& \ (\forall s_1 \leq s) \text{rest}(s_1) \in P\}$ , where  $P$  is WTP &

$\text{reset} \notin \alpha P$ ,  $\text{rest}(s) = s$ , if  $s \upharpoonright \{\text{reset}\} = \langle \rangle$ ,

$\text{rest}(s) = s_2$ , if  $s = s_1 \langle \text{reset} \rangle s_2 \ \& \ s_1 \upharpoonright \{\text{reset}\} = \langle \rangle \ \& \ \text{last}(s_1) \neq \sqrt{\phantom{x}}$

$\text{last}(u \langle a \rangle) = a$

Definition 2 (derivative).

$\text{reset} \notin \alpha P \ \&$

resettable( $P$ ) = start( $P, P$ ), where

$(\text{start}(P, Q))^0 = P^0 \cup \{\text{reset}\} \ \&$   
 $\text{start}(Q, Q), \text{ if } x = \text{reset}$

$(\text{start}(P, Q))/\langle x \rangle = \begin{cases} \text{start}(P/x, Q), & \text{if } x \neq \text{reset} \end{cases}$

The last definition can be adequately implemented in the form of a recursively defined function or procedure.

**Definition of ‘backtrackable’**

Definition 1 (trace based).

$backtrackable(P) =_{df} \{s \mid s \in (\alpha P \cup \{back\})^* \ \& \ (\forall s_1 \leq s) \ clean(s_1) \in P\}$ , where

$P$  is WTP &  $back \notin \alpha P$ ,

$clean(s) = s$ , if  $s \uparrow \{back\} = \langle \rangle$ ,

$clean(s) = clean(s_1 s_2)$  if  $s = (s_1 \langle a, back \rangle s_2)$  &  $a \notin \{back, \surd\}$ .

$clean(s) = clean(s_1)$  if  $s = \langle back \rangle s_1$

Definition 2 (derivative).

$back \notin \alpha P$  &

$backtrackable(P) =_{recover}(P, P)$ , where

$(recover(P, Q))^0 = P^0 \cup \{back\}$  &

$Q$ , if  $x = back$

$(recover(P, Q)) / \langle x \rangle =$  |

$recover(P/x, recover(P, Q))$ , if  $x \neq back$

The last definition can be adequately implemented in the form of a recursively defined function or procedure.

**Definition of ‘coroutine’**

The trace based definition of ‘coroutine’ seems to be too complicated. So here we will only consider a derivative style of definition:

$(P \text{ is WTP}) \ \& \ (Q \text{ is WTP}) \ \& \ (\alpha P \cup \alpha Q) \cap \{off, on\} = \emptyset$  &

$(coroutine(P, Q))^0 = P^0 \cup \{off\}$  &

$coroutine1(Q, P)$ , if  $x = off$

$coroutine(P, Q) =$  |

$coroutine(P / \langle x \rangle, Q)$ , if  $x \neq off$ ,

where

$(coroutine1(Q, P))^0 = Q^0 \cup \{on\}$  &

$coroutine(P, Q)$ , if  $x = on$

$coroutine1(Q, P) =$  |

$coroutine1(Q / \langle x \rangle, P)$ , if  $x \neq on$

**The properties of commonly used operations**

A study of process properties is one of the main problems of a formal approach to software development. A study of the respective properties of the task to be performed enables the selection of the most reasonable and efficient development path. Formulation and proof of these properties helps to avoid making unfavorable decisions, which is very important especially in the initial stages of software development. Study of properties is based on a mathematical model which allows secure, unambiguous, precise and stable process specification. Here we present an example of property analysis of the commonly used ‘resettable’ operation using CSP facilities. We will consider the following properties:

- (1) if  $P$  is a process then  $resettable(P)$  is a process;
- (2)  $s \in P \ \& \ s \uparrow \{\surd\} = \langle \rangle \Rightarrow (resettable(P)/s)^0 = (P/s)^0 \cup \{reset\}$
- (3)  $s \langle reset \rangle \in resettable(P) \Rightarrow resettable(P)/s \langle reset \rangle = resettable(P)$ ;
- (4)  $s \in P \ \& \ s \uparrow \{\surd\} = \langle \rangle \Rightarrow resettable(P)/s = start(P/s, P)$ ;
- (5)  $s \in resettable(P) \Rightarrow resettable(P)/s = resettable(P)/rest(s)$

We omit the proofs of the above mentioned properties. Similar properties could be presented for other commonly used operations.

### Conclusion

This paper presents an approach to the creation of mathematical models for software systems, giving the example of a menu - select interaction using CSP facilities. The model can be used for specification, proof of process properties and implementation. The implementation of the model was carried out on the basis of LISP language and has been approved in a series of applications. We do not consider these implementations here as we hope to present them in the next paper. CSP theory permits the creation of models for a variety of software systems and is especially appropriate for those that are based on an event-driven programming paradigm. This paradigm is widely used in the majority of object-oriented programming systems. The evolution of the object-oriented programming technique has caused the appearance of the new CSP-OZ theory (Fischer, 1997, Enikeev, Benduma.2011), which is based on a combination CSP and object-oriented specification language Object-Z (Duke, 1995). This new theory provides a specification of the behavior of communicating processes and in addition to CSP permits the description of object-oriented models.

### References:

- C. A. R. Hoare, Communicating sequential processes, Prentice-Hall, Inc., Upper Saddle River, NJ, 1985
- J o n e s C. B. Software Development. A Rigorous Approach, — Prentice Hall International, 1980. 382 p.
- C. Fischer. CSP-OZ: A combination of Object-Z and CSP. In H. Bowman and J. Derrick, editors, Formal Methods for Open Object-Based Distributed Systems, volume 2, pages 423–438. Chapman & Hall, 1997.
- Арслан Еникеев, Тахар Бендума, Специализированные модели для разработки информационных систем, изд-во LAP, LAMBERT Academic Publishing, ISBN: 978-3-8454-4045-3, 2011.
- R. Duke, G. Rose, and G. Smith. Object-Z: A specification language advocated for the description of standards. Computer Standards and Interfaces, 17:511–533, 1995

# **CONCEPT-PROCESS MODEL OF THE 2009 SECONDARY EDUCATION CURRICULUM: ITS EFFECTS ON MATHEMATICS PERFORMANCE**

*Emerzen L. Echavez, MAEd-Math*  
Cebu Normal University, Philippines

---

## **Abstract**

Education authorities have been finding ways and means in treating the steady decline in the level of competencies of Filipino students in the global market. They have come up with a proposal in changing the 2003 RBEC curriculum to 2009 Secondary Education Curriculum in which the Concept-Process Model will be used as a method of teaching. This study examines the effectiveness of the Concept-Process Model of the 2009 Secondary Education Curriculum on the mathematics performance of the First Year students of Cebu City National Science High School. It made use of the quasi-experimental design in which two groups of respondents were given pre-tests, intervention, and then post-tests of the first and second grading periods of the first year coverage. Results showed that both the control and experimental group showed a significant mean gain in the mathematics performance level of the students. However, results also showed that there was no significant difference between the control and the experimental group in terms of the post-test mathematics level of performance. It further showed that there was no significant mean gain difference between the control and experimental group. In conclusion, the Concept-Process Model of the 2009 SEC was effective in increasing the level of performance of the students in mathematics. It can also be said further that the CPM of the 2009 SEC was as effective as the 2003 RBEC. However, it is recommended that this method must be tested to other concepts of mathematics in the other levels for purpose of reliability and validity. This method may also be tested to other subjects more specifically to the sciences as an alternative method in teaching the concepts of the subject.

---

## **Introduction**

Secondary Education Curriculum. 2003 RBEC. Concept-Process Model. Performance. Pre-tests. Intervention. Post-tests. Control group. Experimental group

## **Main Text**

### **Statement of the Problem**

The main purpose of this study is to determine the effectiveness of the Concept-Process Model (CPM) in the 2009 Secondary Education Curriculum (SEC) in the Mathematics Performance of the First Year Students of Cebu City National Science High School, SY 2008-2009.

Specifically, the study sought to find the answer of the following problems:

What is the pre-test mathematics level of performance of the students in the control group (2003 RBEC) and in the experimental group (2009 SEC) before the first exposure second exposure?

Is there significant difference in the pre-test mathematics level of performance of the students in both groups before the first exposure second exposure?

What is the post-test mathematics level of performance of the students in both groups after the first exposure second exposure?

Is there significant difference in the post-test mathematics level of performance of the students in both groups after the first exposure second exposure?

Is there a significant pre-post mean gain in the performance of the two groups after the first exposure second exposure?

Is there a significant mean gain difference in the mathematics level of performance of the two groups after the first exposure second exposure?

### **Methodology**

This study made use of the quasi-experimental design. This design was used to establish significant difference among the groups of subjects. Furthermore, this also established balance among the subjects since the sectioning was based in terms of entrance test results, Grade VI general average, and the school where they came from. Thus, with this design (as shown in Figure 2), the effects of these intervening factors or threats to internal validity were eliminated and this resulted to a guaranteed valid research finding and outcome.

### **Environment**

The Cebu City National Science High School (CCNSHS), which is formerly known as Cebu City Science High School, was established on July 17, 1970 as the brainchild of Dr. Aurelio A. Tiro, Cebu City Schools Division Superintendent then, with a rationale patterned after the objectives of Philippine Science High School in line with the Government Science and Technological Education and Manpower Development Program (CCNSHS Handbook, 2006).

The school's vision is to provide a pool of students who are proficient in Science, Mathematics, and English imbued with moral values who will pursue science and technology oriented careers in preparation for their leadership roles in the Philippine society.

Its mission is to gear education towards quality improvements through Science, Mathematics, and English learning. It shall turn graduates to be academically and technologically oriented and skillfully competent in the field of work through a well-equipped school and well-trained teachers.

As of the present, the school is adopting the Engineering and Science Education Program (ESEP) curriculum of the Department of Science and Technology (DOST). With this curriculum, the students are having more science and mathematics courses than any other public high school. In mathematics, the school is offering calculus while in the sciences; it is also offering advanced biology, advanced chemistry, and advanced physics classes.

Aside from the ESEP curriculum, the school also now adopts the 2009 SEC in the first and second year levels while this curriculum is still under study in the third year level. Furthermore, for the fourth year, RBEC is still used. Among other schools in the region, CCNSHS is one of the two schools selected as a pilot study for the 2009 SEC.

### **Respondents**

The participants of this study were two of the five sections of the first year students of Cebu City National Science High School that comprises of 35 students each section, SY 2008-2009. These groups were chosen since these had been scheduled in the afternoon session and follow one after the other. In this manner, the difference in the focus of students was minimized. But then, in the selection as to which group will take the CPM or the Linear Sequential strategy was drawn by lot. As seen in Table I, it is evident that effects on gender were minimized since both groups have equal number of males and females.

### **Instruments**

To measure the mathematics performance of the students, the researcher used the pre-test and post-test papers prepared by the Bureau of Secondary Education (Refer to Appendix

D1 and D2). Attached with it is its Table of Specifications (Refer to Appendix C). Moreover, the Philippine Secondary Schools Learning Competencies (PSSLC) as shown in Appendix B, and the Lesson Guides provided by the Department of Education and The Bureau of Secondary Education (BSE) were utilized in the preparation of the lesson. The Lesson Guides of the Department of Education were used in treating the RBEC or the control group while the Lesson Exemplars made by the researcher were used in treating the SEC 2009 or the experimental group (Refer to Appendix H. In addition to that, the handouts of the 2009 SEC distributed by the BSE during the training were also used. These handouts include the Standard Matrix, Performance Matrix, Concept Matrix, and a few examples of Lesson Exemplars for every grading period (Refer to Appendix E, F, and G).

### **Research Procedures**

Permission to undertake the study to the first year students was sought from the kind principal of Cebu City Science High School as well as from the Head of Mathematics and Science Department. The transmittal letter is found in Appendix A.

As part of the plan, few days before securing the approval from the school authorities, the researcher was able to request for the pre-post test papers and the Table of Specifications of the aforementioned test constructed by the Bureau of Secondary Education and the specialist in Mathematics with no hesitance, responded to this request and immediately e-mailed the pre-tests.

With the approval of the school authorities, the researcher administered the pre-test for the first grading to the two sections in the first year as the subject. These sections were handled by the researcher himself to avoid biases.

The teacher conducted the class with the use of the traditional approach or the RBEC to section Earth. In this approach, the lessons were presented by means lecture, demonstration, and discussion. These modes of presentation were conducted to the class as a whole, and exercises were given in terms of seatwork, board work, and homework. On the contrary, the CPM of the 2009 SEC was conducted by the same teacher to section Venus.

The first grading coverage includes the topics on measurements and the real number system. Measurements include the history of measurements, measures and measuring devices, measurements involving ratios, rounding-off numbers, and problem solving while the real number system includes the set of real numbers such as the whole numbers, fractions, decimals, and integers and also it includes square roots.

At the end of the first grading, a post-test was administered to both the control and the experimental groups.

The same process was done during the second grading period wherein the pre-test was conducted prior to the treatment of the learning approaches. After which, a post-test was then administered after the learning approaches have been utilized in the discussion of the topics.

The second grading coverage includes topics on algebraic expressions and special products and factoring. Algebraic expressions include the topics constants, variables, numerical expressions, translation of verbal to mathematical phrases and vice versa, evaluation of algebraic expressions, monomials, scientific notation, and definition of polynomials. On the other hand, the discussion on special products and factoring includes the operations of polynomials, special products, and factoring.

### **Findings**

The following were the major findings obtained after the null hypotheses were tested at the 0.05 level of significance.

The students were below average in the pre-test performance level in both the control and the experimental group. Specifically, For the first exposure, both groups were below average in their mathematics performance level. More particularly, In terms of Measurements,

both groups were below average in their pre-test performance level. In terms of Real Numbers, both groups were below average in their pre-test performance level.

For the second exposure, both groups were below average in the pre-test performance level. More particularly, In terms of algebraic expressions, both groups were found to be below average in their pre-test performance.

In terms of special products and factoring, both groups were found to be below average in their pre-test performance.

There is no significant difference in the pre-test mathematics performance level between the control and the experimental group. Specifically, In the first exposure, there was no significant difference in the pre-test performance level between the control and experimental group. More particularly, In terms of measurements, there was no significant difference in the pre-test performance level between the control and experimental group. In terms of real numbers, there was no significant difference in the pre-test performance level between the control and experimental group. In the second exposure, there was no significant difference in the pre-test performance level between the control and experimental group. More particularly, In terms of algebraic expressions, there was no significant difference in the pre-test performance level between the control and experimental group. In terms of special products and factoring, there was no significant difference in the pre-test performance level between the control and experimental group. The students were average in the post-test performance level in both the control and the experimental group. Specifically, For the first exposure, both groups were average in their post-test mathematics performance level. More particularly, In terms of Measurements, the control group was above average in their post-test performance level while the experimental group was average in their performance level. In terms of Real Numbers, both groups were average in their post-test performance level. For the second exposure, both groups were below average in the post-test performance level. More particularly, In terms of algebraic expressions, both groups were found to be average in their post-test performance level. In terms of special products and factoring, both groups were found to be below average in their post-test performance level.

There is no significant difference in the post-test mathematics performance level between the control and the experimental group. Specifically, In the first exposure, there was no significant difference in the post-test performance level between the control and experimental group. More particularly, In terms of measurements, there was no significant difference in the post-test performance level between the control and experimental group. In terms of real numbers, there was no significant difference in the post-test performance level between the control and experimental group. In the second exposure, there was no significant difference in the post-test performance level between the control and experimental group. More particularly, In terms of algebraic expressions, there was a significant difference in the post-test performance level between the control and experimental group. The actual mean score of the experimental group (2009SEC) was much higher than that of the control group (RBEC) thus making a significant difference.

In terms of special products and factoring, there was no significant difference in the post-test performance level between the control and experimental group.

There was a significant pre-post mean gain in the mathematics performance level of both groups. Specifically, In the first exposure, there was a significant pre-post mean gain in the mathematics performance level of both groups. More particularly, In terms of measurements, there was a significant pre-post mean gain in the mathematics performance level of both groups.

In terms of real numbers, there was a significant pre-post mean gain in the mathematics performance level of both groups.

In the second exposure, there was a significant pre-post mean gain in the mathematics performance level of both groups. More particularly, In terms of algebraic expressions, there was a significant pre-post mean gain in the mathematics performance level of both groups.

In terms of special products, there was a significant pre-post mean gain in the mathematics performance level of both groups.

There was no significant mean gain difference in the mathematics performance level of both groups. Specifically, In the first exposure, there was no significant mean gain difference in the mathematics performance level of both groups. More particularly, In terms of measurements, there was no significant mean gain difference in the mathematics performance level of both groups.

In terms of real numbers, there was no significant mean gain difference in the mathematics performance level of both groups.

In the second exposure, there was no significant mean gain difference in the mathematics performance level of both groups. More particularly, In terms of algebraic expressions, there was no significant mean gain difference in the mathematics performance level of both groups. In terms of special products, there was no significant mean gain difference in the mathematics performance level of both groups.

### **Conclusion**

Based on the findings of the study, the use of the Concept-Process Model of the 2009 Secondary Education Curriculum has improved the students' mathematics performance. Moreover, the teaching of mathematics with the use of CPM of the 2009 was as effective as teaching mathematics concepts using linear sequential or the discipline-based learning of the RBEC. Thus, it can be said that both methods of teaching affected the students' performance in all content areas covered in this study.

### **References:**

- Alferes, M. S. & Duro, M. C. A. (2007). *MSA Elementary Algebra*. Quezon City: MSA Publishing House.. p.19-20.
- Angeles, M. T. (2006). *Math Essentials (Elementary Algebra)*. Bulacan: Victorious Publications Inc.. p. 169.
- Calmorin, L. & Calmorin, M. (1995). *Methods of Research and Thesis Writing*. Manila: Rex Bookstore Inc. p.140.
- De Leon, C. M. & Bernabe, J. G. (2002). *Elementary Algebra*. Quezon City: JTW Corporation. p. 79.
- Dewey, J. (1916). *Democracy and Education*. MacMillan.
- Edwards, D. & Mercer, N. (1987). *Common Knowledge: The Development of Understanding in the Classroom*. London: Methuen..
- Torreliza, E., Benes, S. C., Misa, E. L., (1999). *Moving Ahead with Mathematics II*. Quezon City: FNB Educational Inc. p. 194.

# VARIANCE COMPONENTS ESTIMATION IN A K-WAY NESTED RANDOM EFFECT MODELS

*Adilson J. M. da Silva, PhD Student & Researcher*  
University of Cape Verde, Cape Verde

---

## Abstract

This work aims to present the  $k$ -way nested random models (designs) and discuss the estimators for the variance components in this kind of models presented by Henderson (1953), proposing conditions concerning their existence, as well as its two proposed modifications presented by Khattree (1999). At the first proposal, where he chooses to sacrifice the unbiasedness of the Henderson's one to preserve the nonnegativity of the variance, and after noting (through simulations) that his estimator has better performance than the Henderson's one except for the variance of the error term, which has less mean square error than the corresponding error term of the Khattree's estimator, Khattree (1999), on his proposed modification, replaced the error term by the error term of the Henderson's estimators. Using Henderson's estimators, methods of determining hypothesis tests based on Satterwaite (1946) procedure are discussed as well.

---

**Keywords:** Nested random models, variance components, Henderson's estimators, Khattree's estimators, tests of hypothesis

## Introduction

The completed *nested models* arise in many experiments and surveys. Suppose, for sake of motivation, that some local government is interested in choosing laboratories to administer urinalyses to human subjects, who work caring for plants with hazardous materials, and next several analyses may be made from each urine sample, so that the underlying model involves laboratories, human subjects within the laboratories, tests within human subjects, and analysis with tests. Each one of the factors (stage) may be chosen fixed or in a random way. For a variety of reasons, more sublevels (data) may be available for some levels than for others, i.e., the data are unbalanced. For example, there may be some occasions on which some subjects do not appear to his test, or more analysis is needed at different levels of the factor tests, so that the sublevels within each level may vary. In this case the coefficient of a particular *variance component* in the mean squares expectation will vary from one *mean square* for another, leading to strong difficulties in computation of the *variance components estimations* or in performance of *tests of hypothesis*, situation which does not hold for the case when the data are balanced (see Gates and Shiue (1962)).

This work aims to analyse the estimators for the *variance components* proposed separately by Henderson (1953) and Khattree (1999) in a *k*-way nested random model (see, for instance, Gates and Shiue (1962) for notions of this kind of model), proposing conditions on their existence, and the performance of tests of hypothesis for the *variance components*, taking the data to be unbalanced and assuming that the observations of the last factor levels, which are randomly taken, constitute the  $(k-1)$ th factor (see Tietjen and Moore Tietjen (1968) for tests of hypothesis in  $k$ -way random nested models). The approach to the construction of the estimators for *variance components* presented here is proposed by Henderson (1953).

**General K-Way Nested Model - Basic Notions**

A statistical model is said be a k-way nested one if it consists of k factors, say  $A_1, \dots, A_k$  (see the Figure 1), having each one of than some levels, where:

- The levels of the factor  $A_k$  are nested within the levels of the factor  $A_{k-1}$ ;
- The levels of the factor  $A_{k-1}$  are nested within the levels of the factor  $A_{k-2}$ ;
- 
- The levels of the factor  $A_{k-3}$  are nested within the levels of the factor  $A_{k-2}$ ;
- The levels of the factor  $A_{k-2}$  are nested within the levels of the factor  $A_{k-1}$ .

The effect associated with any factor is the effect which its levels have on the interest response variable.

One supposes now that:

There is  $a_{(k+1)j_k \dots j_1}$  observations nested within the  $j_k$ th level of the factor  $A_k$ ;

The factor  $A_k$  has  $a_{kj_{k-1} \dots j_1}$  levels nested within the  $j_{k-1}$ th level of the factor  $A_{k-1}$  ( $j_{k-1} = 1, \dots, a_{(k-1)j_{k-2} \dots j_1}$ );

The factor  $A_{k-1}$  has  $a_{(k-1)j_{k-2} \dots j_1}$  levels nested within the  $j_{k-2}$ th level of the factor  $A_{k-2}$  ( $j_{k-2} = 1, \dots, a_{(k-2)j_{k-3} \dots j_1}$ );

•••

The factor  $A_3$  has  $a_{3j_2j_1}$  levels nested within the  $j_2$ th level of the factor  $A_2$  ( $j_2 = 1, \dots, a_{2j_1}$ );

The factor  $A_2$  has  $a_{2j_1}$  levels nested within the  $j_1$ th level of the factor  $A_1$  ( $j_1 = 1, \dots, a_1$ );

The factor  $A_1$  has  $a_1$  levels.

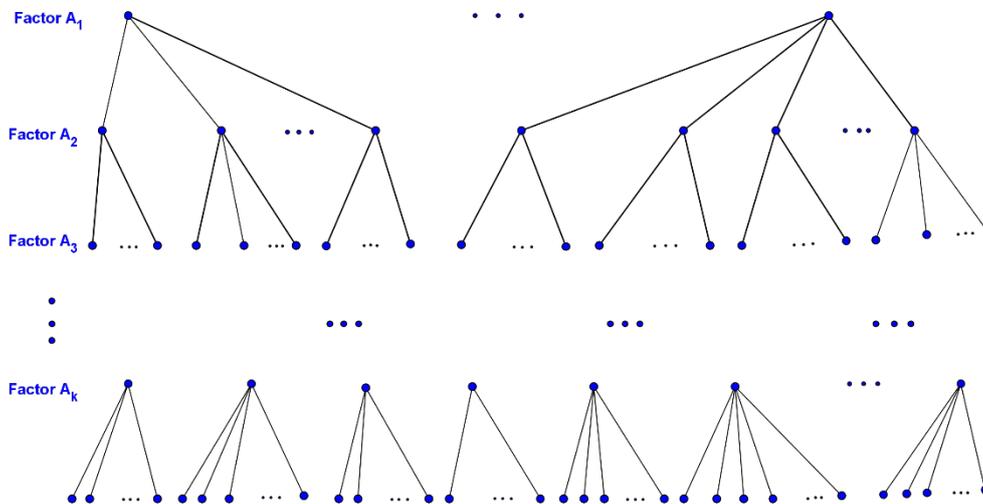


Figure 1: k-way nested model with unbalanced data, with factors  $A_1, \dots, A_k$ . The observations (sublevels) nested within the different levels of the factor  $A_k$  are assumed to constitute the factor  $A_{k+1}$ .

So, a k-way nested random model can be written as:

$$\begin{aligned}
 y_{j_1 \dots j_{k+1}} &= \mu + \beta_{j_1} + \beta_{j_2(j_1)} + \beta_{j_3(j_1j_2)}, \dots, \beta_{j_k(j_1 \dots j_{k-1})} + \beta_{j_{k+1}(j_1 \dots j_k)} \\
 &= \mu + \beta_{j_1} + \sum_{i=2}^{k+1} \beta_{j_i(j_1 \dots j_{i-1})},
 \end{aligned}
 \tag{0.1}$$

with

$$\begin{cases} j_1 = 1, \dots, a_1, \\ j_i = 1, \dots, a_{j_{i-1} \dots j_1}, i = 2, \dots, k + 1, \end{cases}$$

where

$y_{j_1 \dots j_{k+1}}$  is the  $j_{k+1}th$  observation of the  $j_kth$  level of the factor  $A_k$  nested within the  $j_{k-1}th$  level of the factor  $A_{k-1}$  nested within the  $j_{k-2}th$  level of the factor  $A_{k-2}$  nested ... nested within the  $j_3th$  level of the factor  $A_3$  nested within the  $j_2th$  level of the factor  $A_2$  nested within the  $j_1th$  level of the factor  $A_1$ ;

$\mu$  represents the general mean;

$\beta_{j_1}$  is the random effect due to the  $j_1th$  level of the factor  $A_1$ ;

$\beta_{j_2(j_1)}$  is the random effect due to the  $j_2th$  level of the factor  $A_2$  nested within the  $j_1th$  level of the factor  $A_1$ ;

$\beta_{j_3(j_1j_2)}$  is the random effect due to the  $j_3th$  level of the factor  $A_3$  nested within the  $j_2th$  level of the factor  $A_2$  nested within the  $j_1th$  level of the factor  $A_1$ ;;

•••

$\beta_{j_k(j_1 \dots j_{k-1})}$  is the random effect due to the  $j_kth$  level of the factor  $A_k$  nested within the  $j_{k-1}th$  level of the factor  $A_{k-1}$  nested ... nested within the  $j_3th$  level of the factor  $A_3$  nested within the  $j_2th$  level of the factor  $A_2$  nested within the  $j_1th$  level of the factor  $A_1$ ;

$\beta_{j_{k+1}(j_1 \dots j_k)}$  is the random error due to the observation  $y_{j_1j_2 \dots j_{k+1}}$ .

Following Sahai and Ojeda (2005), one assumes the  $\beta$ 's to be mutually and completely uncorrelated variables with means zero and variance  $Var(\beta_{j_1}) = \sigma_1^2$ ,  $Var(\beta_{j_i(j_1, \dots, j_{i-1})}) = \sigma_i^2$ ,  $Var(\beta_{j_i(j_1, \dots, j_{i-1})}) = \sigma_i^2$ ,  $i = 2, \dots, k$ , and  $Var(\beta_{j_{k+1}(j_1, \dots, j_k)}) = \sigma_e^2$ . This last one is the variance of the error term. Here,  $\sigma_1^2, \dots, \sigma_k^2$  and  $\sigma_e^2$  are known as the *variance components* of the response variable.

### The Analysis of Variance: The Expected Mean Squares

In order to establish the analysis of variance (ANOVA) sum of squares for each factor, one firstly provides the sums of the number of levels for different factors, as well as the sums of observations at different levels.

Conveniently, one denotes the number of levels at factor  $A_i$  as

$$a_{i\bullet} = \sum_{j_{i+1}} \dots \sum_{j_k} a_{(k+1)j_k \dots j_1}, i = 1, \dots, k - 1,$$

$$a_{k\bullet} = a_{(k+1)j_k \dots j_1},$$

and the total number of levels (observations) in the sample by  $a_{0\bullet} = \sum_{j_1} a_{1\bullet}$ .

The general sum of observations, denoted by  $y_{0\bullet}$ , is

$$y_{0\bullet} = \sum_{j_1} \dots \sum_{j_{k+1}} y_{j_1 \dots j_{k+1}}$$

and the sums of observations at different levels is given by:

$$y_{i\bullet} = \sum_{j_{i+1}} \dots \sum_{j_{k+1}} y_{j_1 \dots j_k j_{k+1}}, i = 1, \dots, k. \quad (0.2)$$

Thus, the sum of squares for the factor  $A_1$  is given by

$$SS_{A_1} = \sum_{j_1} \frac{y_{1\cdot}^2}{a_{1\cdot}} - \frac{y_{0\cdot}^2}{a_{0\cdot}}; \quad (0.3)$$

The one for the remaining factors  $A_i, i = 1, \dots, k$ , by

$$SS_{A_i} = \sum_{j_1} \dots \sum_{j_i} \frac{y_{i\cdot}^2}{a_{i\cdot}} - \sum_{j_1} \dots \sum_{j_{i-1}} \frac{y_{i-1\cdot}^2}{a_{i-1\cdot}}, i = 2, \dots, k, \quad (0.4)$$

and the sum of squares for the errors is given by

$$SS_e = \sum_{j_1} \dots \sum_{j_{k+1}} y_{j_1 \dots j_k j_{k+1}}^2 - \sum_{j_1} \dots \sum_{j_k} \frac{y_{k\cdot}^2}{a_{(k+1)j_k \dots j_1}}.$$

See Sahai and Ojeda (2005) for some additional explanation.

Having in mind the total number of observations at different factors  $A_i, i = 1, \dots, k$ , the degrees of freedom,  $d_i, i = 1, \dots, k + 1$ , at each sources of variation is computed as follows:

$$d_1 = a_1 - 1; \quad d_2 = \sum_{j_1} a_{2(j_1)} - a_1; \\ d_i = \sum_{j_1} \dots \sum_{j_{i-2}} \left( \sum_{j_{i-1}} a_{i(j_{i-1} \dots j_1)} - a_{i-1(j_{i-2} \dots j_1)} \right), \quad i = 3, \dots, k + 1; \quad (0.5)$$

is the *degrees of freedom* among the levels of the factor  $A_i, i = 1, \dots, k$ , the *degrees of freedom* among levels of the factor  $A_i$  nested within the factor  $A_{i-1}$ , and  $d_{k+1}$  the one among the error factor.

Thus, the *mean square* (which is obtained by dividing the *sum of squares* by its corresponding *degrees of freedom*), denoted here by  $MS_{A_i}, i = 1, \dots, k + 1$ , can be written as

$$MS_{A_i} = \frac{SS_{A_i}}{d_i}, i = 1, \dots, k,$$

and

$$MS_{A_{k+1}} = \frac{SS_{A_e}}{d_{k+1}}.$$

Now, in what follows, one presents the result concerning *expected mean square*. Such result, which is presented here as a proposition, can be found at Sahai and Ojeda (2005) or, for instance, at Searle et al. (2006).

**Proposition 1.**

Consider all the results established up to now. Then, the *expected mean square* at each source of variation is given by

$$E(MS_{A_i}) = EMS_{A_i} = \begin{cases} \sigma_e^2 + c_{i,k} \sigma_k^2 + c_{i,k-1} \sigma_{k-1}^2 + \dots + c_{i,i} \sigma_i^2, & i = 1, \dots, k, \\ \sigma_e^2 & i = k + 1, \end{cases} \quad (0.6)$$

where  $c_{i,s}, i \leq s \leq k$ , are given by

$$c_{i,s} = \sum_{j_1} \dots \sum_{j_s} a_{s\cdot}^2 \left[ \frac{1}{a_{i\cdot}} - \frac{1}{a_{i-1\cdot}} \right] \frac{1}{d_i}, i \leq s \leq k. \quad (0.7)$$

The proof of the above result is very tedious and expensive in what concern the time to perform it, so one will not give it. Instead of that, one recommends Gates and Shiue (1962) or Sahai and Ojeda (2005) for some more details.

**Note 1.**

It must be noted that the condition  $a_{0i} \neq 0 \neq a_{i*}$ ,  $i=1, \dots, k$ , which means every factor has always at least one level, must hold in order to ensure the existence of the  $c_{i,s}$ ,  $i \leq s \leq k$ .

The system of equation (1.6) can be rewritten in the matrix notation as follows:

$$(0.8) \quad [EMS_{A_1} \ EMS_{A_2} \ \vdots \ EMS_{A_k} \ EMS_{A_{k+1}}] = \begin{bmatrix} 1 & c_{1,k} & c_{1,k-1} & \dots & c_{1,3} & c_{1,2} & c_{1,1} \\ 1 & c_{2,k} & c_{2,k-1} & \dots & c_{2,3} & c_{2,2} & 0 \\ 1 & c_{3,k} & c_{3,k-1} & \dots & c_{3,3} & 0 & 0 \\ \vdots & \vdots & \vdots & \ddots & \vdots & \vdots & \vdots \\ 1 & c_{k-1,k} & c_{k-1,k-1} & \dots & 0 & 0 & 0 \\ 1 & c_{k,k} & 0 & \dots & 0 & 0 & 0 \\ 1 & 0 & 0 & \dots & 0 & 0 & 0 \end{bmatrix} \times \begin{bmatrix} \sigma_e^2 \\ \sigma_k^2 \\ \sigma_{k-1}^2 \\ \vdots \\ \sigma_3^2 \\ \sigma_2^2 \\ \sigma_1^2 \end{bmatrix}$$

**Estimation of the Variance Components**

One of the most common procedure for the *estimation of variance components* is the one suggested by Henderson (1953) through is three variations known as *method 1*, *method 2*, and *method 3*, especially because of its simplicity in what concern the computational implementation (even on a hand-held calculator), and umbiaseness. Although the three methods common underlying idea is to form the (observed) *mean squares* for different factors and then equating them to their respective *expected mean squares* (in some case with some readjustment), leading to a system of linear equations, which solved in the *variance components* gives the correspondig estimator, the scenario in this paper is appropriate for the *method 1*, since all terms  $\beta_{j_i}$  and  $\beta_{j_i(j_1 \dots j_{i-1})}$ ,  $i = 2, \dots, k + 1$ , are regarded as random variables. Such estimators, as well as their existence and consistence, are discussed at the subsection which comes next (Subsection 3.1).

Despite its good performance, the Henderson's estimators for the *variance components* abdicate the nonnegativity of variance, situation which is approached by Khattree (1999) on its proposed estimators. The approach proposed by Khattree (1999) which preserve the nonnegativity of variance constitutes a modification to the Henderson's estimators. This is discussed at Subsection 3.2.

**Estimators Proposed By Henderson**

On this subsection one will present the estimator proposed by Henderson (1953) (making use of its method 1) to obtain the estimators for the *variance components* in models with (completely) random designs, which is the case of the one discussed here ( see model (1.1)), and proposes some additional condition over that model in order to get the desired estimators.

Recall the result concerning the *expected mean squares* (the system of equations (1.6) or its matricial notation (1.8)).

Rearranging the matrices involved in (1.8), such result can be, equivalently, rewritten as follows:

$$\begin{bmatrix} EMS_{A_1} \\ EMS_{A_2} \\ EMS_{A_3} \\ \vdots \\ EMS_{A_{k-1}} \\ EMS_{A_k} \\ EMS_{A_{k+1}} \end{bmatrix} = \begin{bmatrix} c_{1,1} & c_{1,2} & c_{1,3} & \dots & c_{1,k-1} & c_{1,k} & 1 \\ 0 & c_{2,2} & c_{2,3} & \dots & c_{2,k-1} & c_{2,k} & 1 \\ 0 & 0 & c_{3,3} & \dots & c_{3,k-1} & c_{3,k} & 1 \\ \vdots & \vdots & \vdots & \ddots & \vdots & \vdots & \vdots \\ 0 & 0 & 0 & \dots & c_{k-1,k-1} & c_{k-1,k} & 1 \\ 0 & 0 & 0 & \dots & 0 & c_{k,k} & 1 \\ 0 & 0 & 0 & \dots & 0 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} \sigma_1^2 \\ \sigma_2^2 \\ \sigma_3^2 \\ \vdots \\ \sigma_{k-1}^2 \\ \sigma_k^2 \\ \sigma_e^2 \end{bmatrix} \quad (0.9)$$

Now, let

$$M = [MS_{A_1} \ MS_{A_2} \ MS_{A_3} \ \dots \ MS_{A_{k-1}} \ MS_{A_k} \ MS_{A_{k+1}}]$$

be the vector whose the entries are the *mean squares* of the different factors,

$$E = [EMS_{A_1} \ EMS_{A_2} \ EMS_{A_3} \ \dots \ EMS_{A_{k-1}} \ EMS_{A_k} \ EMS_{A_{k+1}}]$$

the vector whose the entries are the *expected mean squares* of the different factors, and

$$\sigma = [\sigma_1^2 \ \sigma_2^2 \ \sigma_3^2 \ \dots \ \sigma_{k-1}^2 \ \sigma_k^2 \ \sigma_e^2]$$

the vector of the variances of the effects due to different factors (including the one for the error term). In order to find the estimates for the *variance components*, one must solve the following system of linear equation in  $\sigma$  :

$$E(M) = E = C\sigma, \quad (0.10)$$

where

$$C = \begin{bmatrix} c_{1,1} & c_{1,2} & c_{1,3} & \dots & c_{1,k-1} & c_{1,k} & 1 \\ 0 & c_{2,2} & c_{2,3} & \dots & c_{2,k-1} & c_{2,k} & 1 \\ 0 & 0 & c_{3,3} & \dots & c_{3,k-1} & c_{3,k} & 1 \\ \vdots & \vdots & \vdots & \ddots & \vdots & \vdots & \vdots \\ 0 & 0 & 0 & \dots & c_{k-1,k-1} & c_{k-1,k} & 1 \\ 0 & 0 & 0 & \dots & 0 & c_{k,k} & 1 \\ 0 & 0 & 0 & \dots & 0 & 0 & 1 \end{bmatrix}. \quad (0.11)$$

The system (1.10) yields the (unique) consistent solution

$$\hat{\sigma} = C^{-1}M,$$

with  $\hat{\sigma} = [\hat{\sigma}_1^2 \ \hat{\sigma}_2^2 \ \hat{\sigma}_3^2 \ \dots \ \hat{\sigma}_{k-1}^2 \ \hat{\sigma}_k^2 \ \hat{\sigma}_e^2]$ , if the matrix  $C$  is nonsingular (invertible), having,

therefore, the inverse  $C^{-1}$ . So one has only to ensure the nonsingularity of the matrix  $C$ .

**Note 2.**

*One should note that, in fact, the Henderson's estimator is unbiased. Indeed,*

$$E(\hat{\sigma}) = C^{-1}E(M) = C^{-1}C\sigma = \sigma.$$

**Proposition 2.**

*The necessary and sufficient condition for the matrix  $C$  in the equation (1.10) to be nonsingular is*

$$a_{i-1} \neq a_i, \ i = 1, \dots, k.$$

**Proof.** Since the matrix  $C$  is a triangular one, it is nonsingular if and only if all its diagonal elements are nonzero (this is ensured by the Theorem of Lipschutz (1991)). But this holds if and only if

$$c_{i,i} = \sum_{j_1} \dots \sum_{j_i} \left[ a_{i \cdot} - \frac{a_{i \cdot}^2}{a_{i-1 \cdot}} \right] \frac{1}{d_i} \neq 0, i = 1, \dots, k,$$

which, by its turn, holds if and only if  $a_{i-1 \cdot} \neq a_{i \cdot}, a_{0 \cdot} \neq 0 \neq a_{i \cdot}, i = 1, \dots, k$ . See Note 1 for the latter inequality explanation

Thus, in order to guarantee that the condition  $a_{i-1 \cdot} \neq a_{i \cdot}, i = 1, \dots, k$ , holds, and, therefore, the existence of  $C^{-1}$ , it must be assumed that each factor  $A_i, i = 1, \dots, k$ , has more than one level and each level must have some (sub) levels nested within. One should note that the levels nested within the levels of the factor  $A_k$  are, clearly, the observations.

In the next subsection it is discussed the notable modification to the Henderson's estimators proposed by Khattree (1999).

### Estimators proposed by Khattree

As seen at the preceding sections and subsections, the Henderson's estimator  $\hat{\sigma} = C^{-1}M$  which is a consistent solution to the system  $M = C\sigma$  do not preserve the nonnegativity of the variance, preserving instead the unbiasedness. On its suggested modification to Henderson's estimator, Khattree (1999) (see Khattree (1998) as well), unlike Henderson (1953), choose to sacrifice the unbiasedness of its components to guarantee their nonnegativity.

Namely, on its approach, he considered the problem:

$$\min_{\sigma \geq 0} \|M - E(M)\| = \min_{\sigma \geq 0} \|M - C\sigma\|, \quad (0.12)$$

with  $M, C$  and  $\sigma$  defined above, and  $\|\cdot\|$  (although it may be an appropriate norm) taken to be the Euclidean norm  $\|x\| = (x \cdot x)^{\frac{1}{2}}$ .

In an equivalent way, the problem (1.12) can be stated as

$$\min_{\sigma \geq 0} \frac{1}{2} \sigma \cdot C \cdot C \sigma, \quad (0.13)$$

which is a quadratic problem with linear constrains  $\sigma \geq 0$ . Such problem, as did Lemke (1962), using the primal-dual notion relationship of (1.13) with another optimization problem, in our case can be posed in a different way: find  $\sigma$  and  $u$  such that

$$\sigma - (C \cdot C)^{-1}u = \hat{\sigma}, \sigma, u \geq 0, \sigma \cdot u = 0, \quad (0.14)$$

with  $\hat{\sigma}$  the Henderson's estimator (see subsection 3.1).

Let  $\tilde{\sigma} = \left[ \sigma_1^2 \ \sigma_2^2 \ \sigma_3^2 \ \dots \ \sigma_{k-1}^2 \ \sigma_k^2 \ \sigma_e^2 \right]^*$  be such solution on  $\sigma$ .

Through simulation using a 3-way nested random model, Khattree (1998) remarked (Khattree and Gill (1988) and Ahrens et al (1981) made the same remarks, although in others contexts) that the mean square error of its suggested variances components estimators  $\sigma_i^2$  is generally smaller than the correspondent one of the estimator  $\hat{\sigma}$  suggested by Henderson,  $\sigma_i^2$ , except for the case of the error variance component estimator  $\sigma_e^2$ . For that case he remarked that the result

$$E\left[\left(\sigma_e^2 - \hat{\sigma}_e^2\right)^2\right] \leq E\left[\left(\sigma_e^2 - \hat{\sigma}_e^2\right)^2\right]$$

holds in generally, that is  $\hat{\sigma}_e^2$  has in generally less *mean square error* than  $\hat{\sigma}_e^2$ .

In order to get a estimator with higher performance, Khattree (1998) (see Khattree (1999) as well) combines the “goodness” of his suggested one with the “goodness” of the one suggested by Henderson (1953) performing a modification which applied to our case can be stated as follow.

Let  $\sigma_{(1)} = [\sigma_1^2 \sigma_2^2 \sigma_3^2 \dots \sigma_{k-1}^2 \sigma_k^2]$ , that is the  $k$  first *variance components* (dismissing the one of the error term),  $M_{(1)} = [MS_{A_1} MS_{A_2} MS_{A_3}, \dots, MS_{A_{k-1}} MS_{A_k}]$ , the *mean square* of the different first  $k$  factors, and

$$C = \begin{bmatrix} C_{(11)} & \mathbf{1} \\ 0 & 1 \end{bmatrix}, \quad (0.15)$$

where  $\mathbf{1}$  is an unitary vector with dimension equal to the row number of the sub matrix  $C_{(11)}$ , so that

$$\sigma = [\sigma_{(1)} \sigma_e^2], \quad M = [M_{(1)} MS_{A_{k+1}}],$$

and once the system of equation (1.10) can be rewritten as

$$M_{(1)} = C_{(11)}\sigma_{(1)} + \sigma_e^2$$

$$MS_{A_{k+1}} = \sigma_e^2,$$

equivalently,

$$M_{(1)} - MS_{A_{k+1}} = C_{(11)}\sigma_{(1)} + \sigma_e^2,$$

the problem (1.12) can now be stated as

$$\min_{\sigma \geq 0} = \|M^* - C_{(11)}\sigma_{(1)}\|, \quad (0.16)$$

with  $M^* = M_{(1)} - MS_{A_{k+1}}$ , which amounts to find (following Lemke (1962))  $\sigma_{(1)}$  and  $s$  such that

$$\sigma_{(1)} - (C_{(11)}^* C_{(11)})^{-1} s = \hat{\sigma}_{(1)}, \quad \sigma_{(1)}, s \geq 0, \quad \sigma_{(1)}^* s = 0. \quad (0.17)$$

Let  $\hat{\sigma}_{(1)}$  be the solution in  $\sigma_{(1)}$ . Thereby the Khattree suggested estimator for the *variance components* is then

$$\hat{\sigma} = \begin{bmatrix} \hat{\sigma}_{(1)} & \hat{\sigma}_e^2 \end{bmatrix},$$

with  $\hat{\sigma}_e^2$  the Henderson's estimator for the error term.

### Hypothesis Tests for the Variance Components

Tietjen and Moore (1968) proposed a method to constructing an approximate (pseudo) F-tests to test the hypothesis

$$H_0^r : \sigma_r^2 = 0 \text{ vs } H_1^r : \sigma_r^2 > 0, \quad r \in \{1, \dots, k+1\} \quad (0.18)$$

in nested models with unbalanced data, based on Satterwaite (1946) procedure for testing a linear combination of the mean squares. To perform such tests one construct the ratio  $\frac{MS_{A_r}}{D_r}$ ,

where  $MS_{A_r}$  is the mean squares error at the factor  $r$ , having expectation  $EMS_{A_r} = c_{r,r}\sigma_r^2 + c_{r,r+1}\sigma_{r+1}^2 + \dots + c_{r,k-1}\sigma_{k-1}^2 + c_{r,k}\sigma_k^2 + \sigma_e^2$ ,

and  $D_r = \sum_{i=r+1}^{k+1} l_i MS_{A_i}$  an appropriate linear combination (presented below: equation (1.20)) of the mean squares

$$MS_{A_{r+1}}, \dots, MS_{A_{k+1}},$$

having expected value, i.e.,  $E(D_r)$ , given by

$$E(D_r) = c_{r,r+1}\sigma_{r+1}^2 + c_{r,r+2}\sigma_{r+2}^2 + \dots + c_{r,k-1}\sigma_{k-1}^2 + c_{r,k}\sigma_k^2 + \sigma_e^2$$

which has an approximate  $F$  distribution with appropriate *degrees of freedom*. The *degree of freedom* of the numerator is  $d_r$  (see result (1.5)). To calculate those for the denominator, considering  $C_r$  the  $r$ th row of the matrix  $C$  (see the matrix  $C$  in (1.11)), clearly  $EMS_{A_r} = C_r\sigma$ , so that

$$D_r = C_r\hat{\sigma} - c_{r,r}\hat{\sigma}_r^2 = MS_{A_r} - c_{r,r}\hat{\sigma}_r^2$$

is the desired denominator of the ratio above.

The *degrees of freedom* for the denominator are usually given by

$$d_r^* = \frac{\left(\sum_{i=r+1}^{k+1} l_i MS_{A_i}\right)^2}{\sum_{i=r+1}^{k+1} \left(\frac{(l_i MS_{A_i})^2}{d_i}\right)} \quad (0.19)$$

Let assume now that  $\sigma_{k+1}^2 = \sigma_e^2$  and  $\hat{\sigma}_{k+1}^2 = \hat{\sigma}_e^2$ .

Taking  $c_{i,j}^*$  to be the  $i$ th row and  $j$ th column element of the matrix  $C^{-1}$ , i.e., the inverse matrix of the matrix  $C$ , noting that

$$\begin{aligned} D_r &= c_{r,r+1}\hat{\sigma}_{r+1}^2 + c_{r,r+2}\hat{\sigma}_{r+2}^2 + \dots + c_{r,k-1}\hat{\sigma}_{k-1}^2 + c_{r,k}\hat{\sigma}_k^2 + \hat{\sigma}_{k+1}^2 \\ &= c_{r,r+1}\sum_{j=1}^{k+1} c_{r+1,j}^* MS_{A_j} + c_{r,r+2}\sum_{j=1}^{k+1} c_{r+2,j}^* MS_{A_j} + \dots + c_{r,k}\sum_{j=1}^{k+1} c_{k,j}^* MS_{A_j} + \sum_{j=1}^{k+1} c_{k+1,j}^* MS_{A_j}, \end{aligned} \quad (0.20)$$

where  $\hat{\sigma}_i^2$ ,  $i, \dots, k+1$ , are the Henderson *variance components* estimators, which are unbiased as showed the Note 2, reorganizing the term on (1.20) and noting that  $\sum_{i=r+1}^{k+1} c_{r,i}c_{i,j}^*$  is the coefficient of  $MS_{A_j}$ , and also that except for the absence of the nonzero term  $c_{r,r}c_{r,j}^*$  (and the  $r-1$  terms each equal to zero), the expression  $\sum_{i=r+1}^{k+1} c_{r,i}c_{i,j}^*$  is recognized to be the element at the  $r$ th row and  $j$ th column of  $CC^{-1} = I$ , where  $I$  is the identify matrix of order  $k+1$ .

Thus, by adding and subtracting the term  $c_{r,r}c_{r,j}^*$  to the expression of  $D_r$ , one obtain

$$D_k = -\sum_{i=r+1}^{k+1} c_{r,r}c_{r,i}^* MS_{A_i}. \quad (0.21)$$

The coefficient of  $MS_{A_r}$  is zero since the diagonal elements of  $C^{-1}$  are the reciprocals of the diagonal of  $C$ . Therefore, the *degrees of freedom* for the denominator are given by

$$d_r^* = \frac{D_r^2}{\sum_{i=r+1}^{k+1} \left( \frac{(c_{r,r} c_{r,i}^* MS_{A_i})^2}{di} \right)}. \quad (0.22)$$

This last expression of  $d_r^*$  is easily to compute provided the matrix  $C$  and its inverse  $C^{-1}$ .

So, the test procedure for testing the hypothesis  $H_0^r$  vs  $H_1^r$  is based on ratio statistic  $\frac{MS_{A_r}}{D_r}$ , which follow an approximate  $F$  - distribution with  $d_r$  and  $d_r^*$  degrees of freedom.

## Conclusion

The both Henderson's estimator and Khattree's estimators for the variance components discussed here should not be seen mutually exclusive, seen instead to complement each other, in the sense that when the data are note highly unbalanced or when certain condition on variance components are not violated (the nonnegativity of the variance, for example), the method to find estimators suggested by Henderson (1953) are adequate, as showed Swallow and Monahan (1984) (among others) through Monte Carlo Simulation. Indeed, the underlying approach to his method still play a central role in the variances approaches since it is never totally dismissed, been, instead of, appropriately modified by many researchers (Blackwell at al.~\cite{Blackwell(1991)} proposed to assign zero to the values of the estimators when the correspondent estimative are negative, but this, clearly, compromise their weak optimality of the unbiasedness). On the other hand, the Khattree's estimator and the Khattree's modificate estimator, which as seen constitute a modification to the Henderson's one, inspite of its good performance, sacrifice the unbiasedness (this is preserved for the Henderson's one) of the variance components to guarantee their nonnegativity, and are not explicitly calculated.

Tests of hypothesis presented here are based on the Henderson's estimators. A numerical example for such a tests can be found at Sahai and Ojeda Sahai(2005).

## Acknowledgments

This work was partially supported by the Fundação para a Ciência e a Tecnologia (Portuguese Foundation for Science and Technology) through PEst-OE/MAT/UI0297/2011(CMA). It was also partially supported by the Núcleo de Investigação em Matemática e Aplicações (NUMAT) of Universidade de Cabo Verde.

## References:

- G. Casella, R.L. Berger. Statistical Inference, 2nd ed. Duxbury, 2002.
- S.M. Dowdy, D. Chilko. Statistics for Research, 3rd ed. Wiley, 2004.
- M. Fonseca, T. Mathew, J.T. Mexia and R. Zmy'slony. Tolerance intervals in a two-way nested model with mixed or random effects. *Statistics: A Journal of Theoretical and Applied Statistics*, 41 (4), 289-300, 2007.
- K. Krishnamoorthy, T. Mathew. One-sided tolerance limits in balanced and unbalanced one-way random models based, on generalized confidence intervals. *Technometrics*, 46 (1), 44 - 52, 2004.
- D.C. Montgomery. Design and Analysis of Experiments, 7th ed. Wiley, 2008.
- G. Sharma, T. Mathew. One-sided and two-sided tolerance intervals in general mixed and random effects models using small-sample asymptotics. *Journal of the American Statistical Association*, 107 (497), 258-267, 2012.

# TEACHING MATHEMATICS TO ENGINEERING STUDENTS IN DEVELOPING COUNTRIES

*Nabil Moussa*

Advisor to the President for Development of Academic Staff  
and Mathematics Prof., Ahlia University, Bahrain

---

## Abstract

In this paper we discuss several aspects of teaching mathematics to engineering students in developing countries taking into consideration the methods and strategies of teaching mathematics both at school level and higher education level in general and especially for engineering students. A proposal for measures to remedy the negative aspects of teaching in developing countries is then given.

---

**Keywords:** Teaching Mathematics, engineering students, developing countries, developed countries, school level, higher education level .

## Introduction

Some negative aspects of methods and strategies of teaching mathematics at school level, higher education level in general, and especially for engineering students, in several developing countries are briefly discussed. A proposal for future measures is accordingly given.

In Section 2 the current situation of teaching at school level, higher education level in general, and especially for engineering students in several developing countries are given.

The negative aspects of teaching mathematics at school level and higher education level in general and especially for engineering students in developing countries are illustrated in section 3.

A proposal to remedy the negative aspects is discussed in section 4.

In section 5 our recommendations for the future are given.

Finally the conclusion is then  
briefed in section 6.

## Current Situation in several Developing Countries

To study the situation of teaching in general in developing countries we have to consider following differences (see [1], [2]):

Governing system ranging between dictatorship and partial democracy.

Economic situation differing between very rich and very poor countries.

Standards of teaching in schools and universities which is rather good in some countries and quite bad in some other countries.

Total population which ranges between some hundreds of thousands and some tens of millions.

Ratio of number of schools and universities to total population differing between adequate and not adequate.

Area of the country ranging from a small area and a huge area.

Geographical situation ranging from well situated developing country between 3 continents and very far countries from Europe and USA.

Percentage of non-alphabetical people which is very high in some countries and very low in some other countries.

Technical and financial support of developed countries which ranges from excellent support for some countries and very poor for some countries.

## **Negative Aspects of teaching mathematics in Developing Countries**

### **General Aspects**

The main negative aspects are (see [1], [2]):

Dictatorship is usually not interested in raising critical thinking people. One of their strategies is to keep low standard teaching.

Economically weak developing countries cannot afford investing financially in the field of education.

Developing countries with high population and/or huge area are hindered to spread education in the whole country

High percentage of non-alphabetic people gets sometimes higher priority than education in schools and higher education

Technical and financial support of developed countries is usually based on political decision for definite developing countries

### **At School Level**

The main negative aspects are (see [3], [4]):

Lack of potential teacher with pedagogic high standards and up to date teaching strategies.

Over populated classes.

Emphasizing memorization rather than thinking.

Neglecting visualization and imagination skills.

Lack of support of uneducated parents.

Spending long time on games and internet.

### **In higher Education**

The main negative aspects are (see [5], [6]):

Ignoring the negative aspects of teaching mathematics at school level by some instructors.

Using textbooks written by scientists in developed countries which do not take into consideration the negative aspects of teaching at higher education level in developing countries.

Over populated classes at state universities.

Lack of critical thinking, systematic analyzing, objective criticizing, and creative proposing especially by the freshmen.

Lack of visualization and imagination by the students.

### **Engineering Students**

The main negative aspects are (see [7], [8], [9], [10]):

Many engineering students do not realize the importance of mathematics for their study and careers.

Even some instructors of engineering courses also do not realize the importance of mathematics for the students' study and careers.

Using textbooks written by mathematicians in developed countries which do not take into consideration the negative aspects of teaching mathematics to engineering students in developing countries

Several universities minimize the number of mathematics courses for the sake of more engineering courses.

### **A Proposal to Remedy the Negative Aspects**

#### **Generally**

Establishing a democratic governing system which is really interested in raising critical thinking people.

Investing more in the field of education by state and private sectors.

Decreasing the percentage of non-alphabetical population.

Planning to eliminate or at least minimize technical and financial support of developed countries.

#### **At School Level**

Educating the teachers at school level to have pedagogic high standards and up to date teaching strategies.

Decreasing number of populated classes.

Emphasizing thinking rather than memorization.

Stressing visualization and imagination.

Organizing special tutoring for socially needed parents.

Motivating the young people to get better attitude towards learning.

#### **In higher Education**

Taking into consideration the negative aspects of teaching mathematics at school level by all instructors.

Using textbooks written by scientists in developing countries which take into consideration the the negative aspects of teaching at higher education level in their countries

Decreasing number of populated classes at state universities.

Stressing of critical thinking, systematic analyzing, objective criticizing, and creative proposing especially by the freshmen.

Stressing of visualization and imagination by all students.

#### **Engineering Students**

Engineering students must realize the importance of mathematics for their study and careers.

All instructors of engineering courses must also realize the importance of mathematics for the students' study and careers and convey that to them.

Using textbooks written by mathematicians in developing countries which take into consideration the negative aspects of teaching mathematics to engineering students in their countries

Universities' administration must increase the number of mathematics courses.

#### **Recommendations**

To remedy the negative aspects given in section 3 in developing countries, we recommend following measures:

Establishing democratic governing system which encourages critical thinking people, invests more financially in education, and decrease the number of non-alphabetic population.

Educating all school teachers, who stress critical thinking and visualization in less populated classes.

Recognizing the higher education instructors of the negative aspects of teaching at school level.

Stressing critical thinking and visualization by all higher education instructors.

Realizing the importance of mathematics by all engineering students and instructors.

Increasing the number of offered mathematics courses with wide spectrum for engineering students.

Using textbooks written by scientists in developing countries which take into consideration the political, sociological, economic, social and cultural aspects in their countries

### Conclusion

Enhancement of e-learning in all developing countries according to their sociological and political aspects is highly recommended. In all those countries an intensive informative educative campaign is accordingly very important.

Due to its important role in social and development aspects traditional learning should not be replaced by e-learning in developing countries.

Potential technological support of all developed countries like Bahrain is a necessity

Generous financial support of developed countries to economically weak developing countries like Egypt should be granted. This financial support must be directed to the needy people and not to the governments.

### References:

- Moussa, N, Moussa, S, "Sociological and Political Aspects of E-Learning in Developing Countries", WSEAS Transactions on Advances in Engineering Education, 2006 Issue 9, Volume 3, pp. 869-872
- Moussa, N, Moussa, S, "Economical and Social Impacts of E-Learning in Developing Countries" Proceedings of WORLDCOMP09 International Conference, Las Vegas, U.S.A., 2009, pp. 155-161
- <http://www.accc.edu.au>, Curriculum Corporation Technology, 1994, Report, "A Curriculum Profile for Australian Schools
- Krantz, S. "How to Teach Mathematics: A Personal Prospective", Providence, RI;AMS, 1993
- Nabil Moussa „Quality od Education in Developing Countries“, Higher Education in the Twenty-First Century: Issues and Chalenges, Taylor & Francis Group, London, 2008, ISBN: 978-0-415-48000-0, pp. 109-112
- Mohamed, A., „Accreditation of Higher Learning Institution“, Higher Education in the Twenty-First Century: Issues and Chalenges, Taylor & Francis Group, London, 2008, ISBN: 978-0-415-48000-0, pp. 85-94
- Moussa, N, "Theoretical and Applied Approches for Teaching Mathematics to Engineering Students", WSEAS Transactions on Advanced in Engineering Education, Issue 1, Volume 1, 2004, pp 6-10
- Moussa, N., „Knowledge Delivery Methods of Mathematics to Engineering Students in Developing Countries“, WSEAS International Conference (AIKED'09), Cambridge, U.K., 2009, pp. 266-270
- Moussa, N., "Teaching Mathematical Analysis to Engineering Freshman and Sophomors", Proceedings of the Symposium on Sciences and Engineering Education in the 21<sup>st</sup> Century, AUC, 1995, pp. 202-209
- Nabil Moussa, "Calculus I-Differential Calculus", ISBN: 977-304-109-3 (2005), "Calculus II- Integral Calculus", ISBN: 977-304-110-7 (2005), "Calculus III- Intermediate Calculus", ISBN: 977-304-307-X (2008)

# MATHEMATICS AND PHYSICS ESTIMATES OF SLOW CONTROLS

*O. Carja, PhD*

*A. I. Lazu, PhD,*

Al.I.Cuza University of Iasi, Romania

## Abstract

We consider a linear control system with the origin as target and study the behavior of the minimum norm control as time duration goes to infinity.

**Keywords:** control systems, minimum time, minimum norm

## Introduction

Consider the abstract control system

$$(3.1) \quad \dot{y} = Ay + Bu$$

where  $A$  generates a continuous semigroup in a Banach space  $X$  and  $B$  is linear and bounded from a Banach space  $U$  to  $X$ . This setting is very general and covers most systems encountered in applications: distributed control systems, point control systems, neutral functional differential equations.

The solution of equation (3.1), which satisfies the initial condition  $y(0)=x$ , is given by

$$y(t,s,u) = S(t)x + \int_0^t S(t-s) Bu(s) ds.$$

Here  $S(t)$  is the linear semigroup generated by  $A$ . The minimum energy (norm control) to bring  $x$  to zero in time  $t$  is denoted by  $E(t,x)$ .

Suppose that the system (3.1) is null-controllable on some time interval  $t$ , i.e., for each  $x$  in  $X$  there exists  $u(\cdot)$  such that  $y(t, x, u)=0$ . Obviously, if a state  $x$  can be steered to zero in some time, then it can be steered to zero in any larger time and it is expected that, as the time grows, the control energy needed to transfer  $x$  to zero to become smaller. In this paper, we study the behavior of the minimum energy to transfer  $x$  to zero when the transferable time tends to infinity..

The reverse case, of fast controls (when  $t$  is small), was treated in the finite dimensional setting in [10] for  $L^2$ -controls and in [11] for  $L^p$ -controls, with  $p$  in the interval  $(1, \infty)$  and there were given asymptotics of the minimum norm control as  $t$  tends to zero. In infinite dimensional case, this problem was studied in [12] for coupled systems of partial differential equations.

In [13], for large  $t$ , there are given estimates for the control cost, for an abstract parabolic equations of form (3.1) ( $A$  being a generator of a contraction semigroup) in Hilbert spaces, with  $L^2$ -controls.

In [8], W. Krabs considered a control systems described by an abstract wave equation of the form  $y'' = Ay + u$  in a Hilbert space and studied the null controllability for every positive time with  $L^\infty$ -controls. He showed that for every positive  $t$ , the null controllability is possible by a minimum norm control which is unique on  $[0, t]$  and satisfies a bang-bang principle. Moreover, he proved that the norm control tends to zero when  $t$  tends to infinity. Similar results have been proved in [7] for  $L^2$ -controls. We mention also the paper of S. Ivanov [6] where it is studied the rate for the minimal energy to tend to 0 as  $t$  tends to infinity, for second order control systems with  $L^2$  and  $L^1$ -controls. The constrained null controllability of the system (3.1) was proved in [2] for contraction semigroups. Estimates for fast controls

were also obtained in [3] in the finite dimensional setting as well as in some infinite

The above result says that a function  $r(t)$  satisfying (3.3) on some interval  $[0, T_0]$  can be extended on the whole interval  $[0, \infty)$  again satisfying (3.3). Moreover, we are interested in getting a continuous (eventually, strictly increasing) function satisfying (3.3) on  $[T_0, \infty)$ . To this end, recall that, considering a suitable norm on  $X$ , for some  $\omega$  we have  $|S(t)| \leq \exp(\omega t)$  for any  $t \geq 0$ . Let us define the function  $r(t)$  on  $[T_0, \infty)$  by  $r(t) = (r(T_0) \sum_{k=0}^{n-1} \exp(-\omega k T_0 - \omega q) + r(q))$ ,  $k=0,1, \dots, n-1$ ,  $t = q+nT_0$  with  $q$  in  $(0, T_0]$ . It is clear that if  $r(t)$  is continuous on  $[0, T_0]$ , then its continuation defined as above is also continuous for any  $t > T_0$ , and satisfies the inclusion (3.3).

dimensional cases.

For any positive  $t$ , let us define the operator  $V(t)$  by

$$V(t)u = \int_0^t S(t-s) Bu(s) ds,$$

which, clearly, is bounded and linear. Then, the null controllability of the control system (3.1) on  $t$  means that

$$\text{range } S(t) \subseteq \text{range } V(t). \tag{3.2}$$

Denoting by  $B(r)$  the closed ball centered at zero with radius  $r$  in a Banach space, by the open mapping theorem, inclusion (3.2) is equivalent to the following one:

$$S(t)B(r(t)) \subseteq V(t)B(1), \tag{3.3}$$

for some constant  $r(t)$ . This equivalence still holds in the case when  $V(t)$  is only a closed and densely defined operator. This allows to consider also boundary control systems.

Define the reachable set at time  $t$ , denoted by  $R(t)$ , as the set of all points  $x$  such that there exists a control  $u$  in  $B(1)$  with  $y(t,x,u)=0$ . The reachable set in free time is the union of all  $R(t)$  for positive  $t$  and is denoted by  $R$ .

**Definition** The control system (3.1) is said to be admissible null-controllable if all points of  $X$  can be transferred to zero in finite time with controls in  $B(1)$ , i.e.,  $R=X$ .

In this paper we study estimates of the sets  $R(t)$  for  $t$  large and in particular we study cases when  $R=X$ . As a matter of fact,  $R$  is the domain of the minimal time function. Recall that, the minimal time corresponding to  $x$  is the infimum of the times taken to transfer  $x$  to zero with admissible controls. Of course, here the set of admissible controls is a ball with the center in zero.

Supposing that system (3.1) is null-controllable on any time  $t$  in  $[0, T_0]$ , we provide here remarkable subsets of  $R(t)$  for any  $t \geq T_0$  and we get estimates of the minimum energy. Moreover, if we know a continuous function  $r(t)$  on  $[0, T_0]$  satisfying (3.3) for every  $t$ , we extend continuously this function on the whole interval  $[0, \infty)$  preserving condition (3.3) and having a good growth rate. Further, if the semigroup has a linear growth (in particular, if it is uniformly bounded), then this new function  $r(t)$  has the property that tends to infinity when  $t$  tends to infinity. Consequently, the control system is admissible null-controllable in this situation. Now we give the main results of this paper.

## Results

### Theorem

Suppose that there exist  $T_0$  and a function  $r$  defined on  $[0, T_0]$ , with  $r(0)=0$  such that (3.3) holds for any  $t$  in  $[0, T_0]$ . Then, it can be extended on  $[T_0, \infty)$  by

$$r(t) = (r(T_0) / |S(q)|) \sum_{k=0}^{n-1} |S(T_0)|^k + r(q), \quad k=0,1, \dots, n-1 \tag{4.1}$$

for  $t=q+nT_0$  with  $q$  in  $(0, T_0]$ , which satisfies (3.3) for every  $t$  in  $[T_0, \infty)$ .

In particular, if  $S(t)$  is a semigroup of contraction, we get

**Corollary**

Suppose that  $|S(t)| \leq 1$  for any  $t \geq 0$ . Suppose further that there exist  $T_0 > 0$  and a continuous and strictly increasing function  $r(t)$  defined on  $[0, T_0]$ , with  $r(0)=0$ , which satisfies (3.3) on  $[0, T_0]$ . Then, the extension  $r(t)$  defined on  $[T_0, \infty)$  by

$$r(t) = nr(T_0) + r(q)$$

for  $t = nT_0 + q$ ,  $q$  in  $(0, T_0]$ , is continuous and strictly increasing too and satisfies (3.3) on  $[T_0, \infty)$ . Moreover,  $r(t)$  tends to infinity when  $t$  tends to infinity.

A similar result can be obtained in case  $S(t)$  has linear growth, i.e.  $|S(t)| \leq c(t+1)$  for any  $t \geq 0$  and some constant  $c > 0$ . In this case define  $r(t) = (1/c) \sum_{k=0}^{n-1} 1/(kT_0 + q + 1) + r(q)$ ,  $k=0, 1, \dots, n-1$ , for  $t = q + nT_0$  with  $q$  in  $(0, T_0]$ .

A finite dimensional example of a continuous semigroup with linear growth, which is not uniformly bounded, is given by  $S(t) = [-2t+1 \quad -t; 4t \quad 2t+1]$ , with  $t$  nonnegative, generated by  $A = [-2 \quad -1; 4 \quad 2]$ . It is easy to see that the norm of  $S(t)$  is not less or equal to  $M$ , for any nonnegative  $t$  and any positive  $M$ , but satisfies  $|S(t)x| \leq c(5t+1)|x|$  for any  $x$  in  $\mathbb{R}^2$  and any nonnegative  $t$ .

**Examples**

In this section we give examples of functions  $r(t)$  satisfying (3.3).

**Example 1** In the finite dimensional setting, when  $X = \mathbb{R}^n$ , in [3, Theorem 2.2], it is provided the function  $r(t)$  of the form:

$$r(t) = c \min\{t^n, t\} / \sup\{|S(s)|; s \in [0, t]\},$$

where  $c$  is a positive constant and  $k$  is an integer such that the well known Kalmann condition is satisfied:

$\text{span}\{BU, ABU, A^{n-1}BU\} = X$ .

It is clear that  $r(t)$  is strictly increasing with  $r(0)=0$ . In the case when the semigroup is uniformly bounded, then  $r(t)$  tends to infinity when  $t$  tends to infinity and, for each  $x$  of  $X$ ,  $E(t,x)$  tends to zero for  $t$  large.

**Example 2** Consider the case of reflexive  $X$ ,  $U=X$  and  $B$  is the identity operator.

It is known that the corresponding control system is null-controllable on every  $t > 0$  with controls from  $L^\infty$  (see, e.g., [14]). More exactly, we have that the ball  $B((1/\omega)(1 - \exp(-\omega t)))$  is a subset of  $R(t)$ . Therefore, in the case when  $\omega$  is not zero, we have  $r(t) = (1/\omega M)(1 - \exp(-\omega t))$ . If  $\omega$  is positive then  $r(t)$  tends to  $1/\omega$  when  $t$  tends to infinity. Therefore, the open ball centered in zero and having the radius  $1/\omega$  is a subset of  $R$ . Take now the case when  $\omega = 0$ . It is easy to see that  $r(t) = t$  is a good function that satisfies (3.3). Moreover, if  $\omega$  is not strictly positive, then  $r(t)$  tends to infinity when  $t$  tends to infinity, so we have controllability with vanishing energy and  $R=X$ .

**Example 3** This example refers to the heat equation on a bounded domain (with boundary of class  $C^2$ ) with homogeneous Dirichlet boundary conditions, in which the control is distributed internally on an open subset.

The considered partial differential equation can be rewritten as an ordinary differential equation in  $L^2$  of the form (3.1). In the  $L^\infty$ -control, in [5, Proposition 3.2] it is proved that there exists  $C > 0$  such that (3.3) holds with  $r(t) = \exp(-C(1+1/t+t))$ , for any positive  $t$ . Clearly,  $r$  tends to zero when  $t$  tends to zero. This function increases on  $[0,1]$  and is decreasing otherwise, tending to zero when  $t$  tends to infinity. Then, by Theorem 4.1, we provide a better

function for  $t$  greater than 1 with the property that it tends to infinity when  $t$  tends to infinity. Moreover, we get that  $E(t,x)$  tends to zero for  $t$  large and for any  $x$  in  $L^2$ . Consider now the  $L^2$  – control case. In this situation, again in [5, Proposition 3.2] it is proved that there exists  $C>0$  such that (3.3) holds with  $r(t)=\exp(-C(1+1/t))$ , for any positive  $t$ . Clearly,  $r$  tends to zero when  $t$  tends to zero. This function increases on  $[0,1]$  and is decreasing otherwise, tending to  $\exp(-C)$  when  $t$  tends to infinity. Theorem 4.1 provides a better function for  $t$  greater than 1 with the property that it tends to infinity when  $t$  tends to infinity.

We recall that the semigroup generated by the Laplace operator subject to Dirichlet boundary conditions in  $L^2$  has  $M=1$  and  $\omega<0$ .

We mention finally that throughout we supposed that  $|S(t)| > 0$  for each  $t>0$ ; the case when  $S(t_0) = 0$  for some  $t_0$  is not of interest for the problem studied here.

## Conclusion

The behavior of the minimum energy for large time does not depend on the control operator. It depends on the state operator under the basic assumption that the system is null controllable at some time. In the case when the control system is null controllable for every  $t>0$ , then the minimal time function is continuous in zero. Moreover, the reachable set  $R$  is open and the minimal time function is locally uniformly continuous on  $R$ . We end this paper pointing out that the results can be extended to systems with boundary controls, both for parabolic and hyperbolic type. In this situation the operator  $B$  is not necessarily bounded but there are no differences in reasoning (see [15] for a good reference).

## Acknowledgements

The research was supported by ID PNII-CT-ERC-2012 – 1, "Interconnected Methods to Analysis of

Deterministic and Stochastic Partial Differential Equations", project number 1ERC/02.07.2012.

## References:

- O. Carja, *A note on admissible null controllability and on variational perturbations of the minimum time problem*, An. Stiint. Univ. Al. I. Cuza Iasi Sect. I a Mat. 32 (1986), no. 1, 13–
- K. Narukawa, *Admissible null controllability and optimal time control*, Hiroshima Math. J. 11 (1981), no. 3, 533–551.
- D. Aze, O. Carja, *Fast controls and minimum time*, Control Cybernet. 29 (2000), no. 4, 887–
- O. Carja, A. Lazu, *On the minimal time null controllability of the heat equation*, Discrete Contin. Dyn. Syst. 2009, Dynamical Systems, Differential Equations and Applications. 7th AIMS Conference, suppl., 143–150.
- E. Fernandez-Cara, E. Zuazua, *Null and approximate controllability for weakly blowing up semilinear heat equations*, Ann. Inst. H. Poincaré Anal. Non Linéaire 17 (2000), no. 5, 583–
- S. Ivanov, *Control norms for large control times*, ESAIM Control Optim. Calc. Var. 4 (1999),
- W. Krabs, *On time-minimal distributed control of vibrating systems governed by an abstract wave equation*, Appl. Math. Optim. 13 (1985), no. 2, 137–149.
- W. Krabs, *On time-minimal distributed control of vibrations*, Appl. Math. Optim. 19 (1989), no. 1, 65–73.
- E. Priola, J. Zabczyk, *Null controllability with vanishing energy*, SIAM J. Control Optim. 42 (2003), no. 3, 1013–1032 (electronic).
- T. I. Seidman, *How violent are fast controls?*, Math. Control Signals Systems 1 (1988), no. 1,
- T. I. Seidman, J. Yong, *How violent are fast controls?*, Math. Control Signals Systems 9 (1996), no. 4, 327–340.
- T. I. Seidman, *How violent are fast controls, III*, J. Math. Anal. Appl. 339 (2008), no. 1, 461–

- G. Tenenbaum, M. Tucsnak, *On the null-controllability of diffusion equations*, ESAIM Control Optim. Calc. Var. 17 (2011), no. 4, 1088–1100.
- A. Vieru, *On null controllability of linear systems in Banach spaces*, Systems Control Lett. 54 (2005), no. 4, 331–337.
- L. Pandolfi, E. Priola, J. Zabczyk *Linear Operator Inequality and Null Controllability with Vanishing Energy for Unbounded Control Systems*. SIAM J. Control Optim. 51(1) (2013), 629–659.

## MAKING NATURE'S VALUE VISIBLE: VIDEO ARTISTS AS CITIZEN SCIENTISTS

*Sarah Van Borek*, (MFA)

Emily Carr University of Art + Design, Canada

---

### Abstract

Rewilding Vancouver community projects was a community mapping, storytelling & visioning project designed to reconnect residents in the Metro Vancouver region of British Columbia, Canada with the city's "wild side" (the historical natural environment) and to help "make visible" the different forms that nature takes in Vancouver as ways to inspire the valuing, protection and potential "rewilding" of nature.. The project was developed through a two-semester cross-disciplinary studio-based community projects course in the Faculty of Culture + Community at one of Canada's leading post-secondary art institutions, the Emily Carr University of Art + Design (Vancouver), in partnership with one of Canada's leading environmental organizations, the David Suzuki Foundation (DSF), and the bold, contemporary Museum of Vancouver (MOV).

Postsecondary art students across a variety of levels and disciplines were facilitated in producing a media arts-based "virtual urban safari" as part of the MOV's *Rewilding Vancouver* exhibit running February 27-September 1, 2014. This exhibit is believed to be the first of its kind in Canada to feature the historical ecology of a major city. Many of the students, by their own self-description, came into the course feeling disconnected from the natural world themselves. The course was structured in a way that encouraged students to reconnect with nature in the city through their creative process. The course culminated in a public screening and dialogue, offering the students the opportunity to see the effects of their work on a public audience and feel like their input could have an impact.

---

**Keywords:** rewilding, education, civil society, historical ecology, museum

### Introduction

How should we *see* nature? How does what we are shown about nature, whether it be something we witness directly in the wild or through the mediation of some sort of documentation, affect our perceptions, understandings, and values of nature? How does this visual evidence (or lack thereof) influence our behaviours and our ability to imagine what the natural world should and could be like in the future?

*In 2010, a grey whale visited False Creek, thrilling the people of Vancouver. Most had no idea that it was memory come back to life. Just 150 years ago, grey and even humpback whales-the species known for its haunting underwater songs-were common in Vancouver waters. By 1908, the local whales had been wiped out by whaling (Rewilding Vancouver exhibit, Museum of Vancouver).*

I had been living and working in Vancouver at the historic moment that the grey whale visited False Creek. I live and work right on the False Creek flats, so technically the grey whale swam into my neighbourhood that day. Unfortunately, I did not see it with my own eyes. I definitely heard about it, though. In fact, it seemed to become a comedic way for characterizing a typical Vancouverite: "one whale swims into the creek and the whole city shuts down for the day to go see it." I was definitely someone who, surely like many others, took this to be a once-in-a-lifetime occurrence. That was before discovering that this used to be a common occurrence in the area. When I learned how important this story was to inspiring

the *Rewilding Vancouver* exhibit at the Museum of Vancouver, I decided to search for some videos of the whale to show my *Rewilding Vancouver Community Projects* class at ECUAD. Finding a plethora of youtube videos filmed by citizens on smartphones and other portable devices from curious vantage points including office windows, the sea bus, an inner city bridge, and a kayak, certainly helped to paint a picture of the general atmosphere of awe that day. What stood out for me the most in these videos were the reactions of the eye witnesses, most often available through the sounds of shrieks and comments of disbelief in the background of mostly point-of-view shots. One of the most memorable for me (and perhaps the 48,000+ views it's had at the time of writing this) was Chris Brown's *Science World Whale Vancouver May 5th, 2010*, [<http://www.youtube.com/watch?v=iGVj3D1LqG0>] where Chris rides his skateboard down the causeway alongside Vancouver's science-based museum to document the grey whale, Chris's opening commentary setting the tone, "Wow, wow! Holy crap! Insane!"

What if no one had noticed the grey whale's swim into False Creek in 2010? What if some people had seen it but no one had video documented it? Would it have been easy to convince others who had not seen it for themselves that it actually happened? As J.B. MacKinnon, MOV's guest curator of the *Rewilding Vancouver* exhibit and author of the book *The Once and Future World: Nature As It Was, As It Is, As It Could Be (2013)* reminds us, our first task is to go outside while our second task is to see the nature in our urban locale:

*The crisis in the natural world is one of awareness as much as any other cause. As a global majority has moved into cities, a feedback loop is increasingly clear. In the city, we tend not to pay much attention to nature; for most of us, familiarity with corporate logos and celebrity news really is of more practical day-to-day use than a knowledge of local birds and edible wild plants. With nature out of focus, it becomes easier to overlook its decline. Then, as the richness and abundance of other species fade from land and sea, nature as a whole becomes less interesting – making it even less likely we will pay attention to it (77).*

When the whale spouts in his video, Chris continues to express his wonderment with an exuberant, "Ohhhhhhh." After someone in the background confirms his documentation of the historic moment with an "I got it!" Chris shrieks in delight, "I got it too!" Where Chris's enthusiasm speaks to me of the wonder that the wild world can inspire (and therefore reinforces one of its values), Chris's confirmation of documenting the historic moment offers a glimpse into the potential of video artists (be they amateur video-making citizens or visual artists armed with video cameras) to be citizen scientists - suggesting new ways of seeing nature and our relationship with it.

*The history of nature is critically important to the way we see the world around us. When we forget that whales used to live here, the absence of whales seems normal. When we remember, it becomes possible to imagine Vancouver with whales once again (MOV).*

To better understand what I mean by video artists being citizen scientists, let me first define what I refer to when I say "scientist." While there is a seemingly infinite range of areas of specialization and methodologies, in this case I am referring specifically to the role of scientists in general in terms of how they, through a general process of hypothesizing, inquiring, investigating, observing, documenting and concluding, suggest new ways of seeing the natural world and humans' relationship to it. This can have profound effects in terms of influencing our perceptions, understandings and values of nature, which in turn can influence our behaviours in response to the natural world. An example of this would be the "wilderness myth" - the belief that when European explorers first arrived in the Americas, what they found was mainly empty wilderness. Thanks largely to the work of the indigenous peoples of the Americas, as well as anthropologists, archaeologists, biologists and ecologists, today the "myth" aspect of this has been proven, and consequently our understanding of what is meant by "wilderness" is evolving.

*The myth of the wilderness as “virgin,” uninhabited land had always been especially cruel when seen from the perspective of the Indians who had once called that land home...they were forced to move elsewhere, with the result that tourists could safely enjoy the illusion that they were seeing their nation in its pristine, original state... (Cronon, 79)*

When video artists, creative makers who by practice offer a unique way of seeing the world in general, equipped with audio and visual documentation tools (i.e. video cameras, sound recorders, and audio and video editing software), undertake a similar process of hypothesizing, inquiring, investigating, observing, documenting and concluding, they in turn create new ways of seeing the natural world and humans’ relationship to it.

*...documentary is not shot in studios but on location, and thrives on the ability of the camera, from the very beginning, to freely roam the world. In the process, documentary creates its own cognitive map of the world it goes out to meet. Like all cognitive maps, the places are real but the angles from which they’re seen and the ways of moving around between them derive from the map-maker’s own criteria-cultural, social, imaginary and symbolic (Chanan, 78).*

One way to explain this concept is through a brief examination of the history of nature films. Scott MacDonald, in his book *Adventures in Perception: Cinema As Exploration (2009)*, offers a concise overview of some diverse approaches to producing nature films in the past and the kinds of influences these may have had on humans’ relationship to nature. MacDonald explains how Disney’s *True-Life Adventures* (approx. 1948-1960) came about at a time when animation proved too expensive, so the dramatization of nature became a more cost-effective format of producing films for entertainment. These films anthropomorphized animals and often created stories that promoted conventional ideas about domestic life. These films were constructed narratives compiled out of footage gathered over fragmented times and locations, essentially fictionalizing nature for human consumption. Perhaps these films have contributed to people thinking about the environment as material for human consumption, and in an anthropocentric way-mostly as it relates to the well-being of humans without as much consideration for how our actions and choices affect the non-human world. National Geographic’s ongoing series *World’s Deadliest Animals* boasts “a violent eden” with sequences condensing time and scenes of animals attacking, fighting, killing, and seeming overall dangerous and threatening. These videos and others like them may encourage people to fear nature which might inspire us to urbanize more as a way to protect ourselves from these wild threats.

Jean Painlevé, a French filmmaker, tried to prove that cinema can be a tool for science, documenting scenes to suggest they were fairly objective observations but often making parallels with human behaviour in subversive ways to challenge stereotypes. An example of this is when he showed how male seahorses carry eggs and birth baby seahorses in his film *L’Hippocampe (1934)*. Painlevé’s films presented a shift from commercializing nature to understanding the educational value of nature including how the human imagination can be inspired by phenomena that exist in the natural world. *Microcosmos (1996, Nuridsany & Pérennou)* suggested we pay attention to the fine details of nature in our own backyards by magnifying the actions of everyday insects (i.e. the Dung beetle struggling to push a ball of dung up a hill). These last two examples are perhaps ones we can point to as closer examples to the approaches we have encouraged students consider as they endeavour to inspire the public to pay attention to nearby nature.

Why do we need video artists to show us new ways of seeing the natural world? I consider there to be three main problems currently preventing the general human population from seeing the natural world in ways that can support the wholistic health of the planet: 1) Nature Deficit Disorder, 2) Shifting baselines and 3) Change Blindness.

**Nature Deficit Disorder** is a term coined by Richard Louv in his book *Last Child in the Woods* (2005) to suggest that “*human beings, especially children, are spending less time outdoors resulting in a wide range of behavioural problems.*” Louv outlines some of the problems to include, “*diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses*” (Godbey, 9). Over 80% of Canadians now live in cities and are spending more time indoors and than outdoors. The average Canadian child now spends approximately 6 minutes per day outdoors in contrast to approximately 6 hours per day indoors in front of a computer screen (Charles and Louv). Since 2008, more than half the world’s population has lived in urban areas (United Nations Population Fund). We simply are not outside to see what is happening there.

**Shifting Baselines** is a term created by the University of British Columbia’s Fisheries scientist Daniel Pauly in 1995. It refers to the incremental lowering of standards, with respect to nature, in which each new generation lacks knowledge of past environmental states and consequently redefines what is ‘natural’ according to his/her personal experience. This sets the stage for the next generations (shifting) baselines. We might go outside but the problem is that we see what is happening there today. We do not see what was happening there sometime in the past and this influences what we might believe we can hope to see there in the future.

*Some 120km of fish streams once flowed through Vancouver, producing 100,000 or more salmon and trout every year. The decline of these streams is an example of ‘shifting baseline syndrome’... Each generation sees the natural world around them as normal, and measures degradation of the environment against that baseline. The next generation then takes the degraded state of nature as normal, and so on. Over time, we collectively forget what nature used to be... (MOV)*

**Change Blindness** is “a phenomenon in visual perception in which very large changes occurring in full view in a visual scene are not noticed” (O’Regan). This condition, which Dan Simon and Christopher Chabris proved is part of our hardwiring as humans with their famous Selective Attention Test involving a gorilla suit (1999; <http://www.youtube.com/watch?v=vJG698U2Mvo>), prevents us from seeing major changes in the natural world around us like the depletion of fresh water, healthy food and clean air. As MacKinnon points out, this is further exacerbated by our preoccupation with urban living:

*The adapt-and-forget pattern is amplified by modern life. If you, like me, are a city dweller, then you’re unlikely to suffer change blindness to shifts in the natural world because you’re not there to witness those shifts... For you, the baselines that shift will be mainly urban and technological ones...*

Given these three main problems, Nature Deficit Disorder, Shifting Baselines and Change Blindness, what then is the responsibility of the modern nature filmmaker? If the nature film historically has contributed to humans’ sense of being disconnected from and/or fearful of nature, I suggest that the modern nature filmmaker’s role is to encourage humans to reconnect with nature – “nature as it was, as it is, as it could be” (MacKinnon) and not just nature outside the city but the urban wilderness, not just as something “out there” but as something integral to who we are. This is precisely what we endeavoured to do through the *Rewilding Vancouver Community Projects* course.

## Main Text

**Rewilding** is a term coined in the early 1990s by Dave Foreman, founder of the direct-action *Earth First! Environmental network* (MacKinnon). In the most general sense, MacKinnon points out, it means “To make a place wild again.” A question arose concerning restoring to what/when. The definition was expanded by Michael Soulé and Reed Noss in the 1990s. The term has since evolved to acknowledge that it may not be possible to achieve some specific natural condition from the past, but rather “to bring back species and ecological processes that have been [lost]” (MacKinnon). Rewilding has been implemented in a variety

of ways around the globe, including in Seoul, Korea in 2005 where Cheonggyecheon, a sacred stream that ran through the heart of the city, was daylighted, in the US's Yellowstone National Park where "wolves were re-introduced after a 70-year absence" and in "Dundreggan, a 10,000-acre estate in the Scottish Highlands, overgrazed by deer and sheep [that is undergoing an] ongoing, decades-long process [of reforestation by] the organization Trees for Life (Monbiot).

**Green infrastructure** is "the name given to natural systems which provide services to human populations that might otherwise require the creation and use of the manufactured, or grey, infrastructure. Green infrastructure can assist, and in some cases, replace conventional engineered solutions or grey infrastructure" (David Suzuki Foundation). The simplest way I have explained this concept to my students involves thinking of a healthy ecosystem as an ebb and flow of life: migrating animals, flowing water and air, travelling seeds, etc. The normal course of urban development leads to a fragmented natural landscape where this ebb and flow is intercepted by the built environment of concrete, steel, dams, walls, etc. Green infrastructure acts to reconnect severed pathways along this ebb and flow, whether that be designing a green roof that can be a landing pad for migratory birds, restoring a wetland or leaving a first-growth forest intact.

### Materials and methods

**In the 2012/13 academic year**, the Emily Carr University of Art + Design and the David Suzuki Foundation partnered to pilot a studio-based community projects course that would engage postsecondary art students in media arts based public education projects supporting sustainability initiatives. The pilot course, called *Natural Capital*, was designed to promote the non-market value of natural's ecosystem services in the Lower Mainland region of British Columbia, Canada, and shed new light on the importance of fragile coastal ecosystems in people's lives. Students in the course created a series of short documentaries for an app developed by DSF to bring to life their report on aquatic ecosystems in British Columbia's Lower Mainland. The course was part of a minor in Social Practice and Community Engagement (SPACE) in ECUAD's Faculty of Culture and Community. My article about the course can be found here: <http://online.liebertpub.com/doi/abs/10.1089/SUS.2013.9838> After a successful pilot year, the course was proposed to continue into a second year.

**In the Summer of 2013**, J.B. MacKinnon, author and guest curator of the MOV's *Rewilding Vancouver* exhibit, approached DSF to collaborate on some aspects of the exhibit. DSF suggested we all meet to discuss the potential involvement of ECUAD students. From those early brainstorming meetings, with each stakeholder identifying and aligning his objectives with the others, emerged the *Rewilding Vancouver Community Projects* course offered in the Fall of 2013 and the Spring of 2014.

**In Fall of 2013**, 16 students created a series of short documentaries as part of a "virtual urban safari" or video eco-tour of the different forms that nature can take in Metro Vancouver's urban environment. Building relationships with unique expressions of nature, students had outdoor adventures, used technological innovation and harnessed the wisdom of local community experts (outside the University) to produce site-specific media projects as part of a public education strategy around the natural history of Vancouver's wild sites. The underlying goals of the overall project were to: inspire near-by nature explorations, highlight personal connections between natural areas and individual/community well-being, identify how wild sites contribute to our city's urban environment and "make visible" the natural world in the city, where it tends to be overlooked.

### Site selection

Part of our goal in mapping out specific wild sites in Metro Vancouver was to expand the public understanding of green infrastructure to include examples of sites we considered 1) engineered, 2) restored and 3) intact. In other words, we wanted the public to comprehend that green infrastructure could include everything from first-growth forests to urban farms to daylighted streams. Stream “daylighting” is a term used to explain the process of intentionally removing the grey infrastructure, like asphalt, covering over a stream and returning that stream to “the light of the day” to be flowing above ground once again. We were also aiming to include a variety of land cover types (i.e. forest, beach, wetland, streams, rivers, etc). We also wanted to be sure our sites were no further than one hour of travel time on public transit from the ECUAD campus so that the task of site visits would be feasible for students. Project partners at DSF, MacKinnon and myself brainstormed a variety of sites across Metro Vancouver that included examples in each of these categories. We then cut down our list to 18 sites (the maximum number of students that can register in the course at one time).

### Local expert recruitment

Students’ documentaries from the Fall 2013 semester centered around interviews filmed with local experts affiliated with each of the wild sites. These were people from the broader community who had wisdom and often first-hand experience with a site’s natural history and biodiversity. Project partners at DSF, MacKinnon and myself did research and outreach for nearly two months in advance of the start of the semester to confirm the participation of local experts. These experts, ranging from biologists, authors, lighthouse residents, park interpreters and more, also provided background information to students and in some cases offered one-on-one walking tours of sites to students.

**In Spring of 2014**, building on the work of the first semester, a new group of 15 students created short documentaries that presented their views of reconnecting with wild nature at one of 15 distinct wild places in the Metro Vancouver region through an artistic lens. To encourage more conceptual approaches to the work, myself, MacKinnon and our project partners at DSF decided to give the students themes to use as lenses through which to produce the work. Together we brainstormed and arrived at 18 themes, 9 of which we categorized as benefits of time spent in nature (well-being, memory, balance, creativity, healing, focus, energy, mood and responsibility), and 9 of which we considered larger concepts related to rewilding (life, resilience, shifting baselines, nature deficit disorder, change blindness, ecosystem services, zoopolis, biophony and biophilia). The terms categorized as benefits from time spent in nature stem were provided by project partners at the David Suzuki Foundation. As David Suzuki himself writes in the article, “*Prescription for health and happiness: daily dose of nature*” on the foundation’s website, “researchers from fields as diverse as biology, psychiatry, engineering, horticulture, neuroscience, and medicine have realized what most of us know intuitively: nature is good for our health and well-being. These experts have discovered countless links between time spent outdoors and cognitive, physical, and emotional development.”

### Site visits

In the process of creating videos aimed at inspiring the public to see nature in a particular way, students began to see nature differently themselves. This translated to the public through the videos they made. In both Fall and Spring semesters, an essential aspect of the curriculum required students to build relationship with their sites through a minimum of 3 sites visits (although students often end up doing many more than this, sometimes 3 in just one week!) Students began by being tasked with exploring their site through the lens of a camera. They started paying attention and noticing details about their site that they may not have otherwise, like the presence or absence of specific plant or animal species, or evidence of

human impact. Student April Piluso created her video in the Fall of 2013 after multiple visits to Vancouver's popular Stanley Park to observe first-hand one of the park's lesser known features: "one of the largest urban great blue heron colonies in North America" (Stanley Park Ecology Society). The process enabled her to interrupt her routine of urban living and reflect on how important nature is, particularly in the city:

*We are defined in part by the patterns we drive ourselves towards. I am grateful to say that my participation here allowed me to break the eat-work-sleep pattern that so many of us get drawn into. We need to remind ourselves to stop and observe. We need to have moments of true connection with nature, to simply enjoy the beauty of the world around us. If we do not remember to stop and just appreciate it, it becomes so easy for us to ignore all that nature does for us.*

After examining their sites through the lens of a camera, students were then tasked with exploring their sites through sound. Equipped with a sound recorder and microphone, students repeatedly reported that they often heard things they did not see, and then saw them only after hearing them. Student Faber Neifer created his video in the Spring of 2014 through a series of site visits to False Creek Habitat Island, a restoration project created to make up for shoreline lost to development. Faber visited his site with sound recording equipment in hand at different times of the day and noted:

*Hearing birds on False Creek Habitat Island before sunrise, you wouldn't think we were in the middle of the city. They're singing before most of us are awake.*

Even in the deepest and largest green spaces, students have reported their challenges in recording isolated animal-generated or earth-generated sounds without the infiltration of human-made sounds in the background. In the words of Bernie Krause, soundscape ecologist, "Our ears tell us a very different story" (Krause).

*Just as looking through a camera lens you see the world differently, when you begin to record you hear the world differently.* -Hildegard Westerkamp, sound ecologist

Unlike some indoor or studio-based art practices, outdoor site-specific media projects require that students consider elements of nature as part of both their creative palette of materials and the challenges they need to creatively problem-solve around. This in turn contributes to shifting the way students see nature. Watching the tide tables was important to prevent students from getting trapped at or losing access to Vancouver's last wild beach, the Point Grey Foreshore. An unexpected winter snowfall inspired students' ideas about the role of seasons in food production and consumption at UBC Farm. The diverse paths that water takes and surfaces it flows over provided a rich library of aquatic sound effects at the Lower Seymour Watershed.

### **Screening & exhibit**

Students' media arts-based projects resulted in the creation of a "virtual urban safari" that were featured as part of the Museum of Vancouver's *Rewilding Vancouver* exhibit running February 27-September 1, 2014. This exhibit is believed to be the first of its kind in Canada to feature the historical ecology of a major city.

To expand the public outreach of our project objectives, the course culminated in a public screening of students' work and community dialogue, the first at one of the featured "engineered" wild sites, the VanDusen Botanical Gardens Visitor Centre (in December 2013, so prior to MOV's exhibit launch) and the second at the MOV on April 7, 2014. Both events welcomed a diverse public audience in hopes of spreading the public education aspect widely amongst the broader community. The artistic video works produced through the project were displayed in the MOV, posted to DSF's YouTube channel and continue to have an impact through various means of distribution. The first screening presented new community connections and distribution opportunities for the videos, for example, when a school teacher

asked if a student could visit her school and show her work since the teacher's class was studying the featured wild site.

### **Activating student sustainability leaders**

One of the most significant outcomes of this project was the way it activated students. Rena Harker, an ECUAD student who participated in the course in Fall 2013, shared in the public screening and dialogue event in December that a real "aha" moment for her was when she ventured beyond the highly industrialized area of her site, the Fraser River, to visit a different region of the river where she discovered it was relatively pristine and, contrary to her previous impression, "beautiful." This is when the site, for her, went from something not worth mentioning to something worth protecting. Through her film featuring an interview with Riverkeeper Tyee Bridge, Rena has herself made visible nature's value and, as she says, discovered the value in applying her artistic skills to environmental issues. Rena has since founded ECUAD's Environmental Collective, a student-driven club on campus dedicated to raising awareness about and participating in art activism related to environmental issues. Rena is also undertaking an individual project about rewilding the planned new ECUAD campus for her course in public art.

*The history of nature is not always and only a lament: it is also an invitation to envision another world" (MacKinnon quoted in MOV exhibit)*

### **Conclusion**

I grew up spending my summers along the rural and relatively wild west coast of Vancouver Island, left to my imagination and nature for entertainment. I would spend hours drawing and so many of them spent drawing orcas, which I would frequently see swim past my father's house across from a beach leading into the Strait of Juan de Fuca, that still some 20+ years later I can practically draw orcas with my eyes closed.

Vancouver's False Creek is "false" because it was filled in as part of city developments. It used to be that the ocean flowed straight through this part of the city to what is now Clarke drive. That means that where I currently look out from my patio onto a busy street that will soon be host to ECUAD's new campus, I would have once been looking at the sea and would have maybe enjoyed the passing of grey whales in the same way I grew up watching orcas. But alas, what has disappeared in nature is now left to my imagination. At least now, when I need a burst of hope, I can pull up Chris Brown's video of the grey whale's visit to False Creek on YouTube and glimpse simultaneously the way things were and the way they might be once again.

As Rena Harker's video reveals that the Fraser River is not just an industrial river but a remarkably beautiful one, Jaymie Johnson's video reveals that the daylighting of the urban stream previously buried under asphalt, Still Creek, has witnessed the successful return of salmon two years in a row, and Yuzhen Wang's video reveals a unique overlapping dual-ecosystem in one of the last remaining first-growth forests of the Metro Vancouver region, Lighthouse Park. These video artists have applied their creative abilities as citizen scientists in helping us see what we may not have seen otherwise. Be it due to change blindness, shifting baselines, nature deficit disorder, or our inability to simply notice what is going on in the urban wilderness we live, study, work and play in regularly, we might have eventually reduced or removed some of these wild green spaces, replacing them with grey infrastructure. While it is too soon to predict if these videos may inspire residents to demand policies that will not only protect these wild spaces but also rewild some current grey spaces into green infrastructure, certainly that potential now exists. Where nature itself shows us new possibilities, video artists find new ways of making visible these new possibilities, of getting us to pay attention and to understand what nature is telling us.

## Acknowledgements

The Rewilding Vancouver Community Project required input from a variety of sources. I greatly appreciate the contribution and support of the following: Emily Carr University of Art + Design (Susan Stewart, Sean Arden, Karin Watson, Roxanne Toronto), ECUAD students (Roxanne Bouchard, Julia Lamare, Kirstine MacKeprang, Dena Mamoto, Andrew McKeachie, Faber Neifer, Karisa Evdokimoff, Tong Guan, Shi Yan Huang, Michael Peterson, Jin Qu, Jordan Rivera, Kathleen Wheeler, Michelle Williams, Tamara De la Flor Finetti, Tanya Dwyer, Dallas Eresman, Raine Gauthier, Taryn Goodwin, April Piluso, Meagan Staples, Daniel Buzelli, Joni Danielson, Rena Harker, Jaymie Johnson, Anne Sofie Elkjaer Rasmussen, Joss Rectitud, Ellen Russell, Jun Xiang Shao, Yuzhen Wang), David Suzuki Foundation (Theresa Beer, Karianne Blank, Michelle Mollnar, Jay Ritchlin), Museum of Vancouver (J.B. MacKinnon, Viviane Gosselin, Hanna Cho, Paul Carr, Sarah Kamal) and our invaluable community participants.

## References:

- Brown, Chris. *Science World Whale Vancouver May 5<sup>th</sup>, 2010*: <http://www.youtube.com/watch?v=iGVj3D1LqG0> (last accessed 03/14/14).
- Chabris, Christopher and Simon, Dan. Selective Attention Test (1999). <http://www.youtube.com/watch?v=vJG698U2Mvo> (last accessed 03/14/14).
- Chanan, Michael. *Discovery of Space: The 1920s: The city and the wilderness*. The Politics of Documentary. London: British Film Institute, 2007.
- Charles, Cheryl, Ph D and Louv, Richard. *Children's Nature Deficit: What We Know-and Don't Know*. Children & Nature Network: 2009. <http://www.childrenandnature.org/downloads/CNNEvidenceoftheDeficit.pdf> (last accessed 03/14/14).
- Cronon, William. *The Trouble with Wilderness; or Getting Back to the Wrong Nature*. <http://www.uvm.edu/rsenr/rm240/cronin.pdf> (last accessed 03/14/14).
- David Suzuki Foundation. In-house definition. Vancouver: 2014.
- Godbey, Geoffrey. *Outdoor Recreation, Health and Wellness. Understanding and Enhancing the Relationship*. Resources for the Future Background Study, Outdoor Resources Review Group. <http://www.rff.org/documents/RFF-DP-09-21.pdf> (last accessed 03/14/14).
- Harker, Rena. *Fraser River* (2013) <https://www.youtube.com/watch?v=rGNXRjeW5tY> (last accessed 03/26/14)
- Johnson, Jaymie. *Still Creek* (2013) <https://www.youtube.com/watch?v=Mk3rLMWNxL8> (last accessed 03/26/14)
- Krause, Bernie. TED Talk: The Voice of the Natural World. [http://www.ted.com/talks/bernie\\_krause\\_the\\_voice\\_of\\_the\\_natural\\_world](http://www.ted.com/talks/bernie_krause_the_voice_of_the_natural_world) (last accessed 03/14/14).
- Louv, Richard. Last Child in the Woods: Saving Our Children from Nature Deficit Disorder. Chapel Hill, NC: Algonquin Books, 2005.
- MacDonald, Scott. *Up Close and Political: Three Short Ruminations on Nature Film. Adventures in Perception. Cinema as Exploration: Essays/Interviews*. Berkeley and LA: University of California Press, 2005.
- MacKinnon, James. The Once and Future World: Nature As It Was, As It Is, As It Could Be. Toronto: Random House Canada, 2013.
- Monbiot, George. TED Talk: For More Wonder, Rewild The World. [http://www.ted.com/talks/george\\_monbiot\\_for\\_more\\_wonder\\_rewild\\_the\\_world](http://www.ted.com/talks/george_monbiot_for_more_wonder_rewild_the_world) (last accessed 03/14/14).
- Museum of Vancouver Exhibit: Rewilding Vancouver. Vancouver: 2014.
- O'Regan, J. Kevin. Encyclopedia of Cognitive Science. <http://nivea.psych.univ-paris5.fr/ECS/ECS-CB.html> (last access 03/14/14).

- Piluso, April. *Stanley Park Blue Herons* (2013)  
[https://www.youtube.com/watch?v=Talkb-J\\_rdw](https://www.youtube.com/watch?v=Talkb-J_rdw) (last accessed 03/26/14)
- Stanley Park Ecology Society. Vancouver's Great Blue Herons.  
<http://stanleyparkecology.ca/conservation/urban-wildlife/herons/> (last accessed 03/14/14).
- Suzuki, David. *Prescription for health and happiness: daily dose of nature*.  
<http://www.davidsuzuki.org/blogs/science-matters/2012/05/prescription-for-health-and-happiness-a-daily-dose-of-nature/> (last accessed 03/14/14).
- United Nations Population Fund. <https://www.unfpa.org/pds/urbanization.htm> (last accessed 03/14/14).
- Van Borek, Sarah. "Natural Capital: Illuminating the True Value of Nature's Services through Community-Engaged, Site-Specific Creative Production and Exhibition." *Sustainability: The Journal of Record*. Volume 6. New Rochelle, NY: Mary Ann Liebert, Inc: 2013.
- Wang, Yuzhen. *Lighthouse Park* (2013)  
<https://www.youtube.com/watch?v=EN0FBW01SUc> (last accessed 03/26/14)

# GROWTH OF MULTIDISCIPLINARY SCIENCE IN THE PERIPHERY

*Kevin O'Connor PhD*

Mount Royal University, Canada

*Robert Sharp MSc*

Yukon Department of Education, Canada

---

## Abstract

This paper examines practice, growth and research associated with numerous experiential science, field studies and related place-based activities incorporated in a number Indigenous and rural communities in northern Canada. These approaches to science are presently being applied in the public school systems of the northern Canadian Territories (Yukon and Nunavut), and in numerous Cree and Dene Nation reserve schools in the northern Provinces of Alberta, Saskatchewan and Quebec. The research has followed students over a range of years following their engagement in these programs exploring their ongoing participation in the field of science and in community affairs.

The capacity for communities to direct and manage their own educational programs has been a central concern particularly in rural, remote and Indigenous communities. Characteristics of peripheral communities provide opportunities to initiate and manage various conditions of social change. This paper identifies those characteristics that favor educational approaches that require changes in how schools organize time, teaching staff, and curriculum offerings. These include experiential and place-based science approaches. These approaches have shown a greater engagement and improved outcomes of Indigenous and rural students.

---

**Keywords:** Multidisciplinary science, field studies, rural and indigenous communities, experiential education; place-based learning; student engagement; educational reform

## Introduction

This paper examines practice, growth and research associated with numerous experiential science, field studies and related place-based activities incorporated in a number Indigenous and rural communities in northern Canada. These approaches to science are presently being applied in the public school systems of the northern Canadian Territories (Yukon and Nunavut), and in numerous Cree and Dene Nation reserve schools in the northern Provinces of Alberta, Saskatchewan and Quebec. Our research has followed students over a range of years following their engagement in these programs exploring their ongoing participation in the field of science and in community affairs.

Such initiatives were undertaken among these peripheral communities in response to concerns about student engagement, performance and ineffectual applications of conventional schooling. These conditions created an appetite for change. Significant variations to the ways in which time was used for instruction, the application of multidisciplinary approaches to many subjects and embracing instructional activities as social enterprises were the foundation principles of these initiatives. Within this broader context we have conducted research on the practice, growth and outcomes of multidisciplinary science programs.

## The Settings

We build upon Reeler's (2007) use of the terms 'core' and 'periphery' to distinguish between the urban and rural areas in which differ in their concentrations of economic and

political power. “The conventional division in the world today between urban/core policy-makers (and their theorizing) and local practitioners is deeply dysfunctional, leaving the former ungrounded and the latter unthinking” (p. 3). The relationship between the *Core* and the *Periphery* is increasingly being shaped by a trend of developing Projects, and paying people as service providers to achieve centrally determined outcomes. The core most often sees Project interventions themselves as the change stimulus and processes. Existing Indigenous social change processes, usually invisible to conventional analysis, is seldom acknowledged and is effectively reduced to irrelevancy – except where resultant active or passive resistance to change cannot be ignored.

Urban cores tend to concentrate economic, political and capital infrastructure. Educational institutions in core areas tend to be large complex organizations and structures. Schools are often governed by an institutional inertia that makes operative change difficult requiring sustained energy and focus (Fine & Somerville, 1998). These educational systems, often secondary schools, are typically organized about specific subjects where teachers may teach a single subject within repeated blocks of time. Teachers are typically older and have extensive experience in teaching a narrow range of subjects using traditional didactic instructional practices. The timetabling tends to be inflexible and students are thrown together in different groups each timetable rotation. A teacher may encounter more than 100 students each day and after the semester may not see the cohort of students again throughout their secondary school career.

Rural and Indigenous communities function so that change is initiated at the community level (Barnhardt, 1999; Emekauwa, 2004). Typically, people living in rural and Indigenous communities have an ideology of environmental, community and economic interests setting them apart as a culture distinct from core populations (Gladden, 2001). Such communities have some unique opportunities to develop and implement educational approaches leading to an early engagement in multidisciplinary approaches to science (O’Connor, 2010). In this paper, we examine three different social change processes as defined by Reeler (2007), to explore dynamics related to changes in educational institutions in the periphery.

We use *Indigenous* to refer to the conditions, rights, and way of life of many groups, cultures, communities and peoples who have a historical continuity or association with a given region or parts of a region before its subsequent colonization or the formation of a Nation-State. We do not wish to insinuate by the use of a single reference that Indigenous people can be classified by one term that excludes each group’s specific and particular identity. We have learnt that not only are there definite relations and nuances within Indigenous Nations but they are explicitly specific within each community and reserve. The historical specificity and variability of culture and its synchronous interaction with many other diverse environmental and social structures create specific identities amongst groups that are not to be trivialized by a single term.

With the increase in land claim agreements, renegotiation of treaty rights and local control of resource development, the quest for self-governance by Indigenous people and rural communities is a motivating factor for improving education. This direct control and involvement leads to issues of preservation and sustainable development of their resources. There is a great need to reconnect schools with their communities, so as to provide opportunities for students to contribute to their community and also benefit from the opportunities before them.

### **Dynamics of change processes institutions**

The undeniable interest attributed to Sir Ken Robinson’s call for *Changing Education Paradigms* in his Royal Society for the Arts presentation (Robinson, 2012) represents a growing unrest in public support for current educational processes. He argues that the

industrial model that many educational institutions pattern themselves upon is both crippling and nonresponsive. Robinson's presentation identifies how contemporary approaches to many subjects are ill suited to the needs of our creative and innovative world today. Calls for educational change are supported by a wide variety of historical and social analysis (Dewey, 1916; Foucault, 2002; Freire, 1970; Giroux, 1997; Kincheloe, 2005), but these calls often do not address the "how" such change could take place. This paper identifies such change processes as they may apply to communities at the periphery. Institutions, even those in the periphery, possess an inertia that compels organizational patterns that follow long standing practice that often resists alternative paradigms.

### **Emergent change is change originating with lived experiences**

Emergent change describes the day-to-day unfolding of life, adaptive and uneven processes of unconscious and conscious learning from experience and the change that results from that. This applies to individuals, families, communities, organizations and societies adjusting to shifting realities, of trying to improve and enhance what they know and do, of building on what is there, step-by-step, uncertainly, but still learning and adapting, however well or badly. (Reeler, 2007, p. 10).

Cartesian modernists have the tendency to generalize, and through this process it prevents the development of a certain understanding of the uniqueness of the human experience (van Manen, 1990). With the promotion of "ultimate truths" and the need to own those truths in a capitalist-like banking of knowledge, there is little validity put on ones' lived experience. This goes against the principles of experiential science education, in that learning takes place through direct experience, by action and reflection. The learner assesses the experience, assigning their own meaning and understandings as they relate to learned scientific principles, goals, aims, ambitions and expectations. From this processing of the experience come the insights, the discoveries and the understandings that are generally referred to as experiential learning (Dewey, 1938). As this processing takes place, the pieces fall into place, and the experience takes on added meaning in relation to other experiences and previous knowledge. All this is then conceptualized, synthesized and integrated into the individual's schema of cognitive constructs which he/she imposes on the world, and through which he/she views, perceives, categorizes, evaluates and seeks additional experiences (Wright, 1970). "Lived experience has a methodical feature relating the particular to the universal, part to the whole, episode to totality" (van Manen, 1990, p. 36). A powerful description of experiences' relational aspects comes from Dilthey (1985): "lived experiences are related to each other like motifs in the andante of a symphony" (p. 227).

Varela (1999) provides a progressive description of the relation of experience in conscious thought. He claims that experiential structures are relational to conceptual understanding and rational thought. "The point is not that experience strictly determines conceptual structures and modes of thought: it is rather, that experience both makes possible and constrains conceptual understanding across a multitude of cognitive domains" (p. 16). This speaks to the learner as being privy to various forms of knowledge, and also exposed to various types of learning styles; the power of difference.

### **Transformative change is change through response to problems**

At some stage in the development of all social beings it is typical for crisis or stuckness to develop. This may be the product of a natural process of inner development, for example the crisis of the adolescent when that complex interplay of hormones and awakening to the hard realities of growing up breaks out into all manner of physical, emotional and behavioural pimples. Another example is of a pioneering organization growing beyond the limits of its informal structuring and relationship's. (Reeler, 2007, p. 12)

Varela's (1999) enactivist ontology states that our identities are not pre-formed, and we often learn best when we empty ourselves of all that has been learned, towards what he calls the "virtual self" or "selfless self". "Knowledge appears more and more as being built from small domains composed of microworlds and microidentities" (p. 18). The key times to learn are in those "moments of breakdown" (Varela, 1999), or what Aoki (2005) would refer to as "moments of tension", when we are no longer experts of those microworlds and we become beginners who search for ways to understand what is foreign (through deliberation and analysis) so that we may feel comfortable and at ease with the task at hand. This speaks to experiential and place-based science programming strategic inclusion of adversity and resilience into curricular delivery and content.

It is a radical notion for many educators to envision that wisdom can be gained through a variety of traditions. The applications of enactivism as pedagogy have tremendous implications for experiential science educators, as they provide a rationale for providing diverse experiences and environments in the process of learning. This goes beyond the general tenets of experiential education that: promotes context therefore engagement; addresses diverse learning styles; and, encourages the integration of subjects. It provides a progressive rationale that we hope will provide other educators with a better understanding of the benefits of experiential science methods.

To advocate to students the need to empty ourselves of our pre-learned "baggage" and become beginners, open and eager to experience the "new", is a concept that has powerful possibilities for learning. It begins the journey to selflessness, in which we can begin to understand the creation of a self that is socially constructed (and can be reconstructed) in different environments and through various experiences. This is congruent with Vygotsky's (1997) concept of the zone of proximal development (ZPD), in which the social context shapes the range of learning that takes place. We propose Varela's (1999) search (based on Taoism, Confucianism and Buddhism epistemologies) for the selfless self and ultimately a virtuous self, is one that many experiential and place-based science educators should put into praxis, as it has positive implications for character building, critical personal reflection and a promotion of a socially just community.

### **Projectable change – Working with a Plan**

Human beings can identify and solve problems and imagine different possibilities, think themselves and their present stories into preferred futures, being able to project possible visions or outcomes and formulate conscious plans to bring about change towards these. (Reeler, 2007, p. 14)

Numerous plans have been developed by small communities to address educational needs of their youth. These differ from the "planned project approach" developed by the core areas to "solve" the problems of periphery schools. Small communities are able to plan adaptable approaches that encompass community contexts, resources, and skills. Such community plans are characterized by their flexibility and responsiveness to changing community conditions.

### **Change in educational systems – periphery problems and opportunities**

These are not the problems of someone else. They are our problems. We need to find solutions, not have ones passed down to us. We can learn from others, but our own experiences are paramount. Don't tell us what to do, give us ideas, access to resources and discussion, then let us work it out. (Kleinfeld, McDiarmid & Hagstrom, 1985, p. 89).

The peripheral community, by their very nature, have attributes favoring a range of social change processes that differ from those found in the "core". An analysis of rural Alaska High Schools identifies these as "rural advantages" that are often ascribed as similar to the benefits associated to private schools (Kleinfeld, McDiarmid & Hagstrom, 1985).

### **Children can grow up at home with their families**

In small high schools, children receive a great deal of individual help and attention from teachers who know them well.

In a small high school, children are participants, not spectators.

Small rural high schools offer students increased access to special educational opportunities, such as the chance to travel and lots of time on the computer.

With the schools nearby, parents can exert considerable control over their children's education.

Local high schools enable communities to teach local cultural traditions, languages, and subsistence skills.

Local high schools provide such important community facilities and services as gymnasiums and workshops, spectator sports, newspapers, and community education programs.

A parallel and more in-depth study in rural Yukon Schools added to this list of opportunities for change found in rural communities (Sharp, 1985).

The small size of peripheral communities means that most people know each other, they are part of the same community and they are aware of their issues and have understandings how they may be addressed.

Smaller communities possess greater institutional adaptability and flexibility. Schools in these communities are more responsive to community concerns and disposed to providing programming designed to engage students and respond to community concerns. Community resource people are known to schools and to teachers.

Teachers are often required to teach a variety of courses across many grades. They are required to approach a variety of subjects with an integrated perspective because of their diverse teaching load.

Community issues and problems are more accessible to school as study topics.

Many smaller communities are starting places for young teachers, as young teachers their educational training has often included more contemporary understanding about diverse instructional practices that engage students, understanding of neurological processes, and the value and involvement in instructional communities.

The absence of institutional resources encourages communities to develop their own resources from locally accessible materials.

Limited course offerings encourage students to explore topics they might otherwise overlook.

As educational practitioners, we acknowledge the complexities associated with the process of change and therefore confirm the need to be cognizant to the dynamics of change, to be thoughtful, diligent and regulate practice accordingly. This is not a simple practice, one that challenges science educators to think critically regarding social conditions which begins by addressing emergent, transformative and projectable forms of change. Given the need for a more responsive educational approach, and based on opportunities associated with rural and Indigenous educational environments, we will provide a number of alternative educational approaches below that were developed in recognition of the various conditions of social change.

We begin with a focus on the development of educational approaches that involve integration of curriculum across disciplines, addressing local situations as a means of providing relevance to school studies and using collaborative approaches to schooling. Experiential and place-based approaches have been a logical extension of the rural educational setting. Experiential and place-based initiatives have become a major factor in education, as many Indigenous and rural northern Canadian communities move toward greater autonomy and self-determination: to encourage students to be aware of, and feel responsible for the lands their ancestors have occupied; and, to better prepare and encourage the students for employment opportunities that exist within rural territories and beyond. Initiating experiential and place-

based approaches require changes in the ways in which schools organize their time and instructional processes. These approaches require flexibility in scheduling integrating and combining courses, and changing relationships between student and teacher.

Experiential and placed-based science initiatives have been created to address the lack of success and disengagement amongst Indigenous and rural students in formal schooling. Such initiatives take many form and themes. Within the sciences, a holistic form of science education has evolved. A form that values the importance of ‘place’ and the role of cultural knowledge within the disciplines of what some would consider “formal science” and also more cultural interpretations such a traditional ecological knowledge. The balance of this paper examines a number of approaches in which peripheral communities have used multidisciplinary approaches to science and restructured school experiences to build on the strengths of such communities.

### **Research Methodologies**

Our action research studies—utilizing anecdotal evidence, semi-structured interviews of a sub-set of students, teachers and administrators, and end-of-semester focus groups and anonymous surveys and questionnaires has revealed several key factors related to the concept of place and its relationship with social change processes that contributed to the positive outcomes of these multidisciplinary approaches to science education.

The surveys of the students who took part in the experiential and place-based science programs between five and nineteen years ago (2008-1994) explored many aspects of their life following secondary school (grade 12). Information was collected across this time span through email responses, phone or in-person interviews and focus groups. The analysis of this program is still ongoing.

Data was analyzed using methods of constant comparison to identify emergent patterns and themes (Erickson, 1986; Lincoln & Guba, 1985; Patton, 2002) within and across sites.

### **Periphery schools – examples of change**

There have been a number of programs and approaches developed in peripheral communities that have built on the various aforementioned conditions of social change. Four of these approaches are described below.

*Experiential Science Programs:* One response to these conditions have been the development of multidisciplinary science programs in which a single teacher teaches a cohort of students across three or more fields of traditional science core courses for a semester. In these programs, the courses are built around experiential models of learning, attention is given to community topics, time allocation is flexible to meet study demands and the cohort of students work in collaborative problem solving contexts. Some of these programs have been functioning for more than twenty years and our research has followed cohorts of these students since they were involved (O’Connor & Sharp, 2013).

Our research shows overwhelming success across a number of dimensions. A significant proportion of these students remain engaged in sciences in subsequent undergraduate and graduate studies. More than 80% complete university, compared to less than 50% from the larger rural student population. Many of the field studies associated with the studies undertaken by the cohorts of experiential science programs have assisted communities understand and address local problems.

*Rural Experiential Models (REM):* Another response has been the development of alternative ways of offering courses in weeklong blocks of time. This approach was more readily accommodated within rural high schools. The course offerings were designed around surveys designed to gain the interests of students. The science-based weeklong courses focused on experiential elements and field activities. The REM courses were typically built

around experiential models of learning, focused on community topics and the cohort of students work in collaborative problem solving contexts. Some REM programs have been functioning for more than twenty years.

Research following REM programs has shown high levels of student engagement and ongoing teacher involvement (Kleinfeld, McDiarmid & Hagstrom, 1985; Sharp, 1985, 2007). They have involved a wide range of community support and community members volunteering in a range of REM activities. The REM approach can be part of smaller schools because of both scale and the teachers' knowledge of the students.

*First Nations Land-based and cultural programs:* A third approach has been undertaken by a number of Indigenous communities involving groups of students in land based activities based on a blend of cultural traditions and contemporary science. These activities honor Indigenous traditional knowledge and provide a medium that integrates science with Indigenous knowledge. These types of programs have been embraced by many Indigenous communities where the activities are credited and linked with other fields of study. In order to credit such activities, curriculum outcomes were identified along with ongoing assessment strategies. These were designed to bridge many areas of traditional knowledge and ways of understanding with contemporary sciences (O'Connor, 2009; Sharp, 2005).

*Place-based activities addressing community concerns:* The fourth approach we describe is a more general method of embedding multidisciplinary science initiatives within school programming. Place-based education seeks to help communities through employing students and school staff in solving community problems. Place-based education differs from conventional text and classroom-based education in that it understands students' local community as one of the primary resources for learning. Thus, place-based education promotes learning that is rooted in what is local—the unique history, environment, culture, economy, literature, and art of a particular place (Kawagley & Barnhardt, 1999). Addressing a variety of community problems brings into play many different aspects of science, engineering and mathematics. The “problems” call for solutions requiring multidisciplinary approaches. When students deal with “real” issues and work with community members to find solutions they become engaged. The engagement spills into many fields of science.

Examples of such place-based activities include working to reintroduce salmon populations, addressing problems of highway litter and solid waste, monitoring water quality in community water courses, recording forest structure and growth rate. Most of these activities take place over a period of years. Students build on the work of their older peers and may follow a project over a period of years, growing with knowledge and skills related to the “problem”.

Through a recursive process of data analysis, specific themes emerged in our research that was deemed crucial to experiential initiatives. We explored those themes through the participants' voices. They were: the importance of *Partnerships* within the community; the application of alternative forms of *Evaluation*; the use of *Field Studies* to deliver curriculum and engage students; an incorporation of *Indigenous Culture and Knowledge* in many aspects of the educational context; and the issues of *Sustainability* that include alternative structures and scheduling of the experiential and place-based science programs (O'Connor, 2010).

## Lessons Learned

This paper supports the call by many authors who cite the importance of educators modeling constructivist approaches to science education that engage students in interdisciplinary exploration, collaborative activity and field-based opportunities for experiential learning, reflection and self-examination (Cajete, 1999; Carlson, 1999; Dewey, 1938; McGinnis & Roberts-Harris, 2009; O'Connor, 2009; Rogers, 1969; Sharp, 2007; Tyler, 1949). Using an experiential model that supports reflective inquiry, students learn to appreciate the myriad of ways that science curriculum and pedagogy can be linked to real life

experiences. Students make discoveries and experiment with knowledge first hand instead of exclusively hearing or reading about the experiences of others, often who are considered to be real “scientists”. Students also reflect on their experiences and share them with other active participants in such environments as weekly sharing circles and also, in the less formal settings of school cohorts. Through this process they develop and share new skills, new attitudes and new theories or ways of thinking about science. Students then use this cognition to make informed decisions about scientific endeavors in and outside of the classroom, with the security that they are supported in partnerships.

This experiential science model helps create an educational climate where students can develop into engaged, critical and empowered learners of a diverse and complex globalized society (Bayne, 2009). Pedagogical decisions are based on the teachers’ insights into consciousness construction in the experience of themselves and their students, the interaction of the collective and the personal, diversity, social and educational theory, and instructional strategies. Such informed teaching creates unprecedented levels of awareness and higher forms of cognitive activity in the field of science.

Through the use of extended science field studies that promote experiential and place-based learning, and critical investigations supported by school-community partnerships, students become intimate with the dimensions of their science-based schooling and in society in general, that has been often missing in regular school programs. The teachers of these science programs are now engaged in an educational praxis that raises the conceptual and ethical value of the science education profession and better reflects the present climate of our society today.

Experiential and place-based science educators face the challenge of incorporating some or all of the principles aforementioned while avoiding simple “lip service” through the act of tokenism. Experiential science initiatives, such as a community presence in the school or the incorporation of student journals and self-assessment alone may not lead to improved discourse and less hierarchy. Many students, who have been habituated to their role as passive recipients of knowledge (Freire, 1970; Kincheloe, 2005) may find difficulty and provide resistance with this alternative methodology. This is why we think we need to reconsider the teacher’s role as dictatorial and consider them as facilitators, as it is crucial that they guide transactional relationships between teacher-student and student-teacher. It is the responsibility of teachers to engage in meaningful, experiential and critical praxis of science with students, while avoiding an authoritarian paternalism (Breunig, 2005).

Many experienced educators who have attempted, or are providing, experiential and place-based science praxis speak of its challenges (O’Connor, 2009; Raffan, 1993). Issues of institutional adversity, academic science mistrust, parental resistance, extra time constraints with respect to student-centered learning and activity preparation, funding, legal implications of field activities, and a lack of teacher training in post-secondary institutions are all valid. With that acknowledgement, the majority of our studies’ participants speak to the benefits outweighing the negative, as the application of an experiential and place-based science praxis is crucial toward a vision of a more effective pedagogy towards the preparation of the learner within a socially just world. The advantages from the student, teacher, school and community’s perspective is unlimited, as long as those theoretical and practical components are enacted in a mutual praxis.

It begins with the new generation of teachers, as a better collaboration between theorists and teachers is needed to reinforce the congruence of theory and practice in post-secondary science teacher education programs (Raffan, 1995). Imparting theoretical knowledge is no longer sufficient, yet promoting an isolated experience that lacks intention, purpose and meaningful reflection is also inadequate. Literature on place-based and experiential science education has predominantly grounded itself in “soft skill” environmental or outdoor educational practices. Its location in the school’s curriculum is often limited to its

own specific subject matter (i.e. as Physical Education and Mathematics are found in a school's curriculum). More research is needed in the practical applications of this type of programming, which actually drives the overall operation and philosophy of the school in order to study the application of these methodologies in diverse school environments that incorporate varying learners, cultures and communities.

New science pedagogy is needed that incorporates the best of the fields (experiential/place-based science pedagogy) that is rich in both theory and practice. One that provides substance to the fields' application towards a purposeful science classroom and that incorporates critical learners actively in the development of a science learners identity that will sustain them in good standing in a socially just world. We call for science pedagogy of generative praxis that teaches "in ways that will help each learner walk home experiencing their world differently because of what they learned in school that day" (Jardine, 2005, p. 4). A pedagogy that invests each student with a sense that they can be agents of change on the basis of how and what they learn.

The capacity for communities to direct and manage their own educational has been a central concern particularly in rural, remote and Indigenous communities. Characteristics of peripheral communities provide opportunities to initiate and manage such change. These characteristics favor educational approaches that require changes in how schools organize time, teaching staff, and curriculum offerings. These include experiential and place-based science approaches. These approaches have shown a greater engagement and improved outcomes of Indigenous and rural students. In summary, these programs are practical applications of experiential education and multidisciplinary science as praxis.

### References:

- Aoki, T. (2005). Reflections of a Japanese Canadian teacher experiencing ethnicity. In W. Pinar (Ed.), *Curriculum in a new key: The collected works of Ted Aoki* (pp. 333-48). New York: Peter Lang. [Originally published 1979].
- Barnhardt, C. (1999). Standing their ground: The integration of community and school in Quinagak, Alaska. *Canadian Journal of Native Education*, 23(1), 100-116.
- Bayne, G. U. (2009). Joe L. Kincheloe: Embracing criticality in science education. *Cultural Studies of Science Education*. 4: 559-567.
- Breunig, M. (2005). Turning experiential education and critical pedagogy theory into praxis. *Journal of Experiential Education*, 28(2), 106-122.
- Cajete, G. (1999). *Igniting the spark: An Indigenous science education model*. Skyland, NC: Kivaki Press.
- Carlson, H.L. (1999). From practice to theory: A social constructive approach to teacher education. *Teaching and Teacher Education*, 5(2), 203-218.
- Dewey, J. (1916). *Democracy and education: An introduction to the philosophy of education*. New York: The Free Press.
- Dewey, J. (1938). *Experience and education*. London: Collier-MacMillan.
- Dilthey, W. (1985). *Selected works, volume V: Poetry and experience*. Princeton, NJ: Princeton University Press.
- Emekauwa, E. (2004). *The star with my name: The Alaska rural systemic initiative and the impact of place-based education on Native student achievement*. Washington, DC: Rural School and Community Trust.
- Erickson, F. (1986). Qualitative methods in research on teaching. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed., pp. 119-161). New York: Macmillan.
- Fine, M., & Somerville, J. I. (Eds.). (1998). *Small schools, big imaginations: A creative look at urban public schools*. Chicago: Cross City Campaign for Urban School Reform.
- Foucault, M. (2002). *The order of things*. New York: Routledge.
- Freire, P. (1970). *Pedagogy of the oppressed*. New York: Continuum.

- Giroux, H. (1997). *Pedagogy and the politics of hope: Theory, culture and schooling*. Boulder, CO: Westview Press.
- Gladden, J. (2001). Wilderness Politics in Finnish Lapland: Core and Periphery Conflicts. *The Northern Review*, 23, 59-81.
- Jardine, G. M. (2005). *Foucault and education*. New York: Peter Lang.
- Kawagley, A. O., & Barnhardt, R. (1999). Education indigenous to place: Western science meets native reality. In G. Smith & D. Williams (Eds.), *Ecological Education in Action* (pp. 117-140). New York: SUNY Press. ON LINE at: <http://www.ankn.uaf.edu/curriculum/Articles/BarnhardtKawagley/EIP.html>
- Kincheloe, J. (2005). *Critical pedagogy*. New York: Peter Lang.
- Kleinfeld, J.S., McDiarmid, G. W. and Hagstrom, D. (1986). *Alaska's small high schools: Are they working?* Fairbanks, Alaska: Center for Cross-Cultural Studies and Institute of Social and Economic Research, University of Alaska.
- Lincoln, Y., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage.
- McGinnis, J. R., & Roberts-Harris, D. (2009). A new vision for teaching science. *Scientific American Mind*, 20, 62-67.
- O'Connor, K. (2009). *Puzzles rather than answers: Co-constructing a pedagogy of experiential, place-based and critical learning in Indigenous education*. Unpublished doctoral thesis, McGill University.
- O'Connor, K. (2010). Learning from place: Re-shaping knowledge flow in Indigenous education. *TRANS-Internet-Zeitschrift für Kulturwissenschaften*, No. 7/8-2. Available online: [http://www.inst.at/trans/17Nr/8-2/8-2\\_oconnor.htm](http://www.inst.at/trans/17Nr/8-2/8-2_oconnor.htm)
- O'Connor, K., & Sharp, R. (2013). Planting the science seed: Engaging students in place-based civic actions. *European Scientific Journal*, 9(10).
- Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: Sage.
- Raffan, J. (1993). The experience of place: Exploring land as teacher. *Journal of Experiential Education*, 16(1), 39-45.
- Raffan, J. (1995). Experiential education and teacher education. *Journal of Experiential Education*, 18(3), 117-119.
- Reeler, D. 2007. *A Three-fold Theory of Social Change and Implications for Practice, Planning, Monitoring and Evaluation*. Community Development Resource Association.
- Robinson, K. (2010, October). Ken Robinson: Changing education paradigms. *TED Talks-RSA*. Retrieved February 21, 2014, from [http://www.ted.com/talks/ken\\_robinson\\_changing\\_education\\_paradigms.html](http://www.ted.com/talks/ken_robinson_changing_education_paradigms.html)
- Rogers, C. (1969). *Freedom to learn: A view of what education might become*. Columbus, OH: Merrill.
- Sharp, R. (1985). *Yukon rural education: An assessment of performance*. Whitehorse, YT: Yukon Department of Education.
- Sharp, R. (2005). *IDS approaches for traditional First Nations*. Unpublished curriculum document, Yukon Territory Department of Education, Whitehorse, Yukon, Canada.
- Sharp, R. (2007). *Some possibilities for rural secondary schooling*. Yukon Education Reform Project: Whitehorse, YT.
- Tyler, R.W. (1949). *Basic principles of curriculum and instruction*. Chicago: University of Chicago Press.
- van Manen, M. (1990). *Researching lived experience: Human science for an action sensitive pedagogy*. Albany, NY: SUNY Press.
- Varela, F. (1999). *Ethical know-how: Action, Wisdom, and Cognition*. Stanford, CA: Stanford University Press.
- Vygotsky, L. (1997). *Educational psychology*. (R. Silverman, Trans.) Boca Raton, FL: St. Lucie Press.

Wright, A. (1970). Participative education and the inevitable revolution. *Journal of Creative Behaviour*, 4(4), 234-282.

# THE PROBLEMS OF PREPARATION COMPETENT TECHNICAL SPECIALIST IN THE REPUBLIC OF KAZAKHSTAN

*Zhanbirov Zhumazhan Ginayatovich, Doctor of Technical Sciences*  
*Kantarbayeva Shyryn Myrzahanovna, Doctor of Economic Sciences*  
*Tursymbekova Zakira Zhambylovna, PhD. associate Professor*  
*Smagulova Aigerim Sovethanovna, PhD. associate Professor*

Almaty Dzhandosova 60. Central-Asian University

---

## Abstract

The basic task of education is training of specialists who are capable for effective participation in the industrial-innovative development of the country. In connection with it qualitatively new approaches of training and the creation of effective education system directly effect on development of a technical science innovative processes in republic and integration of domestic scientific researchers at world level.

President of the Republic of Kazakhstan Nursultan Nazarbayev emphasized that "With the growth of economic indicators increased attention should be paid to improvement of cultural and educational level of our society, the formation of a new intellectual Kazakh nation.

To assess the existing problems of improving the quality of training of competent technical staff in the universities of Kazakhstan have been used such methods as empirical research, analysis of engineering and production problems in these sphere. The solution of tasks aimed at improvement of the training of the modern national and competent engineers in the technical colleges, whose implementation is possible, only through a deep theoretical understanding of the national mentality.

*Conclusion.* The system of technical higher education should not only provide one of the main components of the innovation economy - human, but also fulfill the role of a bridge linking education, science and production in all sectors and regions of the country. Therefore the main task of meaningful training of engineers is to describe the processes of studying of new knowledge and changes in thinking, which is the ability to make independent judgments and enables as to form our own point of view.

---

**Keywords:** higher professional education, modernization, innovation, engineer

## Introduction

Positive changes in the social, economic and political life of society on the eve of the third industrial revolution has created a growing need for highly qualified personnel. In his message, President N. Nazarbayev said: "A key condition for the success of the new policy should be supported by staff". [1] Kazakhstan school to enter into international education unit, supported the integration of the Bologna process (member since 2010), the main objectives of which are contribution and improvement of the international competitiveness of higher education, mobility, training and employment of citizens. The new law "On Science" is a historic landmark in the organization of the development of fundamental and applied research and it requires training of specialists of the new formation, which should be carried out jointly, by merge of education-science-production.

Efficiency of formation of the engineering staff has significant reserves for improvement, as knowledge has been preserved; there is human capacity and technical resources, and the desire of the state to its accelerated development. However, there are problems in their preparation. Thus, there is no clear interdisciplinary organization of the content of training, especially in schools, where unpeculiar specialties have been opened, where connection with the production has been lost, due to lack of scientists, which could conduct as equal discussion with experts of the enterprises even in such a matter as the creation of a modern material and technical base of educational institutions. Therefore there is a strong need to strengthen the practical component of education.

Today there is a significant time lag in training of specialists on specific, key, production processes, i.e. it slightly promotes the modernization and re-equipment of the leading companies. To accelerate the process of adaptation of future professionals, creation of regional training, research and production associations is required with the purposes of modern training of personnel for the innovation economy, creation and marketing of innovation. This is an important tool as the future specialist must possess certain skills of creative solutions of practical problems, and have ability to use all the new things that appear in the science and practice, constantly improve their skills and quickly adapt to the conditions of production. This, of course, would enhance the quality of training through closer cooperation of technical universities, research organizations and industry.

Feature of modern Kazakhstan's education is also its entry into the world educational space; it causes profound changes in all areas of education: in the scientific basis, in the function, content, technology, results, i.e. it is a question of change of the educational paradigm. Knowledge-model of education is superseded by competent model, which is based on action and promote versatile development of personalities, successful in society.

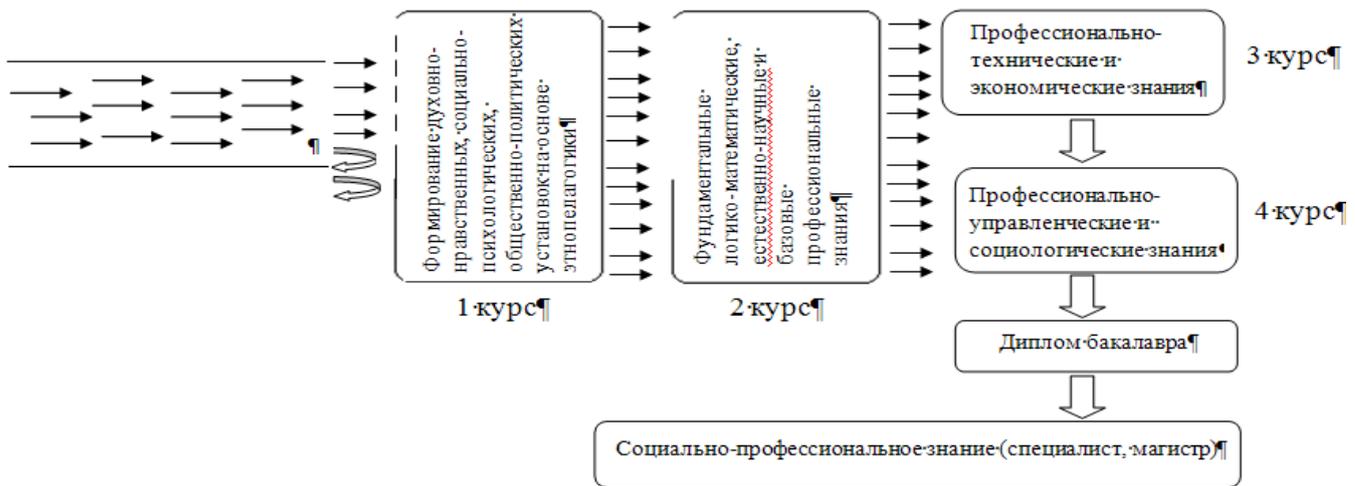
There is a reorganization of system of relations between the participants of educational process in high school, from authoritarian pedagogy to student-centered pedagogy based on interaction between teacher and student. Due to the orientation on competence-based approach to education and the transition to a new generation of standards we should focus on building core competencies of engineers, that provide mobility of the individual in a rapidly changing world and professional success in the innovation economy,

The modern engineer must leave the space of knowledge and enter in space activities and life meaning, therefore offer the following goals and objectives of educational processes in high school.

Table 1. The main objectives of training in university courses on technical specialties

Purpose of the 1 course	Purpose of the 2 course	Purpose of the 3 course	Purpose of the 4 course
Identity formation, the transition from opinion to the position of self-views	To teach how to understand and analyze the subject of controversy	To teach students to methods of problem-thinking	To teach students how to pass from questionable to undisputed
Masters program		A professional manager	
To teach how to act, work and live in situations of misunderstanding		To be able to develop their own point of view and not be afraid to include a conflict of different points of view	

To achieve the above mentioned objectives modern technical university should represent an elite school, in which along with a deep professional knowledge students can receive basic training in the natural sciences, social and psychological, general engineering, socio-economic and humanitarian fields. In this case, the role of fundamental training of future engineers should be specially emphasized. It forming a methodologically systematic invariant knowledge provides the basis for further learning professional application training material, develop creativity and systems thinking, arms by methods of learning, promotes and improves the scientific world, increases the level of professional and general culture of the future expert [2] . Therefore, the main task of teaching the courses should be as follows (Table. 1).



**Table 1.** The scheme of distribution of the main tasks of training courses for technical college degree

Improving the system of engineering education adequate to the new demands of the times it is important to know what is necessary for the training of engineers in accordance with the long-term development projects in Kazakhstan. Here, the main criterion is the successful employment of graduates, level of their salaries. It is necessary to develop and introduce a system of qualitative social standards and professional qualifications of Kazakhstan's citizens, especially the economically active population. It will mortgage a basis of socially fair wage of workers with average vocational training, and the Center for the reception of additional knowledge, increase of qualifications, will allow acquainting with new technologies and technical solutions on a regular basis.

On the other hand, the retained gap between the education sector, science and industry do not allow effectively use modern scientific equipment for research and teaching. Today there is a process of modernization of production, leading enterprises are buying high-tech equipment, which we do not have, and so many graduates of technical universities of the country are not able to work on it. That's why we should establish joint centers and laboratories, small innovative enterprises, campuses, that would constitute a practical platform for the preparation of highly qualified professionals in various industries..

Top managers and key specialists of the industry, among the requirements for young professionals have pointed out not only fundamentalization their knowledge, but also the ability to innovation, expansion of the scope of activities, the willingness to consistently self-training. Young people should possess advanced knowledge of new technologies; have skills of communication, decision-making, high degree of flexibility and ability to work with different systems of motivation and more. We have to activate the system target contract training in various industries, resume distance learning engineering staff. So there is a necessity to work out a system of interaction of technical universities with research organizations and industry. It should be based on the establishment of joint departments, training centers to prepare students for undergraduate programs and external objective independent assessment of quality of education.

Representatives of the companies recommended by the Ministry of Education and Science of Kazakhstan, and the Heads of technical universities must organize training and retraining courses for government and engineering industry workers in Almaty on the urgent issues of management of industrial and innovative projects, science, engineering and technology. In turn, the teaching personnel of technical universities should have an opportunity of an internship on the present expensive equipment of companies of Almaty and Almaty region, because direct interaction of the university and the company will allow to evaluate properly the prospects of further training of various professionals and make timely adjustments to the plans set students on a various specialties.

To improve the quality of technical training in high schools of Kazakhstan we should specially emphasize the role of fundamental training of future engineers. It provides a basis for further learning of application training material, develops creativity and systems thinking, arms methods of learning, promotes and improve the scientific world, increases the level of professional and general culture of the future specialist.

However, the effective development of the educational export of universities is undermined by several factors: poor educational infrastructure, lack of recognition of diplomas of many universities in the former Soviet Union and abroad, teaching only in Kazakh and Russian languages, etc.

For the Republic of Kazakhstan, direct investment in the creation of individual institutions, is not as actual as investments to its infrastructure - providing free access to the Internet, computerization, and creation of online platforms. For example, in Ukraine a national project "Open World", funded by private investors (\$ 700 million) acts for several years. Such mechanism of specialists training is most perspective today, as means are invested in development of mental potential that allows everyone who wishes to get education, to realize the abilities and desires, and to the state receives the high quality experts, capable to develop a national economy and actively participate in a public and cultural life. This program is accessible and attractive to all participants and able to balance the interests of society and the state in education. Involvement of the production sector in the formation of future professionals' qualifications, direct and indirect participation in the formation of educational programs - is not only an effective way of additional funding of higher education, but also a way to improve access to high quality higher education for young people, able to give impetus to the effective development of the education sector as a whole.

As you know, the Bologna process is considered as a means of implementing mobile learning. The process has a great integration potential, which will facilitate the integration of Kazakhstan universities into a uniform international educational space. However, entering the Bologna process we must take into account existing national characteristics and traditions of engineering high school.

Recently the tendency of the leveling relation to various kinds of education is tracing, which we believe is fundamentally wrong. In the early 90's of the last century, Kazakhstan has entered the period of market reforms and faced with an acute shortage of managers, economists, and lawyers. Already existing schools, and the newly emerged, including, and non-governmental responded to this demand. Their joint efforts have eliminated the deficit, but created not less a severe shortage of engineers.

Why is this? One of the reasons - the egalitarian attitude of the government, the training of engineers is fundamentally different from the preparation of the humanities or the lawyers: the need for complex, expensive equipment and for passing of practices at the industry enterprises. That is why the leading technical universities of the republic are still not able to fully master the technology of education of the Bologna process is extremely cautious about the introduction of the two-stage system for the preparation of the basic disciplines. It is simply impossible to receive necessary volume of knowledge and to run in the most complicated equipment within the limits of new offered system

We believe that the technical institutions must implement the principle of the integrity of the educational process in a single industrial-scientific-educational space. This will:

1. Establish strong connection with industry and implement the principle of "education through science," i.e., to merge the educational process and scientific research.
2. Solve the problem conformity of structure issued staff to frame structure needs of the industry. In particular, conduct targeted training, defining the contractual relationship between the administration of the enterprise, institution and the student.
3. Develop and implement a system of improvement of the professional competence of teachers of technical colleges with their practical research and teaching as soon as possible.

4. Create an optimal model of the educational process taking into account the requirements Bologna process and the requirements of enterprises to tier system of training (dual and mono-).

5. Efficient use of existing resources and attract investment capital to the educational sphere.

Ministry of Education and Science provides all the prerequisites for the solving of these and other problems, the rest depends on the ability of the first heads of technical universities to manage the available scientific expertise and physical facilities. For example, Belarus for the first time entered the list of countries with high level of human potential development, taking 64th place in the world and the first among the CIS countries, that is, and there's a launch pad for serious reform, aimed at dynamic and positive development of the economy as a whole [3].

Already now, a lot of the technical universities, including the Central-Asian University, do much for preparation of the technical experts, capable of working in a competitive environment: new curricula are developed; new specialties and specializations are opened by request of the ministries and the enterprises of real sector of economy; business schools and the centers, institutes on advanced training and retraining of personnel in new directions of a science and engineering are created, branches of universities are opened at enterprises allowing to make educational process closer to real conditions of production and to involve high quality experts of the enterprises in transfer of practical experience. And we should also note the ways in which technical education should be developed:

The creation of a system of continuous education on the basis of higher education institutions, vocational schools, vocational schools, meeting the staff needs of leading industries and improvement of management of the system of continuing technical education and training programs, including multi-level system of continuous training and retraining of management, transfer and commercialization of technology, intellectual property management, development of logistics technical colleges, institutes and centers of training and retraining;

- Increasing the efficiency of scientific research focused on the needs of the industrial complex of the republic;

- Improvements in the scientific activities of the technical high schools to meet the needs of the regional economic complex, the development of experimental and production base of technical universities.

- The use and dissemination of the integrated system of education, i.e. corporate training system, which means the theoretical training of full-time students of higher educational institutions in close connection with their work in the chosen profession at the base enterprises, scientific, educational and other institutions. This training is conducted in accordance with state educational standards, curricula of universities and labor laws. Here we can mention the need to strengthen the coordination of the Kazakh National Technical University after name .K. Satpayev and Karaganda Technical University, both basic institutions in higher and technical education of the country.

## Conclusion

Economic realities require constant updating of knowledge associated with scientific and technological progress and highly competitive workforce in the context of globalization. The system of technical higher education should not only provide one of the main components of the innovation economy - human, but also act as a bridge linking the education, science and production in all sectors and regions of the country. Therefore, the main task of the content of training engineers is to describe the process of acquiring of new knowledge and changes in thinking, which is the ability to develop independent judgment to form their own opinion.

Fundamental education, remaining the prerogative of the state, can make adjustments on the applied training specialties. In this case, the provision of financial support by the private capital for scientific and theoretical search, research of deep relationship of higher education and science, the results of which can be incorporated in the relevant industry, should also have state support through tax incentives.

**References:**

- Message of President the Republic of Kazakhstan Nursultan Nazarbayev on December 14, 2012 "Strategy" Kazakhstan-2050 ": a new policy established state"
- I.Fedorov, V. Medvedov. Tradition and innovations in preparation of engineering shots. MGTU after name E.Bauman, Moscow, 2011 (in Russian).
- Zubarev Yu.M. Problems of preparation of engineering shots. Institute of mechanical engineering ITE, St. Petersburg. <http://bstu.by/~opo/articles/3.html>. (In Russ.).

## CULTURAL TOOLS TO ENHANCE LEARNING

*Natalie Senjov-Makohon*, Dr, PhD, MA, BEd, Grad Cert TE, Grad Cert. CA,  
Dip.Ed, BA, Deakin University, Melbourne, Australia

---

### Abstract

The cultural tools to connect, communicate, and prepare learners for future academic and workplace activities underpin today's education. In the 21st century, the use of technologies, and in particular social technologies, provide a paradigm shift in the way teachers become engaged and personalize professional development. The technologies are the cultural tools (Vygotsky, 1975, p. 3) deployed to communicate and analyze learners' realities; however, some experienced teachers are reluctant to embrace these realities. However, there are other teachers who are adopting the 21<sup>st</sup> century cultural tools to make their learning and the learning of their students relevant, social and personal. This paper examines how social practices and cultural tools deployed, in a study with experienced teachers, adds value to teacher professional development. It examines the scaffolding with social technologies to enable learners to progress to higher order development in a Zone of Proximal Development (Vygotsky, 1978) in Higher Education.

---

**Keywords:** Professional development, cultural tools, experienced teachers, zone of proximal development.

### Introduction

The explosion of social technologies in the 21<sup>st</sup> century has enabled more people to become involved in the creation, management, sharing and transfer of information and knowledge. 21<sup>st</sup> century students value and use technology to achieve their academic outcomes (76%), they see technology as preparing them for future educational plans (76%) and it prepares them for the workplace (61%) (Dahlstrom, 2013, p. 1). Organizations like the United Nations Educational, Scientific and Cultural Organization (UNESCO) advocate digital literacy since it "improves employability because it is a gate skill, demanded by many employers when they first evaluate a job application. It also works as a catalyst because it enables the acquisition of other important skills" (UNESCO, 2011, p. 1) to communicate and participate in the life of contemporary existence. Not only 21<sup>st</sup> century students require digital literacy but "all citizens of the knowledge society in order to: select and apply ICT systems and devices effectively; utilize common generic software tools in their private lives; use specialized tools for work; [and] flexibly adapt to changes in infrastructure and applications" (UNESCO, 2011, p. 3). Teachers, as citizens of the knowledge society, should be knowledgeable and able to integrate digital technologies into their professional practice. Like other professionals, experienced teachers have been attending ICT inductions and capacity building sessions to acquire an understanding of digital literacy and in particular social web applications "that enable collaborative knowledge construction and creativity" (UNESCO, 2011, p. 10) Additionally in the knowledge society, learners are required "to find and present knowledge to others" (AQF (2013, p. 14) by deploying social technologies as cultural tools (Vygotsky, 1975) to ensure they are employable or future academic ready. Therefore, teachers need to embrace these cultural tools to ensure digital literacy for their learners. Many teachers have embraced the technologies by attending professional development, where they experience a different way of learning from the learning in their initial degrees. "Teachers

were collectively and independently engaged in doing, experimenting and reflecting on their concrete experience in different ways” (Senjov-Makohon, 2009, p. 189) they were interacting and collaborating. In the knowledge society collaboration and interaction are encouraged through such tools as twitter, instant messaging, web meetings and yammer to share and receive information in a timely manner to solve problems and communicate a variety of possible solutions. Videocasts with short learning segments are and can be uploaded into YouTube (Mohsin & Trinity, 2012) and these can enable learners to understand concepts of learning and gain social capital in achieving their personal goal (Lin, 2001) of learning. Blogs and wikis to further allow learners to share and socialize learning (Hsu, 2008); to collaborate, interact and reflect on their shared knowledge and content. Learners deploying these cultural tools go through a process involving planning, thinking, drafting, revising and editing to communicate or express their ideas to peers and educators. The cultural tools (Vygotsky, 1987) in the form of social technologies enable learners to solve problems and communicate their learning in a context. Learners need to construct learning, which cannot be separated from the social context of the day.

Learners need strategies to assist to further their intellectual capacities. They need guidance, thus the skills acquired during teacher professional development is imperative for the guidance of learners to differentiate and appropriately deploy the social technologies for learning and application in new social contexts. Thus, learning is different from the experienced teachers initial preservice learning; learning now requires action, interaction and collaboration in a Zone of Proximal Development (ZPD) (Vygotsky, 1978). The teachers need to be engaged through social interaction and guidance; they need to acquire and develop the appropriate cultural protocols to function appropriately in the given contexts, so that knowledge and skills are transferable to the new context. The learning needs to be active allowing teachers to make sense of the required knowledge and skills. They need guidance and in this study in the university classroom, the teacher educator guided teachers to make sense, to critically think and solve problems in real work context by structuring learning using appropriate cultural tools “on the social level, and later, on the individual level” (Vygotsky, 1978, p. 57).

The teacher educator, as the guide on the side, assists the experienced teachers to realize the benefits of the social technologies and guides them through scaffolding into the new milieu. These experienced teachers become learners who have lagged behind in the uptake of social technologies in Higher Education. Nonetheless, they are realizing the need to be knowledgeable, skillful, and able in applying social technologies in reference to pedagogical theories in relation to learning and teaching that incorporate the technologies.

### **The Challenge**

A major challenge for experienced teachers is to understand what information, knowledge and skills are required for teaching in the twenty-first century and how to best apply it to enhance learning. These teachers have been the ‘sage on the stage’; however, information is readily available for their students; nonetheless, today’s students require the appropriate critical thinking, problem solving skills and other 21<sup>st</sup> century skills, as mentioned above (UNESCO, 2011), to differentiate the mass of information presented at them. Therefore, the role of these experienced teachers is, now, to scaffold from teacher centered teaching to student centered learning. This paper discusses how the social and professional practice of a group of experienced teachers was enhanced when they deployed social technologies in their teaching to augment their students’ learning. These teachers actively engaged in the construction of authentic and purposeful learning, that they *could use the next day ...*

## The Study

This study focuses on the learning of sixteen experienced teachers who had general classroom teaching experience, but who were unfamiliar with ICT. The study observed the teachers' learning about ICT, how they were learning with ICT and integrating it into their workplaces. The study observed teacher learning in the university classroom. Vygotsky's (1962) concepts of social interactive learning and teaching in a cooperative and scaffolded zone of proximal development [*зона ближайшего развития*] (Vygotsky - Выготский, 1999) provided a model against which to investigate teacher learning. He describes the zone of proximal development (ZPD) as the "distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). In the ZPD, under the guidance of the teacher educator, individuals shape and fashion their learning environment with the prospect of becoming self-directed, lifelong learners. Although Vygotsky in his work discussed mainly children's learning, his theories have also been applied to communities of practitioners' learning (Lave & Wenger, 2003). The mention of "more capable peers" by Vygotsky himself implies a more general potential for the application of his ideas. The study utilised these ideas in relation to adult learning environments. Therefore, Vygotsky's (1999) concept of ZPD was chosen to guide the research and the data gathering and analysis.

This research applied a qualitative participant observation methodology to assist in the further development and understanding of the learning displayed by teachers in a blended mode of learning in higher education. Blended learning mode delivery entails face-to-face interaction as well as online delivery. In this case the teacher educator met the experienced educators for a designated time during the academic year in a university classroom. The other component of the delivery occurred when the whole group transferred to online mediation: WebCt (1995).

## Research Design

A qualitative research approach has been used to identify, explore, and find meaning that has been reconstructed in a reflective, critical, sceptical, and imaginative manner. The focus of this study is the learning of experienced teachers with limited ICT exposure. The methods used to gather information about the learning were comprised of three activities: participant observation, interviews, and written documentation. At the end of the fieldwork, the teacher educator verified the analysis of data.

Analysis of the data employed methods of qualitative research analysis and concept synthesis, coupled with content analysis, to constantly compare and contextualise all the facets of reality depicted by the data. This complex approach was necessitated by the application of the extensive theoretical background, the broad framework of the study and the need to completely understand the phenomenon under examination in the broad and deep world of teacher education. The data was coded according to categories based on Vygotsky's terminology to reflect the 21 observations during the field work, the three interviews, teachers' journals and their online interactions. The research showed the paradigm shift of learning and how the cultural tools were deployed to communicate and solve problems under the guidance of more capable peers.

## Analysis of the Cultural Tools

Learning was scaffolded within a zone of proximal development (ZPD) "through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). While an abstract concept, the ZPD became evident when it was realised that in this new learning and teaching environment, the teachers needed to become involved and interact with the other rather than solely rely on the teacher educator. *Some of*

*them knew more than her [Penelope] and she could learn from them.* The consequence of Penelope's learning involvement and *doing this course ... allowed her to bring more technology into her [workplace] class.* Initially, she deemed it necessary that she have control over her learning and teaching. Later she realised that, through collaboration with the other teachers in the course, she had indeed acquired skills and knowledge not yet familiar to her. She blogged that *learning is making sense ... everyone is giving me tips* Such successful learning confirms Hammond and Gibbons (2005, p. 9) contention that classrooms "with high challenge and high support are those where scaffolding is most likely to occur, and where students are most likely to be working within the ZPD".

Penelope introduced the technologies that she learned in the university classroom into her workplace classroom. *Her own learning has been with the assistance of Patrick, Patricia and Danielle who jointly shared and problem solved the challenges of the ICT learning environment. They set up the school calendars and we all know what's happening. They scaffolded and compared their new ICT skills.* For example, Patricia said: *you see ... has similar features, so you can use it in the classroom... Last week I used audacity to record some readings: it was such fun ...* or when Patrick, an Art Teacher [,] *informed and enlightened the others with his knowledge of the Internet and the different sites, such as the Louvre and how he used mind mapping with [his] students.* Learning occurred through the guidance of more capable or knowledgeable individuals in the ZPD.

Vygotsky originally proposed the zone of proximal development (ZPD) as a metaphor. It refers to the sociocultural activities where what Vygotsky calls the intermental and intramental planes appear. The intermental plane refers to the social interactions where an individual mediates with others, while the intramental plane is where the individual, after mediation with others, internalises learning (Vygotsky, 1978; Van Der Vier & Valsiner, 1994). For example, Con said:

*it's OK, when I explain this to you (Duncan) I'm also reinforcing my own knowledge and rethinking my learning*

Or as, when it was observed that Ashley explained to David about:

*the icons, he used a similar program – ...! He felt comfortable because he could scaffold this knowledge ... now I'm starting to see some connection (meaning the ... application).*

That is, these teachers worked together, shared a common purpose and common information, and learned and internalised the different skills and information necessary for further ICT learning in the two planes.

Vygotsky (1962) also referred in the ZPD to a complex chain of activities that is dynamic and consecutively joins individuals from one link, along with all its attributes and knowledge, to the next link. This dynamic learning and enculturating process fuses, and guides the learners through the acquisition of new knowledge. Learners scaffold from previous links and acquire new knowledge and skills that they in turn pass onto other educators and so continues the chain. For example, Philomena mentioned that *Peg's been a terrific help, very patient, very thorough, step by step, and if, [Philomena] needed any help Peg seemed to know the stuff;* she was able to guide her through the learning process. Philomena also mentioned that at her workplace:

*they're helpful as well, and one in particular who is many years younger than her, he will never do anything for her. He'll say, you know how to do this, so do it yourself. He guides more than actually takes over, he'll say no, you do it yourself, which has actually made her more confident and she has actually remembered and learned it [technology].*

The teachers shared their knowledge about the various apps that they could download and place on their iphone and ipads. One of the participants mentioned that *there certainly is a different buzz in this university classroom ... you know I come home and sit o the net ... I skype to some of the others to talk about these new apps ... They were acquiring certain skills;*

*but simultaneously, they also learned to guide each other.* It also became obvious these teachers required an extensive network to develop their new knowledge and skill base and so attain their learning objectives and progress to the next transitional period of their learning. Phoebe *asked her younger brother in law, ... Polly asked her younger brother, ... Philomena and Peg asked their children, ...* Patrick allowed his students to assist him. However he was adamant in reminding them that *there are things that he can do and they can't; like sign a cheque ...*

Vygotsky (1987) maintains that learners in an interactive, social and collaborative environment follow each other's examples. They gradually develop abilities to perform certain tasks without the guidance of more knowledgeable learners. They become independent by *grabbing onto what others know and they take it from there* as Polly pointed out in her second interview. Ultimately, learners internalise knowledge by appropriately transacting with the assistance of others (Vygotsky, 1962).

The research shows that the participants started the process of socialisation in their communities on the interpersonal plane to maximise their learning and adopt the culture tools to communicate, solve problems and critically think in a variety of ways in the new learning environment. Patrick *felt comfortable in using the graphic apps now, he showed his university colleagues some of the things he was doing...* Patricia *asked him how he introduced this activity to his students* and he explained the process that he had learned in the university classroom. Similarly, Patrick found himself increasingly *using the appropriate language to explain the icons in the some of the other apps.*

In summary, through social interaction and in communities of practitioners, the teachers interconnected when the teacher educator, or more capable learners among their own groups, guided them through the task and shared in the problem solving process. The scaffolding in this ZPD encouraged a positive support system that enabled the participants to learn about the various social technologies and embrace the social realities to make their learning and the learning of their students relevant, social and personal. In understanding the social and cultural practices of their students, but in an environment in which they felt comfortable to acquire the appropriate knowledge and skills to personalize their learning, they were able to progress to their understanding of the social technologies that they could *use the next day* with their students.

## Conclusion

Although numerous conference papers, guidelines and government reports have been published describing initiatives for learning about, and with, ICT since the mid-1990s (Pearson, 2003), teacher education literature has been mute or has frequently been underrepresented in the literature (Gibson, 2004; King, 2004; Loughran, 2006; Schwille et al., 2007) on how experienced teachers learn ICT in the university environment. The literature primarily relates to student learning, as it applies in schools and to pre-service teacher education. Unlike student learning, the learning approach of experienced teachers has seldom been investigated or explained. The absence of research on the development of ICT understanding and competence by experienced teachers is noteworthy, because they represent a substantial sector of the profession. As they age, any reluctance by them to take on ICT-based curricular and pedagogical practices is likely to result in their having an increasingly problematic, and even irrelevant, place in education. Any assumption that "the same methods that worked for the educators when they were students will work for their students now... *is no longer valid*" (Prensky, 2001a, p. 3 emphasis in original). Indeed the literature indicates that not all teachers are attempting to understand social technologies, although they are realizing the need to become knowledgeable, skilful, and able in applying social technologies in their learning and teaching.

This knowledge about teacher learning concerning cultural tools (Vygotsky, 1987) in the knowledge society and socialized learning (Hsu, 2008) in the Zone of Proximal Development (Vygotsky, 1978) is important. Firstly, in understanding how experienced teachers embrace social technologies and scaffold their own learning; they begin to enhance their students' learning with appropriate social technologies connecting the technology to augment learning, with learning. Secondly, the realization of scaffolding and support in learning environments is paramount because teachers take on the role of guides on the side rather than 'sages on the stage'. And furthermore, this understanding enables a supportive and active enterprise for appropriately designed future professional development programs and to improve employability, and effectively assist the immigration of experienced teachers into the pedagogical domain of technologies-rich teaching practices that connects experienced teacher to the system of participation "that enables collaborative knowledge construction and creativity" (UNESCO, 2011, p. 10). In this domain, experienced teachers are connected socially and the cultural tools of digital technologies add value to their teaching. They become empowered by becoming digitally literate, enabling them to communicate, to participate and creatively use digital information to construct their own learning and to *use it the next day ...* for active student learning with authentic, relevant and engaging learning tasks in contemporary reality.

### References:

- AQF, Council. (2013). *Australian Qualifications Framework*. South Australia: Australian Qualifications Framework Council Retrieved from <http://www.aqf.edu.au>.
- Dahlstrom, E, Walker, J.D. , Dziuban, C. (2013). Students and Technology 2013. from <http://net.educause.edu/ir/library/pdf/ERS1302/Eig1302.pdf>
- Gibson, M. (2004). Globalisation, Innovation and Socially Robust Knowledge. In R. King (Ed.), *The University in the Global Age*. Great Britain: Palgrave-Macmillan.
- Hammond, J, and Gibbons, P. (2005). Putting Scaffolding to Work. *Prospect*, 20(1), 6-30.
- Hsu, Chin-Lung and Judy, Chuan-Chuan Lin. (2008). Acceptance of blog use: The roles of technology acceptance, social influence and knowledge sharing motivation. *Information and Management*(45), 65-74.
- King, R. (2004). Globalisation and the University. In R. King (Ed.), *The University in the Global Age*. Great Britain: Palgrave-Macmillan.
- Lave, J, and Wenger, E (2003). *Situated learning-legitimate peripheral participation*. Cambridge, UK.: Cambridge University Press.
- Lin, Nan. (2001). *Social Capital: A Theory of Social Structure and Action*. UK: Cambridge University Press.
- Loughran, J. (2006). *Developing a Pedagogy of Teacher Education – Understanding teaching and learning about teaching*. London: Routledge.
- Mohsin, Ghfoor, and Trinity, Martin ( 2012). Six Ways Social Media Technologies can accelerate large scale change Retrieved 6/12/2013, from <http://www.accenture.com/us-en/outlook/Pages/outlook-online-2012-social-media-technologies-accelerate-large-scale-change.aspx>
- Pearson, J (2003). Information and Communications Technologies and Teacher Education in Australia. *Technology, Pedagogy and Education*, 12(1).
- Prensky, M. (2001a). Digital Natives, Digital Immigrants. *On the Horizon*, 9(5).
- Schwille, J., Dembélé, M. , and Schubert, J. (2007). Global perspectives on teacher learning: improving policy and practice. Paris: UNESCO: International Institute for Educational Planning.
- Senjov-Makohon, Natalie. (2009). *Digital Immigrant Teachers Learning for the Information Age*. (PhD), Victoria, Melbourne.
- Tools, WebCt Course. (1995). Retrieved 28/7/2004, from <http://webct.usg.edu/webct/public>

- UNESCO. (2011). Digital Literacy in Education. Retrieved 17/1/2014, 2014, from [iite.unesco.org](http://iite.unesco.org)
- Van Der Vier, R, and Valsiner, J. (1994). *The Vygotsky Reader*. Oxford, UK.: Blackwell.
- Vygotsky - Выготский, ЛС. (1999). *Мышление и речь*. Москва: Лабиринт.
- Vygotsky, L. (1962). *Thought and Language*. Cambridge MA.: MIT Press.
- Vygotsky, L. (1975). *Thought and Language*. Cambridge MA: MIT Press (Translation of the Russian original, published 1934).
- Vygotsky, L. (1978). *Mind in Society*. USA: Harvard University Press.
- Vygotsky, L. (1987). *The collected works of L. S. Vygotsky-Problems of General Psychology (R. a. Carton, Trans. Vol. 1)*. New York: Plenum.
- Clancy, Tom, Carl Stiner, and Tony Koltz. *Shadow Warriors: Inside the Special Forces*. New York: Putnam, 2002.
- Cohen, Andrew, and J.L. Granatstein, eds. *Trudeau's Shadow: The Life and Legacy of Pierre Elliott Trudeau*. Toronto: Random, 1998.
- Meidenbauer, Jörg, ed. *Discoveries and Inventions: From Prehistoric to Modern Times*. Lisse: Rebo, 2004.
- Puzo, Mario. *The Family: A Novel*. Completed by Carol Gino. New York: Harper, 2001.
- Rowling, J.K. *Harry Potter and the Chamber of Secrets*. New York: Scholastic, 1999

## PROBLEM OF EMPIRICAL DISMUTATION IN TEACHING NATURAL SCIENCES

*Dariusz Witowski*

Ph. D. student at the Faculty of Education of University of Lower Silesia, Wrocław, Poland

---

### Abstract

In 2006 on the fourth level of education new types of text tasks were introduced in Matura examination papers. Open tests relating to school experiment were supposed to increase the importance of experimenting in school labs. Test tasks such as: Suggest an experiment..., Note down the observations... should be considered easy because they have roots in empirical work of students and teachers during lessons. The analysis of passing rate of such test tasks on Matura examinations, compared with the results of research carried out on teachers who admit to do no or few lab experiments, reveals a problem existing in Polish schools. Further research proves the existence of a new problem of pedagogic, psychological and social nature that I noticed back in 2007. I called it empirical dismutation, which is a situation in which due to the lack of all elements necessary for it to arise, few people taking part in it achieve teaching success and the vast majority experience partial or complete degradation of success. The article enumerates the causes of pedagogic dismutation, suggests the methods of prevention and describes the threats arising if no prophylactic measures are taken.

---

**Keywords:** empirical pedagogic dismutation, high school, Matura exam, lab experiments, open experiment tests, chemistry education, teaching chemistry

### Introduction

Tasks that teachers must face on various levels of education change very dynamically. In the light of modern core curricula for natural sciences, they make us reflect on the changes in viewing teachers' competences. It concerns mainly changes for Polish high school teachers, but also teachers and students from all countries in the former Eastern block that after 1989 entered the realities of European or American way of understanding goals of education. The changes determine on numerous planes the subject of research in pedagogy and the model of teachers who shape students' knowledge and skills in the new school reality. They also intensify the research on improving the efficiency of teaching and pedagogic process.

In 2006 a new reformed Matura exam was introduced, which was a breakthrough and it became a model for many European systems of education. Entry exams to universities were abolished. They were replaced with external exams organised in students' home schools. Such considerable changes caused a big stir among the part of society that was interested in the level of preparation of Polish schools for the new challenges. The group included parents, students and teachers but also academia who observed with disbelief and scepticism the ideas of the Ministry of Education transferring the authority to the Central Examination Board.

What constituted the main reason for concern was the new core curriculum, mainly such its implementation so as to face up to the new method of testing, new examination format and new way of grading students' exam papers.

Until 2006 the only natural sciences entry exam to universities was a *multiple choice test* in chemistry, biology or physics organised by the universities. The introduction of so-

called *new Matura exam* caused almost total rejection of multiple-choice tests, in which students chose one out of several suggested answers.

Research carried out among experienced high school teachers of natural sciences with twenty-years' work experience suggests that multiple-choice test is popular. There are several reasons for this. Firstly, a big database with exercises was created over the years. Secondly, teachers quickly learnt technical aspects of such tests and created them in a relatively short time. Thirdly, such type of test is easy and quick to assess. However, further research confirmed that modern open text tasks give students much greater freedom of doing them, formulating conclusions and proposing hypotheses. In natural sciences, comprising chemistry, biology and physics, when an exam task is well-written it is much easier to obtain unambiguous answers. Moreover, an open test eliminates random answers. Naturally, a multiple-choice task can be constructed from a number of elements to make a random answer less likely to be correct, but this causes the task to become an open one.<sup>12</sup>

Core curricula for Polish high schools, which were changed and modified a number of times in recent years, usually suggested that lab experiments should be done in the form of a *demonstration* or *student's individual work*. However, before 2006 the effectiveness of lab activities had little reflection in exercises or exam tasks, especially in the case of multiple-choice tests, which contained hints for students.

Polish as well as many European education systems changed in this matter in the early 21<sup>st</sup> century. The core curriculum from 2006 contained requirements for teachers to combine theoretical problems with experimenting. As early as on junior high school level general goals of chemistry education (and other natural sciences) contain the following requirements: "Students safely use laboratory equipment and reagents, design and conduct lab experiments".<sup>13</sup> Other fragment reads: "Chemistry is an experimental subject. That is why, the emphasis was put on *chemistry experiment* conducted by students themselves or observed by them (detailed requirements contain a fragment that reads: Student plans and carries out experiments)".

This means that the whole students' knowledge of chemistry comes from two sources: theoretical background, including simple calculations, and lab experiments. The latter is of the greatest importance. The *core curriculum* and commentary on it clearly indicate the obligation to carry out *lab experiments* during lessons. Simultaneously, exam tasks in *exam papers* refer to students' ability to conduct lab experiments or their observations of demonstrations given by teachers.

Having analysed the effectiveness of the new way of examining Polish high school students in natural sciences, I observed that between 2006-2013 the passing rate of *open experiment tests* included in Matura exam papers among all Polish high school graduates who chose chemistry as one of exam subjects came to 20-40%, sometimes as low as below 10%. What is more, since 2006 there has not been a single Matura exam paper which did not include instructions such as: *suggest an experiment, draw up a diagram of experiment, choose necessary reagents out of...* etc.

The carried out research was a comparative juxtaposition of three elements: carrying out lab experiments, described in the commentary on core curriculum, during everyday school work, teachers' empirical work with tests taken from exam tests, passing rates included in fact sheets compiled by the Central Examination Board.

## Empirical pedagogic dismutation

<sup>12</sup> TwardowskaA., Grajkowski W., Chrzanowski M., Ostrowska B., Spalik K., *Dlaczego warto zamykać zadania?*, Instytut Badań Edukacyjnych, XVII Konferencja Diagnostyki Edukacyjnej, Kraków 2011.

<sup>13</sup> Podstaw programowa. Edukacja przyrodnicza (...) w liceum. MEN 2013.

I first introduced the term empirical pedagogic dismutation in 2007 in the preface to my problem books in chemistry for students preparing for Matura exam.<sup>14</sup>

Dismutation is a term derived from chemistry. On pedagogic ground it is similar in character to the chemical process described by the term. Empirical pedagogic dismutation is a situation in which due to the lack of all elements necessary for it to arise, few people taking part in it achieve teaching success and the vast majority experience partial or complete degradation of success. I coined this term to describe the state I observed while doing research on Polish chemistry teachers when new Matura exam was introduced.

The conducted research revealed that 100% teachers admitted that they were unable to carry out all lab experiments described in the core curriculum, even though exam tasks referring to lab experiments appear every year on Matura exam. The same applies to experiments that are part of other tests in exam papers.

When we juxtapose other test tasks with data on conducting such experiments during lessons and then with the passing rate, it comes as no surprise that the rate is so low.

Let us assume there is an open test task to do in the form of an experiment. Students who are to complete it ought to have done it themselves or should have observed a teacher's demonstration during chemistry lessons. Students under teacher supervision learnt all the elements of a lab task: 1) design of experiment (choice of glassware, methods, etc.), 2) choice of reagents, 3) record of observations, 4) conclusions, 5) chemical equations.

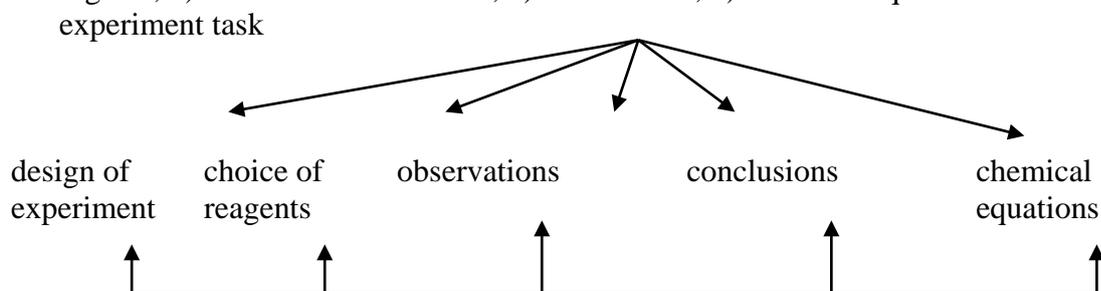


Fig. 1. Mutual relations between elements of experiment.

Source: own data

The diagram shows that all five elements of experiment are closely combined. Usually the knowledge of just one element enables to describe the others. This is the sense of all exam experiment tasks.

Research carried out among teachers proves that situations when they do not do lab experiments with students arise permanently. Teachers often believe that theoretical knowledge (two out of five elements of experiment) is sufficient. When students during examination encounter a task such as: design an experiment... and they have never done or seen it before, a situation arises that is called *empirical dismutation*.

Students strive to find the elements of experiment. They are unable to do it because they have never seen this exercise – they have neither seen the necessary reagents nor have observed the processes organoleptically. Some students, especially those gifted ones, will have good theoretical background, but no empirical) knowledge. Nevertheless, in this group of students we can assume that the result of empirical dismutation will be a success.

<sup>14</sup> Witowski D., *Chemia. Zbiór zadań otwartych wraz z odpowiedziami*. vol. 1-2, Oficyna Wyd. Nowa Matura, Łańcut 2007.

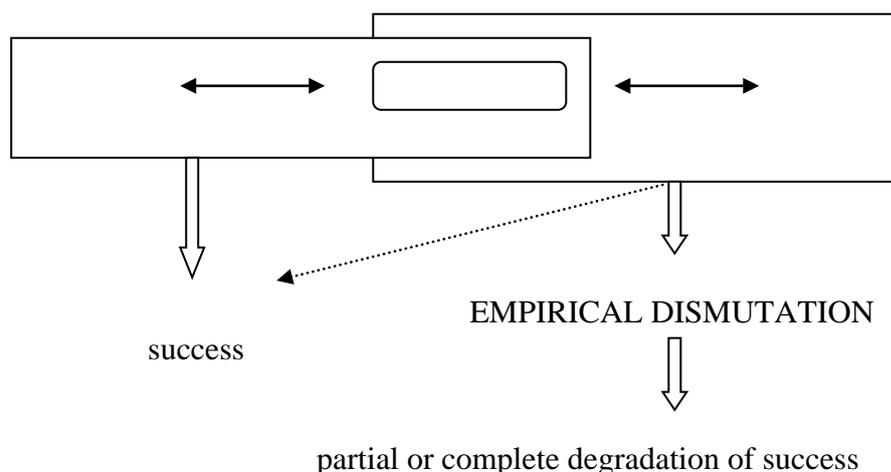


Fig. 2. Emergence of empirical dismutation.  
Source: own data

Low passing rate of such text tasks is a consequence of the fact that chemistry teachers abandoned lab experiments in schools. Among the majority of students (mainly average and poor ones) a stressful exam situation together with no empirical knowledge of a task and insufficient theoretical background will lead to an instant degradation of success due to empirical dismutation. In this situation students are unable to combine the elements of experiment. When a task concerns one element, but it requires adding other elements of experiment as well, a degradation of one or all elements takes place.

Let us assume that an instruction to a task contains one element of experiment, e.g.: chemical equation, but students are asked to write two other elements: reagents necessary to produce a complex chemical reaction and observations. Empirical dismutation can degrade the whole process of reaching correct answers because students will not be able to relate ions to necessary reagents. To counteract total degradation of success, students can be given some reagents as a hint. Then, passing rate of this part of test may be slightly higher. Unfortunately, no such thing can be done in the case of the second part of instruction, i.e.: observations. Students who had not carried out a similar experiment and had not recorded all its elements will not write any observations. Here, partial dismutation takes place.

As shown on the diagram below, in a situation when an open test to be done refers to at least one element from *experiment record form*, which element was not observed during lab experiments in school, partial or total degradation of correctness of answer is about to take place.

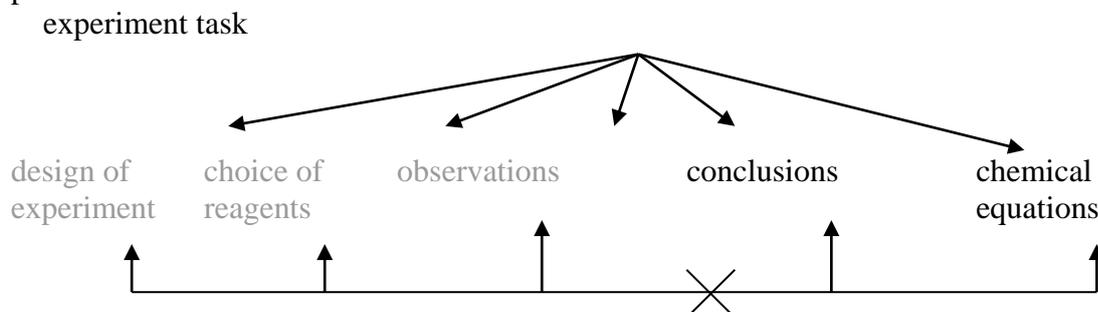


Fig. 3. Degradation of elements of experiment as a result of dismutation and absence of teacher's empirical work.  
Source: own data

The Central Examination Board in 2010, i.e. four years after so-called new Matura exam had been introduced, made a probably random diagnosis telling what to do in order to prevent empirical pedagogic dismutation: "(...) those few students who attempted to complete the exam task and planned further steps of experiment, frequently described actions impossible to perform (...). Such answers are the consequence of verbal teaching of chemistry with students learning about experiments mainly from coursebooks. We must bear in mind that full understanding of chemical processes can only be achieved through unassisted carrying out experiments by students. Unless the teaching process of chemistry changes, all tasks referring to experiments (designing, recording actions and observed changes) will always be considered difficult or very difficult."<sup>15</sup>

The research I have carried out over the last few years indicates that as many as 20% teachers of natural sciences have not carried out any lab experiments in schools since 2006, i.e.: since the introduction of so-called new Matura exam. Only 38% conduct more than a half of experiments required by the core curriculum and contained in experiment tests in Matura exam papers. And this number represents the approximate passing rate of more difficult exam tasks. Thus, a direct relation can be observed between underestimation of the importance of empirical approach to school experiments and the results of Matura exam.

The teachers subjected to research gave the following reasons for not conducting lab experiments: lack of time due to insufficient number of lessons allocated for the subject (100% answers), unavailability of reagents (45%), low school funding which does not allow to buy reagents and lab glassware (38%) and others.

What is worth emphasising, also 12% students indicate that lab experiments are very time-consuming. Not understanding the growing problem of empirical dismutation, they suggest multimedia presentations as an alternative to real-life lab experiments.

The problem of empirical dismutation will increase in the following years. It is now of not only pedagogic but also social nature. We should also pay attention to parents' dilemmas who observe with surprise students' low results in experiment tasks, which were supposed to be easy to complete. When parents blame teachers, they explain that experiment tasks were discussed in the lessons. They may have been discussed, but not carried out and when an exam task requires students to design an experiment, choose reagents and record observations they are unable to do it. During examination lack of practical knowledge triggers empirical dismutation, which manifests itself in partial or total degradation of synthesis of data needed to provide correct answers.

## Conclusion

On the basis of research on low passing rate for experiment tests and analysing commentaries on the reports produced by the Central Examination Board, one might get an impression that such type of test is difficult for examinees.

But the real cause for low exam results is the problem of psychological, methodological, and social nature, which I called empirical dismutation and which has not been discussed or researched yet. The underlying cause is the nationwide wrong approach to lab experiments in teaching natural sciences. It demonstrates in the legal and mental spheres as well as in the growing concern in schools.

The described dilemmas, being the result of laborious research on teachers' work, ought to undergo further study in order to make a correct diagnosis and counteract the growing problem of empirical dismutation. Proper pedagogic prophylaxis supported by nationwide measures such as intense control of following the core curriculum could overcome the effect of dismutation and teaching failure, the latter showing in poor exam results.

---

<sup>15</sup> *Osiągnięcia Maturzystów*, Sprawozdanie z egzaminu maturalnego, CKE, Warszawa 2010, p. 129

**References:**

*Osiągnięcia Maturzystów*, Sprawozdanie z egzaminu maturalnego, CKE, Poland, Warszawa 2009, p. 164, 2011 p. 104, 2008, p. 102, 2010, p. 129.

Podstaw programowa. Edukacja przyrodnicza (...) w liceum. MEN 2013.

Grajkowski W., Chrzanowski M., Ostrowska B., Spalik K., Twardowska A., *Dlaczego warto zamykać zadania?* Instytut Badań Edukacyjnych, XVII Konferencja Diagnostyki Edukacyjnej, Kraków 2011.

Witowski D., *Chemia. Zbiór zadań otwartych wraz z odpowiedziami*. vol. 1-2, Oficyna Wyd. Nowa Matura, Łańcut 2007.

# SUSTAINABLE DEVELOPMENT IN ARCHITECTURAL EDUCATION

*Iva Poslusna, Ass. prof. arch., PhD*

*Hana Urbaskova, Prof. Ing. arch., PhD*

Faculty of Architecture, Brno University of Technology, Czech Republic

---

## Abstract

The Faculty of Architecture of the Brno University of Technology represents an art school at a technical university. That is why its study programmes include subject both from the field of fine arts as well as from technology which get students closer to implement their science. Future architects and urban designers get acquainted with technical creation tools to achieve the goals of their study programmes - to acquire such knowledge and skills to make a BA graduate capable of dealing with designing residential, public and production structures, reconstructions of buildings or their interiors - all that from wider urban relations and basic architectural concept of the work to the urban-design, architectural or technical details. Graduates with Ing. Arch. degree will then become experts - creative workers who can manage project designing and management activities included in the process of investment development in the whole complex of their profession.

We pay close attention to ensure that the education acquired forms basic dispositions for activities which will fulfil all attributes of optimum formation of the environment and principles of sustainable development.

The process of architectural creation fulfilment as a scientific path is conclusively demonstrated to students directly in classes, accompanying workshops, involvement in projects with partner schools, towns, professional institutions. The school then presents outputs of their projects, competitions and stays at internships at exhibitions even in renowned galleries, at conferences and in professional press.

---

**Keywords:** Architecture, urban design, sustainable development, education

## Introduction

Architects and urban designers strive to form material environment that will contribute to the improvement of quality of life. What should such environment look like is a question that we have been trying to answer for centuries. At the beginning of the 21st century, architects and urban designers look for solutions that would preserve architectural heritage and historical values and at the same time eliminate land utilization with negative impacts on landscape; they consider economic use of resources and they can be a positive influence on sustainable development. In this process, education of architects and urban designers in the context of sustainable development plays a significant role.

## Main Text

The Faculty of Architecture in Brno is aware that students of architecture, as significant forming agents of material development, should be systematically informed on the condition of development in technologies allowing environmental solutions to urban-design and architectural tasks and it makes considerable effort to improve conditions in teaching architectural and urban-design disciplines.

At present, the faculty has finished a project from European Structural Funds "Implementation of Sustainable Development Principles into Education of Architects". We

have innovated 20 subjects within the project; we have prepared e-learning support allowing the students to access study materials and use them also for home preparation and self-study. New lectures and teaching aids have been made as well as catalogues of reference examples of environmental and architectural tasks; all that with respect to the latest trends in the field and practical necessities.

In order to make students well-acquainted with natural building materials such as wood, clay, straw and with the craft of building, we hold student workshops. The faculty inner yard saw students building a wooden statue made of planed spruce wood under supervision of Prof. Rajnis.

For architecture students, building something with their own hands represents non-transferable and very significant experience. However, this was not only about teaching the craft of wood construction. A very strong and coherent team was formed during the works which was able to cooperate even under fairly complex division of labour. At the same time, a perfect platform has formed in the yard for encounters of students, teachers, faculty employees and external visitors. Utilization of natural materials and searching for building principles natural for people and friendly for the environment were widely discussed. Other Czech, Austrian and German universities showed interest in similar events.

Workshops are organized in cooperation with doctoral students and the Student Community of the Faculty of Architecture (SOFA). Mutual cooperation among students of the bachelor, master and doctoral study programmes has been manifesting in a positive way in improved quality of students' and dissertation theses.

Every year, the university organizes an international conference of doctoral studies in the field of architecture and urban design "Science in Building" and an international conference "Healthy Houses" where Czech experts exchange knowledge and experience from the process of sustainable structure building and evaluation of their optimal interior environment with their foreign colleagues.

In the Czech Republic, development of energy-saving and self-sufficient buildings has not spread too much yet. The problem is lack of quality project designers, experienced construction companies and low awareness of investors. The Faculty of Architecture plays a significant role in education and promotion in the field of sustainable building, together with a non-profit organization "Passive House Centre". Last year, the foundation Nadace Partnerství implemented an ecological project in the Brno city centre called "Open Garden" as a continuation of the municipal park of the Spilberk castle. It is a counselling and educational centre of non-profit organizations, designed as a green structure using state-of-the-art technologies. The building is heated and cooled using thermal pumps, it recycles rainwater from its roofs and paved areas of the garden and uses it for flushing toilets and watering the garden.

Apart from teaching spaces for experiments performed by school teams, the "Open Garden" also offers interactive teaching routes, stations for watching seasonal natural phenomena, stations designed for understanding physical phenomena and elements and for using the energy of the Sun, wind or water, as well as touch and smell routes for the handicapped. The complete project documentation from the study to the implementation project was prepared by the studio Projektil Architekti s.r.o. which won the "The Award of the Minister of the Environment for the Building Energy Saving and Efficiency" within the competition Stavba roku 2013 (The Building of the Year 2013). Therefore, FA students had a unique opportunity to watch the course of construction of a house which is one of the best examples of green building in the Czech Republic and to acquire practical experience.

Construction of a detached family house designed by our professor Hana Urbaskova as a passive-standard wooden structure also served as a "school laboratory" for our students in the past. The house project was awarded in the competition "ROCKHOUSE 2009" and the

house implementation won the “Construction Magazine Award” in the competition Structure of the South-Moravian Region 2009.

It is an energy-saving, simple, purposeful structure with low initial and operation costs, with a healthy interior climate which positively influences the feeling of warm comfort. During construction, students had the opportunity to see for themselves that in order to achieve quality, cooperation among the project designer, investor, construction supervisor and construction companies is crucial since a passive-standard house will work only when everything - the house design, project and construction - is provided by professionals.

Prior to the construction completion, the building air-tightness was verified by means of the “blower door test”. Building thermal protection quality was verified by means of construction thermography. Surface temperatures of the building were measured using an infra-camera (thermovision) which allowed potential thermal bridges to be localised. Students have the possibility to further monitor the house in terms of its operation and to assess its interior climate.

Apart from structures in the territory of the Czech Republic, students also visit foreign structures which meet the requirements of sustainable development. Expert field trips are organized within the project “Paths to Experience” from the European Structural Funds which the faculty organizes in cooperation with the Passive House Centre. The project also allows students to go for domestic and international internship stays at project design companies developing so called “green solutions”.

Students welcome and accept the effort to interlink the teaching process with real life. This well-established interconnection between theory and practice manifests well during submissions of Bachelor and Master theses topics which are assigned in cooperation with cities. Students' works are displayed in municipal galleries and the public has the possibility to get acquainted with them. The aim of student exhibitions is to raise interest of local inhabitants in architecture as an inherent part of contemporary culture and as interest in their city. To search for answers for the questions of today together: “Is it possible to meet requirements of sustainable structures when demands of both commissioners and users keep getting higher? How should we perceive actual investments into architecture and sustainable development?”

Students' projects are also displayed in galleries together with projects and implemented works of their teachers - architects. The university also has its own exhibition premises; the “GALLERY MINI” where exhibitions alternate every 2 weeks.

Apart from tackling architectural tasks concerning sustainable development, the university also deals with issues of sustainable urban development. Within the project “AKTION Czech Republic - Austria” supporting bilateral cooperation in education and science in the tertiary sector, we have been working on the project “Current Development in the Cities of Brno and Graz in Terms of Sustainability and Energy Saving” with TU Graz and on a project called “Is it possible to connect the rescue of the industrial monument with the development of the city?” with TU Vienna. We have also been cooperating with the Donau Universität Krems on the project “Revitalization of small and medium towns in Lower Austria and South-Moravian Region” and on “Revitalization of Church Structures and Premises in NÖ and CZ”.

Partner relationships with foreign universities play a very important role in the field of education; they are developed primarily by means of international mobility project defined by the LLP Erasmus programme. Our university also cooperates with universities from countries outside the European Union. At present, our cooperation is well-developed with the Swiss university Berner Fachhochschule Architektur, Holz und Bau in Burgdorf, with TH VADUZ Hochschule Liechtenstein, IIT College of Architecture Chicago, with the Faculty of Architecture of the S.Seifullin Kazakh Agro Technical University in Astana.

In the Doctoral study programme, we have had dissertation theses by students from Iraq, Iceland, Angola, Bolivia and most recently also from Syria, Turkey and Kazakhstan. Currently, our professor, Ing. arch. Vladimir Slapeta, DrSc. is hosting at the Irwin S.Chanin School of Architecture of the Cooper Union in New York.

Innovation in teaching and cooperation with foreign faculties has reflected positively into success of our students in domestic and international competitions. For example, in 2013 our student Adela Kyselova won the 4th place in the international student competition INTERNATIONAL STUDENT DESIGN COMPETITION and students Jakub Frolík and Vojtěch Kolar were successful in the INTERNATIONAL COMPETITION FOR THE MIAMI MONUMENT with their design called "GREAT SPIRIT WOODS" and they achieved the honourable mention.

Our students also achieved success in domestic competitions concerning the environment and sustainable development; e.g. DUM NOVE GENERACE 2012 (House of the New Generation), BUILDING EFFICIENCY AWARDS (BEFFA) 2012, ENVIROS 2012, REGIONAL ENVIRONMENTAL OLYMPICS 2012, ACTIVE HOUSE AWARD 2012.

The latest success our doctoral students achieved is the victory in the selection procedure for the Czech pavilion for the EXPO 2015 in Milano, Italy. Doctoral students Ing. arch. Ondřej Chybík and Ing. arch. Michal Kristof have designed the pavilion as a temporary structure consisting of containers, with simple operation and maintenance which will be disassembled after the EXPO and it will find a new purpose in the Czech Republic. The sustainable project is in accordance with the theme of the world exhibition which is "Feeding the Planet, Energy for Life" and follows the overall concept of Swiss architects Jacques Herzog and Pierre de Meuron who strived to reduce short-term fashion fads and focus more on the idea and sustainability of pavilion structures. The overall design by Herzog and de Meuron is dominated by the water channel which will bypass the entire exhibition premises. This is related to one of the key themes of the Czech pavilion - discoveries made by the Czech Republic in terms of water treatment, nanotechnologies and biochemistry applied in agriculture which push the topic development further into the future. The aim of doctoral students architects Chybík and Kristof is to create an environment with high aesthetic value using containers. They design confident architecture with contemporary expression referring to the simplicity of national style - modernism. A Czech pavilion, as they say, should be both a house and an experience.

## Conclusion

Innovation of study programmes implementing the principles of sustainable development has contributed to improvement in quality and modernisation of architectural education at the FA BUT. Education of architects with the support of workshops, conferences, excursions, competitions and exhibitions has encouraged students' creative abilities, developed their independence and also their social responsibility and endurance. Students' adaptability and mobility have also seen great improvement as well as qualifications of the faculty's teachers.

The faculty strives to make its graduates from innovated study programmes capable of seeking solutions to urban-design and architectural issues as a consensus acceptable for all parties concerned which is the most efficient means of gradual fulfilment of the strategy for the environmental spatial development.

Our university also had a visit from a team of auditors in October 2012 who arrived within the international project QUESTE-SI which is organized by the EFMD (European Foundation for Management Development) and which asserts sustainability and responsibility (economic, social and ecological) as new criteria of quality. The team was formed by Juan Jesus Perez, Full Professor, Universitat Politècnica de Catalunya, Spain

Julia Falkerby, Research Officer, KTH Stockholm, Sweden.

Jérôme Tarbès, Jet Conseil, France.

Muzio Gola, Vice-Rector for Quality, Evaluation and Accreditation, Politecnico di Torino, Italy.

They made QUESTE-SI EXTERNAL AUDIT VISITS and our faculty was evaluated to receive the QUESTE-SI Award on 28th January 2013.

**References:**

Urbaskova, Hana: 5E DOMU - The 5 E's of a House, FA BUT 2010, pp. 26, ISBN 978-80214-4186-6, ISSN 1213-418X

Poslusna, Iva; Urbaskova, Hana; Guzdek, Adam: Bachelor theses 2012, FA BUT 2012

Poslusna, Iva; Urbaskova, Hana; Guzdek, Adam: Master theses 2012, FA BUT 2012

[http:// www.fa.vubr.cz](http://www.fa.vubr.cz)

# **AN INTEGRATIVE DECISION MAKING MODEL UNDER CRISIS: EXAMINING TWO REAL LIFE CRISIS DECISION MAKING CASES**

*Dechao Zeng*

China Jianyin Investment Co. Ltd.,PHD. Beijing, China

*Xiaoyu Zhang*

Peking University HSBC Business School, Master. Beijing, China

---

## **Abstract**

Researchers have explored extensively into aspects of importance in the decision making process, however, the field of researches on building an integrative decision making model is uncultivated. To bridge the chasm, a systematic decision making model under crisis conditions is built in this paper by integrating factors into the classical decision making model. There are five main elements in the construction of the integrative decision making model, i.e., classical decision making model, decision making under crisis, psychological effects, risk and uncertainty and cross-cultural differences. By incorporating similar elements into integrative factors, three factors as key components in the decision making model, i.e., external environment, risk and idiosyncratic characteristics are listed. The model is expressed in two formats; the first being a simple mathematical formula while the second a flowchart that transforms the abstract thinking process into concrete phases, namely, status quo, identification, development and selection. The focus is centered more on the second method since it matches the reality better. From the analysis, the conclusion is derived that when the decision process is a stochastic dynamic Markov process, the final choice will approach a standard function of the factors in the current state with certain factors dominating the process in different circumstances as the times of making similar decisions increase. In terms of practicability, the model can properly explain the decision processes in the Asiana Airlines crash case and the Jiaduobao Trademark withdrawal case.

---

**Keyword:** Decision making process, crisis, culture, model, markov property

## **Introduction**

Researches on decision making behaviors have gone through 3 major transformations. The origination of decision making behavior studies is classical economics where the decision making micro-body is assumed to be perfectly rational. In the 1950s, Herbert A. Simon put forward theories of bounded rationality, which stated that the decision makers' capacity of information processing is limited by a set of constraints [1]. This hypothesis motivated psychologists and economists to join forces and further researches on the psychological basis of decision making behaviors. In the 1970s, psychologists Daniel Kahneman and Amos Tversky published a series of papers discussing the role of cognitive biases and psychological effects in the economic decision making processes. Their innovative incorporation of cutting-edge research findings in the fields of experimental and cognitive psychology with economics gave rise to new branches of studies where economics and other disciplines crossed paths. Subjects like behavioral economics, behavioral finance and neuroscience-economics became the new approach to answering questions about individual and organizational decision making processes.

Hitherto, an abundance of researches have explored a great deal into aspects of importance in the decision making process, ranging from psychological effects to cross-

cultural differences, however, the field of researches on building an integrative decision making model is pretty much uncultivated. To bridge the chasm, this paper aims to build a systematic decision making model under crisis conditions by integrating factors of risk and uncertainty, psychological and cognitive biases and cross-cultural differences into the classical decision making model. After establishing the theoretical model, we analyzed two real life crisis decision making cases under our modeling framework to provide some insights into the model's practicability.

## **Main Body**

### **Literature Review**

#### **Classical decision making models**

Simon (Simon 1960) proposed the three phase decision making sequence of intelligence-design-choice, which insisted that the decision making process retained cerebral rationality and can be decomposed into several simple preset steps [2]. After that some researchers set out to refine the Simon 3-phase model. In 1976, Mintzberg et al expanded Simon's three-step method into a structured process with 3 central phases, 3 sets of supported routines and 6 sets of dynamic factors (Mintzberg, Henry, DuruRaising Hani, and Andre Theoret 1976)[3]. Still there are others that seek to treat decision making as a discrete-stage stochastic dynamic sequential process and approach the problem with optimization programming methods known as Markov Decision Process (Puterman, Martin L. 2009), which assumes the stochastic process has the Markov property, that is, the conditional probability distribution of future states of the process (conditional on both past and present values) depends only upon the present state[4].

#### **Psychological effects and decision making under crisis**

Researchers of psychology have documented a vast variety of psychological and cognitive effects that would distort the decision making processes in classical models. Preference, for instance, is proved by much experimental evidence to be susceptible to psychological effects such as loss aversion(Kahneman, Daniel, and Amos Tversky 1991) [5]and status quo alternative,that is, doing nothing or maintaining one's current or previous decision (Samuelson, William, and Richard Zeck hauser 1988)[6]. With respects to the decision makers' mental framework, overconfidence in their judgments, shortsightedness, optimism (Russo, J. Edward, Paul JH Schoemaker, and Edward J. Russo 1990) [7]and isolation effects (Kahneman, Daniel, and Dan Lovallo 1993) [8]will all induce seriously biased decisions .

In crisis conditions, the role of psychological effects in decision making becomes more prominent because when there is little time and the pressure surges, the stress becomes all too overwhelming that a thorough review of the constraints and the primal objective of the decision maker is out of the question(Sayegh, Lisa 2004)[9].In essence, stress is hardly the only emotion evoked in crisis conditions, anger, fright, anxiety, and sadness (Jin, Yan, and Augustine Pang 2010) [10],positive emotions such as gratitude, interest, love and so forth (Fredrickson, Barbara L., et al 2003) would all surge up when a crisis is imminent[11].The mixed effect of these emotions on the psychological state of the decision maker is a force to be reckoned with, thus they play a determinant role in the decision making process in crisis conditions.

#### **Risk and uncertainty**

Risk and uncertainty are highly correlated, but are inherently different. As Knight pointed out in 1921 in his dissertation "Risk, Uncertainty and Profit", uncertainty is a basic fact of life whereas risk is only a special case of uncertainty, one that's related to

'disagreeable events ( FH Knight 1921)[12]. In our research, uncertainty is a much more relevant concept.

### **Cross cultural differences in risk perception**

Cross-cultural differences have been a constant reminder of the imperfection of the homogeneous economic agent assumption, moreover, due to its deeply-rooted influence on the risk perception of the decision maker, it is an indispensable factor in an integrative decision making model. Earlier researches on this subject tended to adopt the experimental methodology. In one study, respondents from China, U.S.A, Germany, and Poland were found to differ in risk preference, as measured by buying prices for risky financial options (Weber and Christopher 1998) [13]. Later studies focused on offering diverse explanations for the discrepancies in risk perception caused by cross-cultural differences. According to Hofstede(2001), individual attitudes towards risk and uncertainty are strongly associated with uncertainty avoidance. A culture is characterized by high uncertainty avoidance when its members feel threatened by uncertain or unknown situations(Hofstede2001)[14]. More recent studies focused on specific impacts of different uncertainty avoidance levels on behaviors such as information search and planning (Money, R. Bruce, and John C. Crotts 2003)[15], Internet shopping (Lim, Kai H., et al 2004) [16], technology acceptance (Hwang, Yujung 2005) [17]and business ownership rate(Wennekers, Sander, et al 2010)[18].

### **Integrative Decision Making Model under Crisis**

There are TWO assumptions and FIVE components vital to the construction of our integrative decision making model.

*Assumption 1: The decision process can be divided into several phases, but there are no simple sequential relationships between them.*

Concerning phases in decision making processes, the most famous theorem is the Simon (1965) intelligence-choice-design trichotomy. However, as is pointed out by several scholars after conducting substantial amount of empirical researches (Witte 1972, Mintzberg 1976), human beings cannot gather information without in some way simultaneously developing alternatives. They cannot avoid evaluating these alternatives immediately, and in doing this they are forced to a decision (Witte 1972)[19]. We agree with this framework in the paper as it is also our belief that phases do exist in human decision making behaviors, but decision making is also a dynamic process with interactions and feedbacks between each phase.

*Assumption2: The development phase of the decision making process is in itself a stochastic process which has the Markov property.*

The development phase is the most important phase in the decision making process. It is the phase when all the constraints, available information and inherent characteristics of the decision maker begin to reconcile with each other and yield the final set of alternatives for the crisis. We propose that this phase is a stochastic Markov process because we are under the belief that after repeating similar decision making processes infinite times, given that the decision maker is seeking alternatives in the current state, the past becomes irrelevant in terms of what decisions are made now and what will be the possible consequences of these decisions. Namely, if the decision maker is very experienced in a crisis situation, his/her response to the circumstances will be infinitely close to standard reactions, leaving past experience out of account but making small adjustments corresponding to the current state.

### **Elements and its corresponding role in the model**

*Classical decision making model:* We choose to base our integrative decision making model on the structure of the "unstructured" model in Mintzberg (1976), which divided the decision making process into 3 phases, i.e., identification, development and selection. Even

so, there are several immeasurably vast differences between Mintzberg's and our model. Firstly, to emphasize the importance of cross-cultural difference in risk perception and the psychological state of the decision maker before the realization of the crisis, a phase delineating the status quo is added to the original three phase model. Secondly, Mintzberg's intention was to build a general model of strategic decision making process, in most scenarios, it lacked the sense of urgency in crisis conditions. The significance of psychological and mental factors was reduced to oblivion, which is entirely opposite to the focus and purpose of this paper. Thirdly, Mintzberg included 12 elements in his model, with 3 central phases, 3 sets of supporting routines and 6 sets of dynamic factors, whereas in the model we proposed, except for the 3 central phases, all the other elements were replaced with our own set of constraints.

*Decision making under crisis:* The specific setting of crisis conditions is the highlight of our model. The recognition of crisis is not only a triggering event of change of state from status quo, it is the underlying reason why a particular class of psychological effects such as stress and loss aversion dominate the penultimate and final phases of the decision making process. To put it another way, the identification of the crisis forced the decision maker to change the status quo and remain alert to the emergent conditions until the decision making process is completed.

*Psychological effects:* Psychological states and effects enter into our model in two ways. First, the decision maker's state of mind in status quo is worth looking into because together with the examination of cross-cultural differences, the decision maker's perception of risk and level of uncertainty avoidance can be determined, which are inherent characteristics that rarely change even in years, let alone in a transient period of crisis decision making. Hence, the first way of factoring psychological effects into the model is *permanent* since it is initiated from phase one—status quo. The second way of channeling psychological effects into the model is to study the systematic biases in “rational decision making” caused by a set of emotions kindled by the sudden awareness of the crisis, for instance, stress, fright and anxiety, etc. In such a situation, the psychological effects are only important *periodically*, especially in the development and selection phase.

*Risk and Uncertainty:* Even though the perception of risk and the level of uncertainty avoidance are determined at status quo, they only begin to play a part until phases 3 and 4 when alternatives are developed, evaluated and selected. Aside from the effects of risk and uncertainty perception on screening and searching for alternatives, the objective of the final choice also depends heavily on the uncertainty level in general. Two people with low and high levels of risk aversion respectively would probably have completely different goals in crisis conditions and act accordingly when choosing from a series of alternatives, thus risk and uncertainty are a set of factors most dynamic in phases 3 and 4.

*Cross-cultural differences:* The cross-cultural differences element in essence coexists with the risk and uncertainty element. The symbiosis between these two elements is what narrows the general concept of uncertainty and risk down to a real life case where the risk perception accords with the decision makers' idiosyncratic attitude towards risk. In conclusion, phases 1, 3 and 4 in which risk and uncertainty play a major role in the decision making process are the main phases where cross-cultural differences should be taken into account.

### **A general Integrative Decision Making Model under Crisis**

The five elements of importance can be integrated smoothly into three factors. The emergent circumstances, denoted by E, correspond to the external environment similar to the set of constraints in classical models. Risk and uncertainty can be incorporated into the risk factor denoted by R. The psychological effects and the cross-cultural differences can be summed up as the idiosyncratic characteristics of the decision maker denoted by C. The

decision making process is considered as stochastic and dynamic. Last but not least, the function  $f$  is an abstract form indicating the integration of the three factors rather than a concrete formula. In conclusion, a simple mathematical form of our model can be written as:

$$D_1 = f_1(E, R, C) \quad (1)$$

$$D_n = f_n(E, R, C, D_{n-1}) \quad (2)$$

$$\lim_{n \rightarrow \infty} D_n = f(E, R, C) \quad (3)$$

In words, equation (1) is a statement of the decision making process for the first time in a series of similar circumstances. As experience accumulates, equation (2) declares that a decision made is based not only on the external environment, risk and the individual characteristics, but also the decision made in the previous time. Equation (3) is a demonstration of Markov property in assumption 2, where after infinite times of repetition, the decision making process grows independent of past experience and the final decision becomes a standard function of the three factors.

Even though presenting mathematical formulas is a good way to illustrate what constitute the model and what the model is aiming at, a flowchart suits our purpose better since we are trying to transform abstract thinking processes into concrete steps. The General Integrative Decision Making Model under Crisis is shown in figure 1. There are 4 phases in the model, status quo, identification, development and selection, and each phase is explained in detail as follows.

In the *status quo phase*, we are mostly interested in the decision maker's psychological state of mind and his/her perception of risk and uncertainty level largely determined by his/her cultural background. Accordingly, the determinants are idiosyncratic characteristics unique to the decision maker, which are only observable and detectable in real cases.

The second phase, *identification*, is where the crisis is recognized and the psychological state of the decision maker changes accordingly. Although his/her perception of risk is unaltered, this is the phase when the element of risk and uncertainty is activated. This phase lasts for a relatively short period since one feature of a crisis is its suddenness or conspicuousness. Once the crisis is recognized, the identification phase is over.

*Development phase* is the stage after identifying the crisis and the decision maker searches avidly for solutions to the problems in crisis or makes attempts to create new ones. It is the most important phase in the decision making process because the final decisions made are contingent on the set of alternatives created. As is mentioned in assumption 2, we assume that the development phase is a Markov process; consequently, this phase can evolve in 2 ways dependent on the decision maker's experience in similar crisis conditions. *If the decision maker is very experienced, we can approximate the times of making similar choices to infinity and the set of alternatives developed in this case is highly standard with minor adjustments to the uniqueness of the crisis conditions. However, if the decision maker is very inexperienced or rarely has any similar experience, the decision maker will lean on past knowledge more heavily. As a result, he/she will go back to the former two phases in the hope of obtaining more useful information, namely, there will be a feedback effect in this situation.* In addition, in developing various alternatives, risk perception and uncertainty avoidance are a pair of constraints that restrict the number and type of alternatives constructed. So the first two phases also have sequential effects on the development phase.

The final phase, *selection*, is bound up with the development phase as the decision maker evaluates the alternatives and matches the one most suitable for his objective and makes a choice simultaneously. Since the crisis condition in most cases is not duplicable, once the choice is made, there will no longer be any feedback effect.

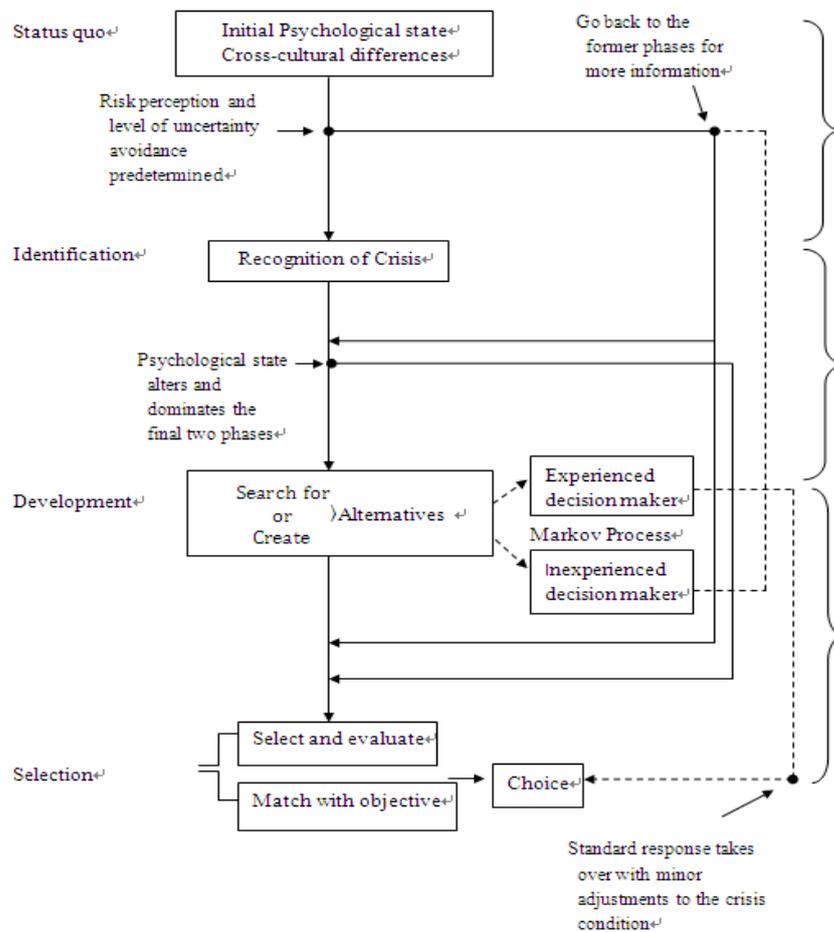


Figure 1 A General Integrative Decision Making Model under Crisis

**Case Study**

**Asiana Airlines crash case**

On July 6th, 2013, Asiana Airlines flight OZ 214 crashed at the San Francisco International Airport when the attempt to land failed. The United States National Transportation Safety Board (NTSB) ruled out mechanical failure as cause for the crash and concluded that the pilot’s operation mistakes were the major reason why the tragedy occurred.

**Status Quo**

According to Hofstede’s in-depth studies on cross-cultural differences, South Korea is characterized by strong collectivistic values, high power distance and strong uncertainty avoidance (Hofstede 1983) [20]. The ties between individual South Koreans are very tight. Everybody is supposed to look after the interest of his or her in-group and the in-group will protect them when they are in trouble. The degree of inequality in power and centralization of authority is high. And low tolerance of uncertainty induces a higher level of anxiety in people, which manifests itself in greater nervousness, emotionality and aggressiveness.

The crew on OZ214 consisted of 4 pilots, the one flying the plane is a 46 year old pilot with nearly 10000 hours of flying experience in total but only logged 43 flight hours of Boeing 777, the model of OZ 214. The other three pilots are very experienced and act as tutors in the whole flight. This organizational structure accords with the collectivist culture where the in-group members look out for each other. With regards to power distance, the seniority of the other three pilots established the inequality in power. Therefore it is not presumptuous to say that the flying pilot will turn to the other three for advice if anything unexpected arises.

## **Identification**

The crisis was first identified when one of the crew members realized the plane was flying at a speed significantly lower than the target speed of 137 miles per hour. According to the recording of communications between the control tower and the flying pilot, it is very obvious that the pilot panicked and became so nervous that he can barely understand what the tower's orders were. As is consistent with the model, the feeling of stress grew strong and the high uncertainty avoidance inherent in the entire crew's nature worsened the situation by making all of them on edge.

## **Development**

Searching for or creating alternatives is exactly what the crew on OZ 214 did after realizing the plane could not land at a speed far lower than the standard speed. Two alternatives were offered altogether. 7 seconds before the crash, the black box recorded one pilot from the cabin saying clearly to speed up. After 5.5 seconds when the first method didn't seem to work, another pilot demanded overshooting but it was too late.

The flying pilot is very inexperienced. In accordance with our model, he should go back to former phases to obtain more information. However, in this case, the psychological effect or the cross cultural difference proved to be the dominating factors in this phase. The alternatives were offered by the more experienced crew members and the flying pilot abided without a second thought because of the strong influence of high power distance, which compelled him to take advice from more superior figures. Meanwhile, inherent collectivist values made it natural to depend on in-group members when he was in trouble. On the other hand, the propositions provided by the crew members with more experience proved our point that rich experience yields standard response. Overshooting is a common practice for Asiana Airlines. According to statistics compiled from mid-June to the end of July, 2013, the overshooting rate of Asiana Airlines is 6-8 times higher than other airlines. More experienced crew members were able to come up with the alternative of overshooting when the flying pilot could not demonstrate that the response to a crisis is infinitely approximate to standard reaction after similar decision making processes have been repeated numerous times.

## **Selection**

Same as the development phase, to the flying pilot with little experience of operating Boeing 777, the selection phase was guided by his abeyance to seniority and the collective leadership. He took action immediately once an order was given and switched to another order swiftly when the first try was of no avail. The only reason the last two phases of the model didn't accord with what happened in reality is that the psychological effects and the cross-cultural factors are dominant from the beginning.

## **Jiaduobao Trademark Withdrawal case**

On May 11th, 2012, China International Economic and Trade Arbitration Commission declared the "Wong Lo Kat" trademark licensing agreement and the Supplementary agreement between Guangzhou Pharmaceutical Group and Hongkong Hongdao Group, the parent company of "Jiaduobao", null and void. Contrary to popular opinion, Jiaduobao turned around in just a few months.

## **Status Quo**

China is one of the Asian countries that scored high on collectivist tendencies, power distance and uncertainty avoidance (Hodstede, 1993)[21]. Uncertainty avoidance is a very distinct trait manifested in Jiaduobao's management. Except for the efforts to prolong the contract, they also launched the high-end mineral water "Kunlun Mountain" to lessen the adverse impact in case the license to use the brand "Wong Lo Kat" was revoked.

## Identification

The identification phase of the crisis began in May 2012 when the arbitration award was announced. According to the vice general manager of Jiaduobao Brand Management Department, the moment the result was released, Jiaduobao stopped all producing and marketing activities of "Wong Lo Kat" and began building their own brand Jiaduobao.

## Development

Jiaduobao group has been a well-known expert in marketing strategies long before it changed its brand in 2012. Based on the model, the management, as a group of very experienced decision makers with concerted goals, is supposed to take action very rapidly because they do not have to dwell too much on past information and the actions are standard means of marketing that get the company through many crisis before. From what really happened, we can see the management did exactly what the model predicted. They fleetly took a series of forceful marketing measures such as advertising, packaging and sponsoring hit shows to build the Jiaduobao Brand, which resembled the marketing strategies that put "Wong Lo Kat" in the leading position in the herbal tea industry in the first place.

## Selection

Since the management of Jiaduobao is highly experienced, the development phase and the selection phase proceed simultaneously as the actions taken are also the choices made. This corresponds with the model where an experienced decision maker searches for alternatives and jumps directly to making choices. In other words, in Jiaduobao Trademark withdrawal case, the dominating force is the Markov property because the case demonstrated that an experienced decision maker's response to a crisis is and is only a standard function of the current state itself. The effects of psychology and cross-cultural differences are played down partly due to the substantial experience of the decision maker, partly due to the fact that the group of decision makers has conflicting idiosyncratic characteristics that tend to cancel each other out when the group is large enough.

## Conclusion

The decision making process in crisis conditions can be decomposed into four phases: status quo, identification, development and selection. Integrating factors regarding external environment, risk, psychology, culture and past experience into the process produces a new method of obtaining realistic optimal choices. When the decision process is a stochastic dynamic Markov process, the final choice will approach a standard function of the factors in the current state as the times of making similar decisions increase. The model is solid in terms of practicability. As is shown in the case study, our model can properly explain the decision process in the Asiana Airlines crash case and the Jiaduobao Trademark withdrawal case. However, the paper didn't provide further discussions on the theoretical framework of the intrinsic relationship between Markov process and the decision models, which is a field worth exploring for fellow researchers in the future.

## References:

- Simon, Herbert A. "A behavioral model of rational choice." *The quarterly journal of economics* 69.1 (1955): 99-118.
- March, James G., and Herbert Alexander Simon. "Organizations." (1958).
- Mintzberg, Henry, Duru Raisinghani, and Andre Theoret. "The structure of" unstructured" decision processes." *Administrative science quarterly* (1976): 246-275.
- Puterman, Martin L. *Markov decision processes: discrete stochastic dynamic programming*. Vol. 414. Wiley. com, 2009.

- Tversky, Amos, and Daniel Kahneman. "Loss aversion in riskless choice: A reference-dependent model." *The Quarterly Journal of Economics* 106.4 (1991): 1039-1061.
- Samuelson, William, and Richard Zeckhauser. "Status quo bias in decision making." *Journal of risk and uncertainty* 1.1 (1988): 7-59.
- Russo, J. Edward, Paul JH Schoemaker, and Edward J. Russo. *Decision traps: Ten barriers to brilliant decision-making and how to overcome them*. Simon & Schuster, 1990.
- Kahneman, Daniel, and Dan Lovallo. "Timid choices and bold forecasts: A cognitive perspective on risk taking." *Management science* 39.1 (1993): 17-31.
- Sayegh, Lisa, William P. Anthony, and Pamela L. Perrewe. "Managerial decision-making under crisis: The role of emotion in an intuitive decision process." *Human Resource Management Review* 14.2 (2004): 179-199.
- Jin, Yan, and Augustine Pang. "Future directions of crisis communication research: emotions in crisis—the next frontier." *The handbook of crisis communication* (2010): 677-682.
- Fredrickson, Barbara L., et al. "What good are positive emotions in crisis? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001." *Journal of personality and Social Psychology* 84.2 (2003): 365.
- Knight Frank, H. "Risk, uncertainty, and profit." книга (1921).
- Weber, Elke U., and Christopher Hsee. "Cross-cultural differences in risk perception, but cross-cultural similarities in attitudes towards perceived risk." *Management Science* 44.9 (1998): 1205-1217.
- Hofstede, Geert H. *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*. Sage, 2001.
- Money, R. Bruce, and John C. Crotts. "The effect of uncertainty avoidance on information search, planning, and purchases of international travel vacations." *Tourism Management* 24.2 (2003): 191-202.
- Lim, Kai H., et al. "Is eCommerce boundary-less? Effects of individualism–collectivism and uncertainty avoidance on Internet shopping." *Journal of International Business Studies* 35.6 (2004): 545-559.
- Hwang, Yujong. "Investigating enterprise systems adoption: uncertainty avoidance, intrinsic motivation, and the technology acceptance model." *European Journal of Information Systems* 14.2 (2005): 150-161.
- Wennekers, Sander, et al. *Uncertainty avoidance and the rate of business ownership across 21 OECD countries, 1976–2004*. Springer Berlin Heidelberg, 2010.
- Witte, Eberhard, Norbert Joost, and Alfred L. Thimm. "Field research on complex decision-making processes-the phase theorem." *International Studies of Management & Organization* 2.2 (1972): 156-182.
- Hofstede, Geert. "The cultural relativity of organizational practices and theories." *Journal of international business studies* 14.2 (1983): 75-89.
- Hofstede, Geert. "Cultural constraints in management theories." *The Academy of Management Executive* 7.1 (1993): 81-94.

# THE ROLE OF CULTURE, LANGUAGE, AND ETHICS IN GLOBAL BUSINESS

*Michael Ba Banutu-Gomez PhD, MSW, BA, TC, Prof.* of Management and Entrepreneurship, William G. Rohrer College of Business Rowan University

---

## Abstract

Global business is the key to creating a better economy. Businesses across the globe need to work together in order to survive. Businesses need an understanding of other countries through research and implementation. Companies which devote time and effort to adapt to the countries they plan to do business in will be successful. Businesses need to realize that it takes more than a good speaker or savvy manager in order to compete in global business. Companies need to successfully understand three important aspects of business before they enter a foreign market. The three aspects are culture, ethics, and language. Understanding other countries culture, ethics and language are invaluable to creating a successful business internationally. These three aspects are the learning foundation of entering a foreign market and without them there will be no way to succeed. It takes time and commitment for a company to learn and understand the culture, ethics, and language of a potential country. No amount of studying and research will be able to show the company the rules and norms a certain country lives by. These aspects of culture, language, and ethics can only fully be understood through firsthand experience. All the training and education a company injects into their employees is useless unless there is total commitment from the managers and employees to prepare for conducting business abroad. Some aspects of global business are similar to taking a class abroad. The reason you take a class in another country is to broaden your skills and improve your understanding of other places. The traditions of a countries culture are essential to the student's success in studying in that particular county. This is similar to the norms and cultural quirks which businesses must understand in order to be successful in other countries.

---

**Keywords:** Culture differences and adaptation, language and communication, ethics and decision making, and networking in business.

## Introduction

Culture can be defined as “the collective programming of the mind which distinguishes the members of one group or category of people from another.” Another definition is that Culture is defined as the specific learned norms of a group's attitudes, values, and beliefs (Daniels, et al, 2011). The differences between two or more cultures may create problems which make the business tough to manage. Therefore firms need to learn the rules of the game and make an effort to mimic the cultural values and norms to show the countries they are in that they respect their values and beliefs. Otherwise firms will be destined for failure.

From an ethical standpoint, a business that is abroad must follow the rules by the book. A business must accept and adhere to government laws and policies no matter what country a business is located in. But, there needs to be a balance of understanding from both the business and the country they are doing business in. Businesses must draw the line on certain ethical dilemmas such as how women in Islamic countries are viewed and treated. Businesses cannot expect to use the ethical principles from one country and have success in another county. There has to be a set of guidelines businesses must follow in order to meet

particular country's demands. Decision making tools are necessary to improve a company in foreign countries.

Speaking many languages in the business world is the foundation for communication across multiple countries. Not being able to understand your clients or foreign business workers will ultimately end your business. A company will not be able to perform because of this barrier and have no idea what is being asked or requested. People in different parts of the world have different interpretations and attitudes towards business located in the United States. It is important for an American business to realize that entering a foreign country without knowing how to speak the primary language of that particular country will be a huge barrier for entry. The citizens of the foreign country need to be able to communicate with any outside business trying to enter to grasp their purpose of entering.

### **Data Collection**

In order to acquire the information necessary for this research paper, the researcher was able to utilize local primary sources and the library's vast secondary sources. Using both primary and secondary sources allowed us to obtain in depth information from both angles on how culture, language, and ethics are three of the most important variables in an international business venture. Only after interpreting and analyzing the data, the researcher was able to successfully report the results.

To fully comprehend the influence of culture, ethics, and language on international business the researcher's main priority was to get a first person view on the subject by conducting an interview with a leader who is familiar with international business. Through an interview the researcher was able to establish how a leader or company views the importance of culture, ethics, and language when they are conducting business. Conducting the interview was the researcher's most valuable source when constructing this research paper. Obtaining a first hand or primary source gave the researcher ability to go beyond the books and articles to acquire a more in depth understanding on how crucial culture is in global business. The questionnaire consisted of questions that tried to make a distinction between ethics, language, and culture so that we could determine their value. This allowed researcher to clearly compare and contrast data collected from secondary sources. Asking questions such as "What cultural differences play into your decision to choose one country over another when it comes to establishing a presence in a foreign country? (i.e. type of government)" permitted us to evaluate a leader's view on what variables are most important.

### **Literature and Results**

Throughout the literature reviewed for this paper, one main theme occurred constantly. Culture, ethics, and language present a direct impact on the way businesses interact globally. Preparation is a key factor in the percentage of successful international organizations and unsuccessful ones. The manner in which organizations treat new customers and employees in foreign markets through business ethics differs in any given country. International organizations that have recently entered a new country's market know the difference it can make between having an outsiders point of view on the local language versus having a perspective from someone who has lived in the country. Traditions and culture can create clashes between employees and management and even ruining an organizations representation within the new country.

### **Culture Differences and Adaptation**

Culture differences between an organizations home country and the new international interest are far from an easy obstacle to overcome. Throughout the research there was a pattern of success for companies who learned the culture extensively especially in terms of how people interact with each other within the new country. "Not only do nonverbal cues help

us interpret verbal messages, but they are also responsible in their own right for the majority of the messages that make up human communication. This means that posture, hand gestures, facial expressions, eye contact, proxemics, and touching” (Gary P. Ferraro 2002, pg 8) have an impact on how people react to a new organization entering their country. All of these tendencies and nonverbal communication tendencies of other countries citizens and potential employees or business partners play a crucial role in the success of international organizations.

Of course not everyone in the world acts the same or has the same needs as the international business’s home country. Therefore businesses have to accommodate to their various surroundings based on the demand of society. Cultures vary throughout the world and change constantly. These changes and differences must be addressed by any organization attempting to conduct business. A specific company that has had continued success in recent years over many international ventures is Walt Disney. Walt Disney opened Disneyland in 1955 and within one year there were more than one million visits. Now there are near fifteen million visits each year. With Disney’s overwhelming success in the United States, the opportunity to expand and grow presented itself as a vital addition to their already impressive organization. Like any company, their goal is to seek out potential consumers around the world and meet their needs in order to gain a profit. They of course need to have the right tools for decision making to send employees overseas and the method in which to market their product in particular countries. A division in the company was created that actually lays out the blue prints to improve globalization around the world. This division is called Walt Disney International. They are constantly going to different countries trying to see what particular markets have interest in them. Trial and error occurs constantly because they do not know which aspect of their company fits best with the new country’s culture and with their own goals in terms of revenue. Disney needs to evolve and transform in order to achieve their goals, “more accountability and decision-making authority are being shifted to local managers so they can determine which Disney brand, franchises, and characters are most relevant and emotionally resonant to consumers in their markets” (corporate.disney.go.com). Only leaving their headquarters and visiting a possible new international opportunity is not enough. An American employee making an assumption on another countries culture based on a few visits has a high risk. Disney products need to replicate the type of culture that is already present in the new country in order for them to breed success. Their products must be designed and built as if they were created within that particular country. With the employment of local managers, Disney is able to learn specifically ways in which to improve sales by relating to the current culture. Disney has seen its share of success and failure in international business but still shows profits because of their discipline to doing research and learning from their mistakes.

In order for Walt Disney to be successful in other countries they need to actually take the culture and create new and inventive ideas that suit the country in which they want to do business in. Walt Disney, utilizing their Walt Disney International department’s research on Russian culture wanted to create a movie that would relate to Russia. “Disney’s first locally-made-Russian film, *Book of Masters*, an adventure story based on traditional local tales, opened to strong box office and positive reviews in late 2009” (corporate.disney.go.com/investors/annual reports). This film presented Russian ideals and had a strong cultural reference. Many Russian people can cherish it because it is their very own, similar to the reaction to *Snow White and the Seven Dwarfs* in America. It was exclusively designed to be successful within Walt Disney’s new international business venture and because they focused on Russian culture the movie was a success. Disney may have started in the United States but they are beginning to act like they have no one real home. With all the effort they are putting into research for international opportunity they are beginning to see the world as their playground. With Walt Disney now focusing on a global agenda, many countries are enjoying the magical experience they provide.

Disney may be a successful company but success just does not happen all by itself. Adapting to Russia's culture was not an easy task for Walt Disney to perform. Where it all started was Tokyo, where the first foreign park was built. It opened in 1983 and that's when the Disney Corporation knew it needed to continue its growth Disney knew it needed to provide its services across the world. They knew that if they located themselves in the East they could easily draw attention. It was an immediate success however if it wasn't for the wide popularity Disney would not be as successful.

When the Hong Kong Disneyland opened September 5<sup>th</sup>, 2005 it was not so successful. There were changes that need to be done in order for business to be successful. Jonathan Matusitz wrote an article about Disney's successful yet challenging globalization process in Hong Kong. He explains that there were four changes of labor practices that were needed to be in order for Disney to have its two feet planted in the ground. "From a globalization perspective, four major changes were made: (1) reduction of prices; (2) adaptation to local visitors' customs; (3) change of décors and settings; and (4) adaptation of labor practices". What wasn't working was that Disney's new park in Hong Kong "demonstrated too much Western cultural imperialism (Jonathon Matusitz, 2009, pg 2)." and needed to fix this situation by providing other means of pleasing the Chinese culture. The changes that were made are clear examples on how any company needs to look into and research about before they open an establishment. It shows that culture is an important aspect to remember when a company is to globalize is industry and venture across into another country. Disney's major problems were the labor practices. If the general population is not open and friendly then the people working in the park should not be up in your face and smiling all the time. Even though happy employees makes a happy customer, too much of a good thing can be bad. That was something Disney had to learn the hard way.

### **Language and Communication**

To discuss language and how it pertains to international business the researcher decided to research a company that does business internationally. The company the researcher chose to research to see how they manage language differences is called L-3 Communications. L-3 Communications is the sixth largest defense company in the United States, and is a leader and prime defense contractor in intelligence, surveillance, secure communications, government services, training and simulation and aircraft modernization and maintenance.

L-3 Communications Corporation has 101 business units worldwide and more than 60,000 employees. Their offices span to different countries like Australia, Canada, Germany, United Kingdom, and United States. In order to communicate with the different countries, there has to be a common language between the parties. Even though there are English speaking countries where L-3 conducts business, there are other countries that don't utilize the language as much. L-3 doesn't take the chance to go in to do business with another country and just hope the country speaks English along with their native language. The corporation takes into consideration the differences and thus makes proper adjustments and accommodation to make sure that there won't be language barriers. "Globalization has called for the use of one common language", that language is English because English speaking companies contribute to 40% of world output (Peng, 65-66). L-3 communication hires employees not only from US but from countries where they're doing business. Also hiring multi-language speaking employees as well as training helps to gap the language and communication barrier. L-3 Corporation realizes the need for understanding between employees that speak different languages and they take different actions in order to meet that need.

Starting with L-3's code of ethics and business conduct policies, they are done in different languages in order to communicate their policy to the non-English speaking

employees. They have especially dedicated website l-3code.com that is designed in different language where l-3 does business so that ethic policies can be reviewed and complaints can be made to the company. Very interestingly not only l-3 Communication Corporation acknowledges the difference in languages and how it's crucial in communication but they have a designated report on Code of Conduct in different countries where they do business. Because different countries have different rules the company employees need to be aware of those rules. The company's website has code of conduct for different countries like Australia, Canada, China, Denmark, Germany, India, Ireland, Italy, Korea, Netherlands, Norway, Singapore and United Kingdom. The Code of Conduct for different countries is different. For example the code of conduct for Korea includes information about bribery, Anti-corruption Act, gifts and entertainment with non-government persons, and fair completion. For Singapore the document covers things such as avoiding kickbacks/soliciting and receiving gifts and entertainment, avoiding bribery and improper payments, insider trading, avoiding conflicts of interest, maintaining accurate books and records, confidentiality of information, competition laws, drug and alcohol abuse and many other subjects and laws that pertain to that country. "As companies expand internationally and their foreign operations become more dispersed, language differences begin to influence inter-unit and intra-unit communication" (Rogerson-Revell, 2007, 2008). "To reduce the negative effects of language diversity, multinational companies (MNCs) have formulated language policies, that is, formal ways to decide which language is used in corporate communication and documentation" (Marschan-Piekkari, Welch, & Welch, 1999a). Such languages are chosen to make the communication and understanding easier. The language is important because many aspects of business have to be communicated through it. From institutional based view some examples include language training for local employees in countries other than the original country, training and development, recruitment and selection, and performance appraisals.

### **Ethics and Decision Making**

Ethical decisions in international business are paramount to the success of a company operating in a foreign country. There are two different views when it comes to companies making ethical decisions which are not "fiscally advantageous" for the company. The first view explains that making decisions which are socially responsible and ethical will lead to maximization in shareholder wealth in the long-run even if they are fiscally unfavorable to the company in the short-run.

Milton Freeman argued that corporate managers should be legally restrained from deviating from their proper role of maximizing shareholder value. Various positions – that corporate social responsibility is 'bad capitalism school', that weak corporate social responsibility is 'bad development', that capitalism can make 'hardly any corporate social responsibility', and that corporate social responsibility is nothing more than 'good capitalism' and therefore not worth thinking about in its own right – being discussed and debated (The Ethics of International Business, 1996, p. 563) . Many companies are switching their view of corporate social responsibility toward the stance of maximizing shareholder wealth even if the decisions made by the company do not directly increase profits. Other companies see corporate social responsibility as bad capitalism and a myth to maximizing shareholder wealth. "While the corporate world is increasingly seen to be articulating its regard for social responsibilities, critics continue to see this as more a myth than a reality, since corporate capital is, in the final analysis, interested in accumulation alone" (The Ethics of International Business, 1996, p. 563).

Coca-Cola is a world leader in the soft drink industry. The company's wholesome family brand image in the United States is very different in other countries such as India. Coca-Cola faced major criticism from the Indian country of Kerala after there was a depletion and degradation of the country's water table. The Coca-Cola plant was shut down

immediately and was blamed for the poor quality and quantity of drinking water available to farmers in Kerala. The bottling plant in Kerala has been shut down since March of 2004. This incident created unwanted criticism toward Coca-Cola from the most populous country in the world. Kerala demanded a ban of Coca-Cola in the state. A High Power Committee established by the state government of Kerala in India has recommended that Coca-Cola be held liable for Indian Rupees 216 crore (US\$ 48 million) for damages caused as a result of the company's bottling operations in Plachimada. ([www.indiaresource.org/news/2010/1003.html](http://www.indiaresource.org/news/2010/1003.html)) The criticism Coca-Cola faces is due their own negligence in choosing an ethically irresponsible way to create their product.

Coca-Cola has also faced criticism over the level of pesticides found in their products in India. The Coca-Cola products in India contained dangerous levels of lindane, DDT, malathion and chlorpyrifos. Coca-Cola said sales in India declined 11 per cent in the third quarter of 2003 due to "false" allegations that its soft drinks contained a high level of pesticide (business-standard.com/india/news/coke-sales-fall-11pesticide-controversy/159950/).

After facing criticism from India and pressure from neighboring countries Coca-cola decided to pledge to support the UN Global Compact. Coca-Cola changed its stance on corporate social responsibility from a second thought to "incorporated into every aspect of doing business." The UN Global compact seeks to promote "responsible corporate citizenship so that business can be part of the solution to the challenges of globalization" and work toward a "more sustainable and inclusive global economy" (Community-Coca-Cola Interface, 2007, p.106).

The interview with Charlie Fusco granted the researcher access to a firsthand view on the importance on fully understanding a markets language, ethics, and culture before embarking on a business venture. Mrs. Fusco is the owner and CEO of Synergixx LLC, a company with the slogan of "building your brand through direct response synergy."

Through the interview the researcher was exposed to her views on culture's effects on the marketing aspect of international business. Being in the international marketing business for over a decade Mrs. Fusco provided the researcher with a plethora of information. When asked about the importance of understanding your markets culture Mrs. Fusco replied, "successfully marketing foreign products is no simple task and requires a vast amount of information about a countries overall culture" (Fusco, 2010). Does Culture Matter provided additional information on Mrs. Fusco position when the authors stated, "An understanding of how culture differences affect international marketing decisions is important to a firm's external operation. It can be used to predict strategic moves and response of competitors and hence design effect competitive strategies." (Tse, Lee, Vertinsky, & Wehrung, 1988, p. 81).

### **Networking in Business**

Networking is essential in business whether it be local or international. Through this research the researcher was able to determine the importance of networking in specific examples of such as "International firms collaborate with local firms in emerging BRIC countries to obtain exposure to their consumer markets and local firms collaborate with international firms for an introduction to the international business turf" (Gupta, Navare, & Meleware, 2010). Mrs. Fusco believes her ability to network is her key tool in gaining a competitive edge over her competition. When asked what culture differences play into your decision to choose the market with the maximum potential, Mrs. Fusco responded "Through many years in this business I have built a network of colleagues that I seek advice from whenever I am determining which area would provide the best chance for success. Their input on current values and trends in their own market has been the deciding factor for me on countless media buys." (Fusco, 2010). The interview with Charlie Fusco gave the results

desired by the researcher with determining of the vital aspects of trying to penetrate a new foreign culture.

### **Discussion and Implication of Culture, Language, Communication, Ethics and Decision Making**

Culture differences may be the most overlooked factor when it comes to doing business globally; however in many cases it can make or break an organizations success globally. Cultural differences exist in almost every place on Earth. Even in the United States the difference from the east coast to the south is obvious. From traditions to food to religion, cultures differ tremendously across the globe and many times businesses overlook this.

After researching about Disney and the problems they faced when entering a foreign market companies can now be warned. The lesson learned is that even a good thing in one country can turn into a bad thing somewhere around the world. To fix the problems that were occurring was simple. Have a theme park that directly reflects the daily lives of the Chinese culture. That means make them feel at home. Adaptation was the most important part of providing for the Chinese. For example, here in America we celebrate New Year's Eve. The Chinese culture celebrates their own holiday. Therefore, "Disney's Chinese New Year, are shown in the park to celebrate main Chinese festivals" (Jonathon Matusitz, 2009, pg 2). This shows Disney not changing the park but providing a better atmosphere for the Chinese culture to relate to and understand. They need something to grab hold of and be part of so they can feel somewhat astonished that their expectations are right on target. Otherwise they would feel confused and lost while also clearly seeing the Western customs cared over. Disney tries to make the Chinese community feel that this park is special for them and unique. That was their goal for combining cultural traditions into an international worldwide company. Even a company like Disney can have problems because it is so hard to pin point every little detail. That was the risk they took and it made them see clearly what needed to be done.

It is easy to overlook cultural differences when beginning to extend an organization globally. Many businesses solely look at numbers when deciding if it may be a good decision to enter a global market. From the research done, it seems to be the biggest mistake for a business looking to expand into a global market to overlook the possible cultural differences within that market. Yes the numbers matter especially when deciding if it may be opportunistic for a business to enter a new country, but it is the cultural differences that will either bring success or hinder a company's ability to obtain that same success. Cultural differences range in a variety of things including some of the simplest of things like greeting an individual. In the United States, greetings can be seen as too casual and inconsiderate. Many countries, including some in Africa prefer a more in-depth greeting, one that shows much more respect toward the individual.

Mistakes that are made when entering a global market can last a lifetime. A company's reputation can be ruined with just one mistake. "In 1983 Columbia pictures produced a four-hour movie set In Egypt that resulted in the banning of all Columbia pictures in Egypt. The Egyptian authorities were offended by the numerous inaccuracies that included accent (Pakistani), clothing (Moroccan), and behavior (American). The late Egyptian president Gamal Abdel Nasser, for example was portrayed publicly kissing his wife- an unacceptable act in Egypt and in many other countries (Ricks, David A., 1993). It is so important to understand everything about a countries culture before beginning to do business there because just one overlooked detail can put a close on an entire project. The way in which Columbia pictures conducted their business in Egypt led to a complete ban in that country. Because Columbia pictures did not do research on the way in which the Egyptian culture sounds, looks, and behaves, they failed their business venture into Egypt. Lessons like the Columbia Pictures incident serve as examples for organizations doing business internationally. Putting these attributes that people actually care about is detrimental to any business.

Customers are the number one priority and without their expectations met they will not be happy. If the customer's expectations are not met then there needs to be new ways to discover how it will be. Questions a business must ask themselves is what ways can we improve our business and in the cheapest way.

Businesses entering a global market must understand that while some behaviors may seem like minor details to the organization, they may actually mean much more to the local people. Treatment of employees is essential to keeping a business successful. Many businesses and organizations in the United States give employees coffee breaks at different times in order to keep the organizations efficiency as high as possible. Unfortunately carrying that same policy over into a new venture in another country may not work, as was the case for General Motors of Canada. "General Motors of Canada reported that it sustained a forty-seven day strike during the 1967 contract negotiations over the issue of the coffee break. This is a ten minute rest period scheduled twice each day at all plants. It is a complete shutdown of all operations – an uneconomic practice compared with the rotating rest period, which the company favored, where only a small number of workers are away from the lines at any given time. In the end, management capitulated to the unions on this issue because the workers had become so emotional and adamant over it. Management stated that there was no compelling rationale to the workers position; it was something that they customarily expected and valued" (Kujawa, 1971). In the case of General Motors of Canada, the organization overlooked the value of a break between employees. The employees in Canada felt strongly enough about their breaks with each other that they went on strike. In America it might be unheard of for a group of workers to strike due to a coffee break issue but other cultures value the unity experienced in one shared coffee break.

Drawing lessons from businesses doing businesses globally including Walt Disney, it is clear that research, preparation, and training all play crucial roles in the success of an international business venture. Training may very well be one of the most important steps a business must partake in if they are expecting success. By making people in a business aware of how another culture behaves and interacts, businesses are lowering their overall risk. A good lesson learned and one that many businesses doing business globally constantly partake in is international training. With employees of a company well aware of culture tendencies, businesses are becoming better prepared for new global business. Businesses must be comfortable enough to work within other countries and in order to do so they must do their homework and study cultures so they can adapt to their new surroundings. First impressions made between two potential business partners across countries can make or break a global business. It is important to give international business partners the respect they deserve. Not only from the perspective of the businesses home culture, but that of the new business partners culture as well. "Even the rejection of a cup of coffee can cause major problems. While a very profitable opportunity was being negotiated, one US executive innocently made the mistake of refusing a Saudi Arabians friendly offer to join him for a cup of coffee. Such a rejection is considered an affront in Saudi Arabia. Naturally, the Saudi became much less sociable and the negotiation process was far less successful than it might have been" (Ricks, David A., 1993).

Culture is the make-up of society and therefore should not be changed or persuaded to change by other countries or organizations. It is important to also realize that with every culture, laws and ethical issues will be considered because of the way particular societies practice. Therefore studies conducted must be carefully acknowledged in order to help businesses implement the best strategy for doing business internationally. Not every company will be successful upon entry to a new market. A foreign company must be strongly connected with the native company so that there is a strong relationship. Two countries need to have similar perspectives about their overall goals and having research on a countries culture will certainly benefit an international business looking to expand.

Starting from the beginning,” language, as the generally agreed-on, learned symbol system, used to represent the experiences within a geographic or cultural community” (Samovar, Porter, & Jain, 1981). From gathering information about language and its effect on international business, we can conclude that without a common language or a communication policy business can’t exist. From the information we gathered from L-3 Communication Corporation we can conclude that language and communication is very important when stepping into outside countries to do business. The results from the research we did from L-3 communication company were first that you had to make policies and procedures in every language where you are selling your product or service, second is that you need to hire bilingual employees and third is that you have to make the code of conduct clear for every country you are doing business.

L-3 communication decided to put up the policies and procedures in the different languages where they do business. They put these documents online so that they can be easily reached by anyone in any country and you don’t have to have the knowledge of the English language to understand what the policies are. Another important factor we learned about language and communication international businesses is that you need bilingual employees that speak both English, in L-3’s case, and the language where they are doing business internationally, for example Korea. “Scholars have argued that Multi-National Companies should use a common corporate language for internal communication and local language(s) in host country market(s). This strategy requires a substantial portion of employees to be bilingual” (Van Den Born, 2010). Another very important piece of information we have learned from L-3 Communication Corporation is the importance of understanding different cultures and code of ethics and behavior when entering other countries for business. On the company’s website they listed all the countries where they do business and they compiled files about each country and the important information in regard of code of conduct and behavior. We have discussed in class the importance of understanding culture and proper behavior when it comes to doing business internationally in other countries. L-3 Communication Company has done all the things mentioned above in order to make the communication and language barrier and issues smoother.

Some further data that could be collected in order to be able to do more research on the topic of language and how it affects international business, we would have to take other international companies and research how they manage this subject.

According to Mike W. Peng of Global Business, ethics is defined as the principles standards, and norms of conduct that govern individual and firm behavior. Ethics is part of both informal institutions and part of formal laws and regulations. One major problem with ethics is the discrepancy between actions and behaviors which are deemed unethical yet not formally illegal or against the law. This gray area is where a company’s business rules must cover what is ethical and what is unethical. The grayness surrounding ethics throughout the United States companies may seem immense, but when corporations go global these ethical concerns are magnified greatly.

Companies which decide to go international must decide how they are going to choose to manage their ethics in foreign countries. International companies must be able to manage what the company believes is ethically correct without disrespecting the ethical ways of the foreign country. The thin line company’s must tight rope is essential to the success of the company in other countries. According to Peng, companies use one of two views on ethics in other countries. The first view is called ethical relativism, which could be defined as conforming completely to the ways of the country they are in. If a country does not eat beef, we do not eat beef, if the country does not allow women to work; we don’t allow women to work. The second view is called ethical imperialism. Ethical imperialism says, “There is only one set of Ethics, and we have it.” This view takes the parent countries views on ethics

and applies them to other countries because what is ethical in the United States is ethical in France is ethical in Egypt.

Giant multinational companies such as GAP, Nike, Coca-Cola, and Wal-Mart are always under scrutiny from the public eye. For giant companies, making decisions which are unethical seem very easy because of the financial benefits that result from their choices. For example, a company may realize that dumping their waste illegally into nearby water sources and settling a potential lawsuit will be cheaper than the cost of properly disposing of their waste. Companies who take the easy way out to increase profits are not ethically responsible. There will be short-term benefits to the company's decision to illegally dump which will increase profits and lead to maximization of shareholders wealth. A company which is revealed to have been knowingly dumping in a foreign country will see decreases in sales, profits, and see their image destroyed. The short-term success will be ruined by a company's lack of ethical responsibility.

Corporate social responsibility is a key concept of ethics in international business. Should a company make fiscally irresponsible decisions in order to help the environment or give back to the community? This question epitomizes the definition of corporate social responsibility. Many people oppose corporate social responsibility due to the fact that it is 'bad' capitalism. Those who have this view see corporate capital as the final analysis and this alone determines the success of the company. Coca-Cola found itself hated in the most populous country in the world due to their ethical negligence in how they operated their plant in India. Coca-Cola now faces an uphill battle to redeem its tarnished brand image in India in order to stabilize sales in this precious country.

Mrs. Fusco is a woman who has an abundance of experience in international business and the researcher's interview with her awarded detailed results to interpret and draw lessons from. Via her instructions the researcher now knows the importance of fully understanding your markets language, ethics, and culture before one decides to penetrate a foreigner market. Her reference on a cookware product from Germany that succeeded to effectively penetrate the Australian, New Zealand, and American markets due to their development of specialized commercials for each country was insightful. By specializing each commercial for each countries preference in food and language they demonstrated how valuable creating a specific marketing strategy for each culture can be. In general, culture differences should be the main focus when planning for international marketing. Conversely, being able to analyze culture differences is not a simple task and cannot be done effectively from simply secondary sources. From the interview we were able to conclude a company must network with those from the country or culture they are attempting to venture in to if they wish to gain an in-depth sense for the foreign countries culture. As Mrs. Fusco said, "networking is the key when you are trying to penetrate an unfamiliar culture" (Fusco, 2010). The interview allowed researcher to relate the theories and how we can put them into practical real life situations. Comparing theories from both Mrs. Fusco and secondary sources was crucial in understanding their implications.

## **Conclusion**

Not everyone has the same language ethical code of conducts and culture, or the same values. Any company who plans to conduct business overseas or abroad needs to know these fundamental aspects of a particular country or more before they embark on a business trip. English is not the universal language around the world or handshaking with a right hand is another norm, because it's not. It is important to learn every single detail to properly present yourself respectfully in front of another business representative. Being rude is the last thing you want to be so you must be prepared. Therefore, abrupt surprises should not occur if a company has thoroughly implemented their time to have a full awareness towards which who they're doing business with. Sudden surprises such as miscommunication could occur if and

when your company does not know background information. Information about how attitudes, languages, and perspectives may change depending on where you are in the world. So in order for a business to successfully grasp what they need to do to accomplish their goals they need to be able to understand the cultural differences within the country they are entering. International business depends on those aspects and is a necessary tool of the trade for being successful abroad. The mentioned businesses showed great examples of failure to explain in detail what they needed to do to overcome their problems and make a successful turnout. The companies also had positive business plans that were enough to make the changes necessary to make the country they were working in accepted. International business is a great way for new and existing companies to enter new markets but without the research and or firsthand experience of how the each country operates there is no way to tell how entering or establishing will result.

### **Acknowledgments**

The researcher would like to thank students in his Managing International Business class who took an active part in collecting data for this research at Rowan University for their insightful comments of this paper.

### **References:**

- Daniels, J. D., Radebaugh, L. H., & Sullivan, D. P. (2011). *International Business Environments and Operations* (13th ed.). Upper Saddle River, New Jersey: Prentice Hall.
- Ferraro, Gary P. (2002) *The Cultural Dimension of International Business*. Massachusetts: Prentice Hall
- Fusco, B. (2010, November 8). The Importance of Culture, Ethics, and Language. (B. Dock, Interviewer)
- Gupta, C, Navare, M, Meleware, Initials. (2010). Investigating the implications of business and culture on the behavior of customers of international firm, *Industrial Marketing Management*, 3, 12-23. Retrieved from: Google Scholar Database.
- Kinnear, J. (1995). "The ethics of international business." *Digital Speeches of the day* 61(18), 651. Retrieved from Academic Search Premier
- Kujawa, Duane. (1971) *International labor relations management in the automotive industry; a comparative study of Chrysler, Ford, and General Motors*. New York, Praeger Publishers
- Marschan-Piekkari, R., Welch, D., & Welch, L. (1999a). Adopting a common corporate language: IHRM implications. *International Journal of Human Resource Management*, 10, 377-390
- Matusitz, Jonathon. (2009). *Disney's Successful Adaptation in Hong Kong: A Globalization perspective*. *Asia Pacific Journal of Management* 1-15.
- Peng, Mike W. (2011, 2009) *Global Business, 2<sup>nd</sup> Edition*. Ohio: South-Western College Pub
- Raman, K. (2007). Community-Coca-Cola Interface: Political-Anthropological Concerns on Corporate Social Responsibility. *Social Analysis*, 51(3), 103-120. Doi:10.3167/sa.1007.510305. Retrieved From Academic Search Premier.
- Ricks, David A. (1993) *Blunders in international business*. Published: Cambridge, Mass., USA: Blackwell Business
- Rogerson-Revell, P. (2007). Using English for international business: A European case study. *English for Specific Purposes*, 26, 103-120
- Samovar, L., Porter, R., & Jain, N. (1981). *Understanding intercultural communication*. Belmont, CA: Wadsworth
- Tse, K, Lee, H, Vertinsky, R, & Wehrung, A. (1988). *Does culture matter? A cross-cultural study of executives choice, decisiveness, and risk adjustment in international marketing*. Birmingham, Alabama: American Marketing Association.

Van Den Born, F., & Peltokorpi, V. (2010). Language Policies and Communication in multinational companies. *Journal of Business Communication*, 47(2), 97-118. Retrieved from Business Source Premier Database

# EXPERIMENTAL MACROECONOMICS, A CHALLENGE FOR THE FUTURE?

*Helena Chytilova, Ing. Ph.D., MA*

University of Economics, Prague, Faculty of Economics, Czech Republic

---

## Abstract

Standard econometric approaches have been many years a well-established workhorse in economic research. However, widespread application of macroeconomic models with explicit micro-foundations since rational expectations revolution in 1970 gave birth to experimental macroeconomics recently, where controlled environment might be used to get insights regarding the effects of alternative institutions and policies with direct implications at the aggregate level. This article aims to enrich present discussion about appropriateness of this method, since a very few studies deal with this new phenomenon among others Ricciuti (2008), Duffy (1998). We claim that experimental macroeconomics shouldn't be omitted as one of the possible methods in economics, since individual and aggregate outcomes might be assessed. As a result, it should represent complement to standard econometric techniques. Furthermore, illustrative case study is used to demonstrate that macroeconomic experiments are not a distinct ones from microeconomic ones and represent powerful instrument for evaluation of micro-founded macroeconomic models.

---

**Keywords:** Macroeconomic experiment, controlled environment, aggregate outcomes, external validity

## Introduction

Standard econometric approaches have been many years a well-established workhorse in economic research. Recently, experimental economics has gained considerable standing as an alternative method. However, a very special subfield called experimental macroeconomics is still very unheard of, despite being utilized by many well-known economists as mentioned in studies of Ochs (1995), Duffy (1998) and Ricciuti (2008).

Experimental macroeconomics as a relatively new discipline aims to address aggregate economic phenomena with help of controlled laboratory methods in which specific assumptions and predictions of macroeconomic models are tested. Without rational expectation revolution (Lucas 1972), development of experimental macroeconomics would have been impossible. Since then, macroeconomic propositions started to be based on individual maximizing behavior, given the constraint. These micro-foundations of macroeconomic models opened the space for experimental macroeconomics, which observes interaction of individuals in artificial environment followed by individual and aggregate outcomes. Based on that, powerfulness of micro-foundations of macroeconomic models might be assessed.

Although there are many possible insights to be gained, still experimental results are met with skepticism with regards to macroeconomic implications from rather insufficient experimental samples. As argued by Sims (1996, p. 107) "Economists can do very little experimentation to produce crucial data. This is particularly true of macroeconomics."

This article aims to contribute to relatively new research, outline relatively new subfield of experimental macroeconomics and disprove common misleads about experimental macroeconomics. After delineation of position of experimental macroeconomics within the laboratory economics, identification of the main burning downsides of macroeconomic

experiments mentioned by critiques is the case. Based on that, arguments in favor of this new method are discussed in order to alleviate frequently mentioned deficiencies of experimental design. Furthermore, illustrative case study is used to demonstrate that macroeconomic experiments are not distinct from microeconomic ones and represent powerful instrument for evaluation of micro-founded macroeconomic models.

### **The Nature of Experimental Macroeconomics**

In order to understand the true nature of experimental macroeconomics, its position within the laboratory economics has to be delineated. According to Ricciuti (2008) two classes of experiments are present in macroeconomics. The first approach considers an experiment which concentrates on single market. Not only it is easy to apply *ceteris paribus* condition in case of a single market, but this approach is more consistent with the current character of macroeconomic modeling, based on micro-foundations. As a result, most experiments fall rather within this category. The main purpose of these types of experiments is to test microeconomic predictions and assumptions of macroeconomic models with direct implications at the aggregate level. This type of experiment may be summarized in vein of Duffy (2011, p.6) who claims: "In practice, experimental macroeconomics is not distinct from microeconomic laboratory experiments, there is just a different focus or interpretation. A macroeconomic experiment is one that tests the predictions of macroeconomic model or its assumptions or is framed in the language of macroeconomics." Even Ricciuti (2008) emphasizes that it is almost impossible to find a substantial difference of macroeconomic experiment over microeconomic one, since these type of experiments are based on individual behavior of agents and the only macroeconomic feature is analysis of aggregates such as inflation, unemployment, etc. The second approach was firstly applied by Charles Plott in several of his experiments and is the one, which has a real macroeconomic content due to its focus on inter-relations between several markets and the spill-over between them. This Walrasian type of the laboratory experimentation is related to examination of the system effects, equilibration and spillovers between markets. To sum it up, although laboratory economy is not as complicated as the real economy, its simplified version may provide clue whether the model can or cannot be applied to more complex real world. If a simplified version of the economy in the laboratory does not reject the model of macroeconomic behavior, it means that the model may be actually plausible.

Precise origins of macroeconomic experiments are rather not clear according to Duffy (2008). Explicit statement of the existence of macroeconomic experiment within economics are mostly dated to Robert Lucas's (1986) invitation to macroeconomists to conduct controlled laboratory experiments to cope with coordination problems, which remained unsolved by macroeconomic theory. However, Vernon Smith's (1962) double auction experiment is prevalently considered as the first macroeconomic experiment conducted ever. Sometimes it is pointed to Phillips' (1950) experiment, which used a colored liquid-filled tubular flow model of the macroeconomy, which however did not involve human subjects. Additionally, John Carlson's (1967) experiment, which aimed to examine price expectations in stable and unstable versions of the Cobweb model is also one of the first possible attempts.

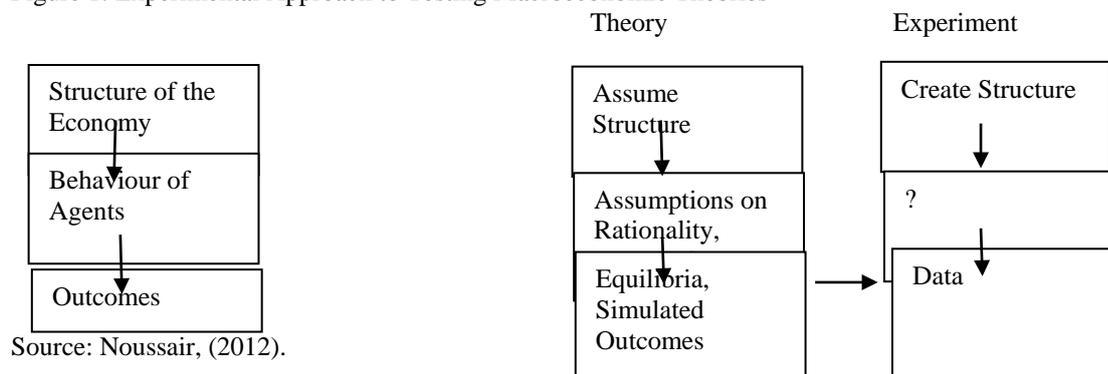
### **Possible Insights and Common Downsides of Macroeconomic Experiments**

The basic difference between experimental approach to testing theories and standard macroeconomic modelling might be illustrated with help of Figure 1 below. According to Noussair (2012) both methods have the same chain starting from the structure of the economy, followed by agents' behavior with outcomes at the end. The difference lies in the way how to reach the final outcomes. Whereas theoretical models simply assume the structure of the economy, macroeconomic experiments set up the structure of the economy in the laboratory environment. Secondly, in case of theory the behavior of agents follows from assumption

given by the structure of the economy. In case of macroeconomic experiment it ensues from the interaction of individuals and their decision-making in artificial environment.

Lastly, in case of theoretical models simulated outcomes and equilibria are outputs which might be compared with the data acquired on the basis of the laboratory experiment.

Figure 1: Experimental Approach to Testing Macroeconomic Theories



Source: Noussair, (2012).

The basic advantage of experimental economics as opposed to real data is that it offers full control over parameters in the lab, since the experimenter is flexible in modelling and can set parameters in a desirable manner and direction. As a result, precise information about the factors, which changed during the experiment are available, (Ricciuti, 2008). This is also connected to micro-level causal relationships, since experimenter can directly isolate phenomenon which he aims to test via parameters setting. Moreover, unaccounted factors are highly eliminated. Causal relationship in terms of so called internal validity is secured by specification of experimental group, which is exposed to tested effect and control group, which is not exposed to this effect, but otherwise groups face the same conditions *ceteris paribus*. Critiques point out to Duhem-Quine problem related to under-determination (and impossibility to secure all *ceteris paribus* condition), due to which it is highly tough to secure internal validity and thereby examine given phenomenon. However, this is general problem in experimental economics, (See for instance Guala 2005). Furthermore, if we make comparison of experimental data with field data, they cannot be described by the same degree of internal validity in terms of causal relationship, (Duffy 2008). Additional argument, which goes in favor of laboratory experimentation is replication of the experiment (with adjustment) if doubts about internal validity emerge, (Smith, 1982). Concerns about internal validity are common for both microeconomic and macroeconomic experiments together. However, what are the most striking methodological concerns related directly to experimental macroeconomics?

The most frequently mentioned issue, which is considered to be a delicate problem, is external validity. External validity refers to “inferring from the special circumstances created in the laboratory to the phenomena that takes places in the real world”, (Guala 2005, p.141). Firstly, external validity is also common for microeconomic experiments. As a result we should delineate external validity in case of macroeconomic experiments, which is rather related to the problem of sample size. Secondly, artificiality seems to play also some role, but that is also the case for microeconomic experiments. As opponents point out, substantial internal validity at the expense of external validity may lead to high artificiality of experiment, whose results is impossible to apply in the real world, (Starmer 1999), Cartwright 2007). For instance Lowenstein (1999) points out that economists “have not been able to avoid the problem of low external validity that is the Achilles heel of all laboratory experimentation,” (Lowenstein 1999, p.3).

To clarify the former, macroeconomic experiments are described by rather small sample size. Involving small groups of experimental subjects interacting for a short period of time represents serious problem according to opponents, in order to utilize experimental outputs and derive implications for the real world. The analysis of aggregate economic

phenomena or even testing of predictions or assumptions of models is met with some skepticism due to non-representativeness of the laboratory experiment from macroeconomic point of view. However, with the current trend of macroeconomic models with microeconomic foundations, the issue of number of subjects may not represent a problem. Classes of macroeconomic experiments centered on single market are considered to be rather simplification of the real economy, which is aimed to test exactly microeconomic foundations of macroeconomic models. In other words, definition of macroeconomic experiment itself provides justification for acceptable external validity, consistent with the current trend of macroeconomic modeling. Moreover, their scientific strength is in building on economic theory, (Ricciuti, 2008, Duffy, 2008). Additionally, studies of Smith's double auction (1962), Forsythe (1982), Plott and Sunder (1982), Sunder (1995) with partial equilibrium approaches and Lian and Plott (1998) with a general equilibrium approach, generally conclude that small population of 5-10 subjects with enough trading experience is sufficient in order to achieve efficiency consistent with competitive equilibrium in various market environments. Statement about not necessarily large sample size is documented by various experimental studies of macroeconomic nature like Fehr a Tyran (2008), with number of subjects  $n=76$ , Fehr, Kirchsteiger, Riedl (1998),  $n=52$ , Adam (2007)  $n=30$ , Duffy a Fisher (2005),  $n=10$ , Arifovic, Sargent, (2003),  $n=12$ , Van Huyck, et.al (1994),  $n=40$  and others. Additionally, we should not rest on too restrictive definition of macroeconomic experiment, since there are many experiments like coordination issues, which have purely microeconomic content with macroeconomic flavor as noted by Duffy (2008).

To clarify the latter, internal validity at the expense of external should not be considered as serious problem, since the degree of external validity is dependent on type of the experiment. Schramm (2005) emphasizes that highly theoretical experiment doesn't necessarily require high degree of external validity, but rather of internal validity in order to secure strong causality. In this case, experiments are used to test performance of theories in light of working institutions or to test the initial assumptions of the theory. The other side is represented by experiments designed to test-bed policies. In these experiments external validity is of a major importance. This is usually common, when some new institutional design is tested and requires unique practical skills, which are out of student's domain.

### **Illustrative Macroeconomic Experiment**

Robert Lucas's (1986) invitation to conduct macroeconomic experiments was followed up on by many influential economists, recently Lim, Prescott and Sunder (1994), Marimon and Sunder (1993), (1994), (1995), with a consequent expansion of macroeconomic theories tested in the laboratory, among others by Duffy and Fisher, (2005), Van Huyck et al. (1990), (1991), 1994), Arifovic, Sargent (2003), Bernasconi, Kirchkamp (2000), Deck (2004), Duffy, Ochs, (1999), (2012), Fehr and Tyran (2007), Fehr and Tyran (2008), Heinemann, Nagel, Ockenfels (2004), Hey (1994), Noussair, Plott, Riezmann (2007), Lei, Noussair, (2007) and others. There is infinite variety of macroeconomic experiments, ranging from Walrasian competitive equilibrium, asset price bubbles and crashes, bank runs, sunspots, Keynesian coordination failures to speculative currency attacks and contagions.

This study will restrict attention to microeconomic experiment with macroeconomic flavor in vein of Fehr and Tyran (2001) in order to further support afore-mentioned methodological discussion and provide possible justification for conducting macroeconomic experiments. Experiment is based on  $n$ -player pricing game with unique equilibrium and strategic complementarity in vein of Haltiwanger and Waldmann (1989), where the best reaction of individual in order to maximize profits is to set price, which is positively related to the average price set by other  $n-1$  players. The game has 40 rounds plus one trial period, with a group size of  $n=4$ . Experiment is divided into a pre-shock and a post-shock phase, all of which has  $T=20$  periods. Fully anticipated negative monetary shock is implemented during

the game, which is common knowledge to participants, (reduction of money supply from  $M_0=42$  to  $M_1=14$ ). Treatment groups received payoff functions, which provide them with information about their pricing strategy. Pay-offs of participants are expressed either in nominal or real terms. In order for subject to decide correctly about the price of his product (price lies between 1 and 30) in the nominal environment, he needs to re-count nominal pay-off into the real pay-off. The nominal pay off is given by  $P_{-i} \cdot \pi_i$ . In order to compute real payoff, subjects have to divide their nominal payoffs  $P_{-i} \cdot \pi_i$  by  $P_{-i}$ .

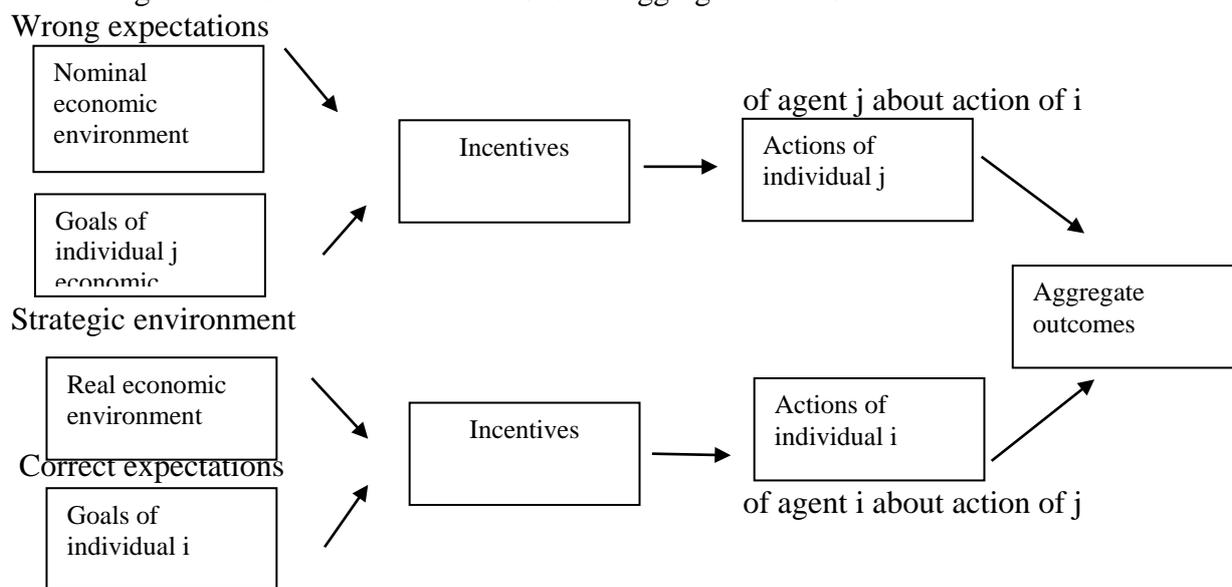
The real pay-off of subject  $i$  is given in Fehr, Tyran (2001) by:

$$\pi_i = \pi_i (P_i, P_{-i}, M) \quad i=1, \dots, n$$

where  $P_i$  stands for nominal price,  $P_{-i}$  is the average price of the other  $n-1$  group members, and  $M$  is nominal shock variable. Subjects are informed about payoffs of other subjects in the group, since  $x$  and  $y$  types players are present in nominal treatment. The need to recount nominal pay-off into real pay-off is a cognitively challenging task, which is the main barrier to optimal behaviour. This experiment aimed to test the ability of subjects in the economy to adjust to the equilibrium after full anticipated negative monetary shock depending on whether they face nominal or real environment. Results of Fehr and Tyran show that subjects, which have to face money illusion in form of nominal pay-offs adjust in much slower way in line with strategic complementarity. In other words, subjects (despite their rationality) have tendency to set prices close to the pre-shock price, consistently with development of the average price of  $n-1$  players if only few players in reality suffer from money illusion. This proved that money illusion is persistent phenomenon, causing substantial nominal rigidities. Consequently, implications are derived for the economy at the aggregate level, strengthening thereby New Keynesian predictions. In line with previous methodological discussion, question arises, whether it is possible to derive implications from such laboratory experiment at the aggregate level. Based on afore-mentioned methodological discussion, the following comments are worth mentioning with regards to laboratory experiment used for our illustrative purposes.

Firstly, one dimension concerns the well discussed number of subjects under scrutiny due to the belief that it is difficult to approximate macroeconomic world through a laboratory experiment with a small number of subjects. However, this macroeconomic experiment rests on micro-foundations in line with assumptions of New Keynesian economics built in experimental design. Figure 2 demonstrates more closely derivation of the aggregate level effects from individual behavior.

Figure 2: From individual effects to the aggregate effects



Source: Tyran, (1999).

Microeconomic foundations of experiment are initially based on artificial economy with strategic complementarity, where pricing behavior of individuals is tested after the shock. Figure 2 shows that decision-making of individuals is tested in two different environments, based either on nominal or real pay-offs. Subjects  $j$  are expected to form wrong expectations about behavior of the other players  $i$  in an environment of nominal pay-offs. This is given by individual money illusion. Additionally this movement in wrong direction is multiplied since nominally confused individuals are followed even by rational subjects in an environment described by strategic complementarity. According to Fehr and Tyran (2001), these multiplied effects of individual money illusion are called indirect effects of money illusion. On the other hand, the control group in real environment is expected to form correct expectations about actions of  $j$ . Experimental results in this study proved the presence of strong indirect effects of money illusion, which are associated with nominal rigidities. This proof strengthens even more microeconomic foundations of New Keynesian theory and is additional reason for slow adjustment at the aggregate level, (others are imperfect information, implicit contracts, etc.). This is shown further in diagram, where actions of individuals are followed by aggregate outcomes. As a result the sample size need not be the relevant issue, as already suggested above and conclusion about nominal rigidities might be generalized at the aggregate level. Moreover, as emphasized by Duffy (2008), evidence from many auction experiments since Smith (1962) suggests that equilibration to competitive equilibrium occurs reliably with just a few individuals on supply or demand side market, so a large number of subjects need not be a necessary condition.

Secondly, this experiment enables the collection of a type of data less directly observed in the field and even of better quality in terms of causation as suggested by Duffy (2008). For instance, the examination of expectation formation after the shock is valuable output, which cannot be obtained otherwise. Additionally, it is extremely difficult to collect individual information sets regarding the actual price in the pre-shock and the post-shock phase in the field, needed for comparison with ideal equilibrium prices to identify nominal inertia, (Tyran 1999). Also identification whether the monetary shock is anticipated or not is a serious constraint. The experimental method (as opposed to field data) possesses an immense advantage in its control over the environment and information conditions. This is closely associated with causal relations (and internal validity), which are directly under experimental control, where the frame can be easily set by specification of treatment conditions as emphasized by Fehr and Tyran (2001), (2005). In this case environment of nominal and real pay-offs was created in experimental design. Examined phenomenon is secured by specification of treatment condition with possible elimination of all other factors, which should be constant, (See Table 1 for more details). Experimental group faces environment of nominal pay-offs, which represent the need of subjects to cope with some barrier, i.e. the need to recount nominal pay-off into the real pay-off. On the contrary, control group has to work with an environment of real pay-offs when making decision about the price of production. This does not represent any cognitive barrier and subjects should be pretty comfortable in this environment. When keeping other factors constant, we are able to examine phenomenon of confusion by nominal values by comparing the difference between these two examined groups. Since otherwise equal conditions are secured for both groups with sufficient elimination of all other effects, we may consider causal relation to be strong enough. This method “allows a dramatic reduction in the number of auxiliary hypotheses involved in examining a primary hypothesis”, thereby reducing Duhem-Quine problem as emphasized by Davis and Holt (1993, p.16).

Table 1: Treatment Conditions

	Treatment	Other factors
Experimental Group	Nominal pay-off	Constant
Control Group	Real pay-off	Constant

Source: Fehr, Tyran, (2001), Guala (2005).

Additionally, objections might be raised regarding the external validity of experimental results. However, in the case of the more theoretical character of the experiment examined in this case, there are fewer objections against lower external validity, which is supported also by study of Schramm (2005). In case of these experiments internal validity is predominant.

### Conclusion

Experimental macroeconomics is becoming increasingly popular method used even by well-known economists for evaluation of various economic phenomena. Like every alternative method even this field is under scrutiny of opponents, who point out that validity of experimental outputs might not be satisfactory. This article tried to tackle the most burning methodological issues of experimental macroeconomics. Consequently, illustrative case study follows, which provides further justification for conduct of macroeconomic experiments. Study shows that although economists need to be careful in making generalizations based on the results of an experiment that involves a small number of subjects, still less objection should be made against using experiments in order to test predictions of macroeconomic models based on explicit micro foundations. These experiments might provide guidance for how subjects perceive examined phenomenon with consequent generalization. For instance, in the economy with multiple equilibria it might indicate what equilibrium subjects consider as more relevant. Additionally, experimental data should be understood as a complement to standard econometric analysis of field data if there is no possibility how to gather some specific data or if field data do not possess the character, which is desirable for examination of specific phenomenon. Indeed, experimental data offer possibility, how to secure sufficient internal validity in terms of micro-level causal relationships and exhibit better characteristic in this sense than standard field data. Last but not least, we have to bear in mind in vein of Duffy (2008) that all experimental work should be judged by its findings and not deficiencies, since all empirical methods have their strengths and weaknesses.

### References:

- Adam, K. Experimental Evidence on the Persistence of Output and Inflation. *Economic Journal* 117, pp. 603-636, 2007.
- Arifovic, J., Sargent, T.J. Laboratory Experiments with an Expectational Phillips Curve. In D.E. Altig and B.D. Smith, eds., *Evolution and Procedures in Central Banking*, (Cambridge: Cambridge University Press), pp.23-55, 2003.
- Bernasconi, M. and Kirchkamp, O. Why Do Monetary Policies Matter? An Experimental Study of Saving and Inflation in an Overlapping Generations Model. *Journal of Monetary Economics* 46, 315-343, 2000.
- Carlson J.A. The Stability of Experimental Market with a Supply-Response Lag, *Southern Economic Journal* 33, pp.305-321, 1967.
- Cartwright, N. *Hunting Causes and Using Them*. Cambridge: University of Cambridge Press, 2007.
- Davis, D., Holt, C. *Experimental Economics*, Princeton University Press: Princeton, 1993.  
dostupné z: [http://www.upf.edu/leex/\\_pdf/events/BLEESSM11MacroExperiments.pdf](http://www.upf.edu/leex/_pdf/events/BLEESSM11MacroExperiments.pdf)
- Duffy, J. Monetary Theory in the Laboratory. *Federal Reserve Bank of St. Louis Review* 80, pp.9-26, 1998.
- Duffy, J. Macroeconomics. A Survey of Laboratory Research. Chapter of the *Handbook of Experimental Economics*, vol.2., lecture, 2011.
- Duffy, J. and Ochs, J. Emergence of Money as a Medium of Exchange: An Experimental Study. *American Economic Review* 89, pp. 847-77, 1999.
- Duffy, J. *Macroeconomics: A Survey of Laboratory Research*. Working Papers 334, University of Pittsburgh, Department of Economics, 2008.

- Duffy, J., Fisher, E.O'N. Sunspots in the Laboratory, *American Economic Review*, Vol.95, pp.510-529, 2005.
- Duffy, J. and Ochs, J., Equilibrium selection in static and dynamic entry games, *Games and Economic Behavior* 76, pp. 97–116, 2012.
- Fehr, E., Tyran, J. Money Illusion and Coordination Failure. *Games and Economic Behavior*, Elsevier, vol. 58(2), pp. 246-268, February, 2007.
- Fehr, E., Tyran, J. Limited Rationality and Strategic Interaction: The Impact of the Strategic Environment on Nominal Inertia. *Econometrica*, Econometric Society, vol. 76(2), pp.353-394, 03, 2008.
- Fehr, E.; Kirchsteiger, G.; Riedl, A. Gift Exchange and Reciprocity in Competitive Experimental Markets. *European Economic Review*, Elsevier, vol.42(1), pp. 1-34, January, 1998.
- Fehr, E.; Tyran, J.R. Does Money Illusion Matter? *The American Economic Review*, Vol. 91 No.5, pp.1239-1262, 2001.
- Fehr, E.; Tyran, J.R. Expectations and the Effects of Money Illusion. In: B. Agarwal and A. Vercelli (Eds.): *Psychology, Rationality and Economic Behavior. Challenging Standard Assumptions*. International Economic Association, Ch. 8: pp.155-80, 2005.
- Forsythe, R. et.al. Asset Valuation in an Experimental Market. *Econometrica* 58, pp.537-68, 1982.
- Guala F. ed. *The Methodology of Experimental Economics*. New York: University of Cambridge Press, 2005.
- Haltiwanger, J.; Waldman, M. Limited Rationality and Strategic Complements: Implications for Macroeconomics. *The Quarterly Journal of Economics*, Vol.104, No.3, pp.463-483, 1989.
- Heinemann, F., Nagel, R. and P. Ockenfels, P. The Theory of Global Games on Test: Experimental Analysis of Coordination Games with Public and Private Information. *Econometrica* 72, 1583—1599, 2004.
- Hey, J. D. Expectations Formation: Rational or Adaptive or ...? *Journal of Economic Behavior and Organization* 25, pp. 329-344, 1994.
- Lei, V. and Noussair, C.N. Equilibrium Selection in an Experimental Macroeconomy. *Southern Economic Journal* 74, pp. 448-482, 2007.
- Lian, P. and Plott, C.R. General Equilibrium, Markets, Macroeconomics and Money in a Laboratory Experimental Environment. *Economic Theory* 12, 21-75, 1998.
- Lim, S. Prescott, E.C. and Sunder, S. Stationary Solution to the Overlapping Generations Model of Fiat Money: Experimental Evidence. *Empirical Economics* 19, pp. 255-77, 1994.
- Loewenstein, G. Experimental Economics from the Vantage-point of Behavioural Economics. *The Economic Journal*, 109:F25-F34, 1999.
- Lucas, R. E. Jr. Expectations and the Neutrality of Money. *Journal of Economic Theory*, Vol. 4, No.2, April, pp.103-124, 1972.
- Lucas, R.E. Jr. Adaptive Behavior and Economic Theory. *Journal of Business* 59, pp. 401-426, 1986.
- Marimon, R. and Sunder, S. Indeterminacy of Equilibria in a Hyperinflationary World: Experimental Evidence. *Econometrica* 61, pp. 1073-1107, 1993.
- Marimon, R. and Sunder, S. Expectations and Learning under Alternative Monetary Regimes: An Experimental Approach. *Economic Theory* 4, pp. 131-62, 1994.
- Marimon, R., and Sunder, S. Does a Constant Money Growth Rule Help Stabilize Inflation? *Carnegie-Rochester Conference Series on Public Policy* 43, pp. 111-156, 1995.
- Noussair, C.N., Plott, C.R. and Riezman, R.G. The Principles of Exchange Rate Determination in an International Financial Experiment. *Journal of Political Economy* 105, pp. 822-61, 1997.
- Noussair, Charles. *Macroeconomic Experiments*. Lectures, Tilburg University, 2012, Available at: [http://www.upf.edu/leex/\\_pdf/events/bleess12\\_courses/macro\\_experimentsII.pdf](http://www.upf.edu/leex/_pdf/events/bleess12_courses/macro_experimentsII.pdf)

- Ochs, J. Coordination Problems. in J.H. Kagel and A.E. Roth, eds., *The Handbook of Experimental Economics* Princeton: Princeton University Press, 195—251, 1995.
- Phillips, A.W. Mechanical Models in Economic Dynamics, *Economica* 17, pp. 283-305, 1950.
- Plott, C.R. and Sunder, S. Efficiency of Experimental Security Markets with Insider Information: An Application of Rational-Expectations Models, *Journal of Political Economy*, 90, 663-698, 1982.
- Ricciuti, R. Bringing Macroeconomics into the Lab. University of Siena Department of Economics WP No.4, 2005.
- Schram, A. Artificiality: The Tension between Internal and External Validity in Economic Experiments. *Journal of Economic Methodology*, 12 (2), pp. 225-237, 2005.
- Sims, C. A. Macroeconomics and Methodology. *Journal of Economic Perspectives* 10, pp. 105-120, 1996.
- Smith, V. L. An Experimental Study of Competitive Market Behavior. *Journal of Political Economy*, Vol.70, pp. 111-137, 1962.
- Smith, V. Microeconomic Systems as an Experimental Science. *American Economic Review*, 72, pp. 923-955, 1982.
- Smith, V.L. An Experimental Study of Competitive Market Behavior. *Journal of Political Economy* 70, 111-137, 1962.
- Starmer, C. Experiments in Economics: Should we Trust the Dismal Scientists in White Coats? *Journal of Economic Methodology*, 6, pp. 1-30, 1999.
- Sunder, S. Experimental Asset Markets: A Survey. in J.H. Kagel and A.E. Roth, eds., *The Handbook of Experimental Economics* Princeton: Princeton University Press, 445-500, 1995.
- Tyran, Jean-Robert. Money Illusion and Strategic Complementarity as Causes of Monetary Non-Neutrality, *Lecture Notes in Economics and Mathematical Systems*. Berlin: Springer, 1999.
- Van Huyck, J.B., Battalio R.C., and Beil R.O. Tacit Coordination Games, Strategic Uncertainty, and Coordination Failure. *American Economic Review* 80, 234-48, 1990.
- Van Huyck, J.B., Battalio, R.C. and Beil R.O. Strategic Uncertainty, Equilibrium Selection, and Coordination Failure in Average Opinion Games, *Quarterly Journal of Economics* 106, 885-910, 1991.
- Van Huyck, J.B., Cook J.P., and Battalio R.C. Selection Dynamics, Asymptotic Stability, and Adaptive Behavior, *Journal of Political Economy* 102, 975-1005, 1994.

# THE IMPACT OF VIOLENCE ON THE MENA REGION BUSINESS AND TRADE

*Akl Kairouz, Prof. Emeritus*  
*Issam Atala, DBA*  
*Sagesse University, Lebanon*

---

## Abstract

International business, historically, consisted of trade and transactions of goods being exchanged between different parties. It embodies manufacturing, purchasing, shipping and marketing of specific products under different brands and shapes within a highly competitive environment. After the research and findings conducted by Adam Smith and elaborated in his book the wealth of nations, the world made tremendous changes. The Division of work and tasks along with the evolution of the business concept and trade more control and coordination are needed nowadays. Since the evolution by itself created new processes to implement, the human behavior faced new challenges as well, the repercussion of the latter affected the exchange of goods and services system and the situation is becoming more ambiguous to understand if what drives the forces in trade are result of violence carried out by market forces or initiated in organizational culture!

The success in international business depends on many key factors namely; the product's quality and costs, the financial, political and legal ingredients, cultural differences and similarities, the availability of natural and human resources to acquire and sustain competitive advantage, within a secured and stable environment.

This research focuses upon the cultural- military environment and its impact on national and international business trends in mainly the MENA region.

---

**Keywords:** Violence, international business, trade, communication, behavior

## Introduction

Originally, successful international trade led many empires, in human history, to gain political and military powers as they exploited conquered territories and colonies. The main actors in history have been identified in ancient Phoenicia/ Greece, Venice, England, Spain and many others. Presently with the technological revolution in science, communication and transportations, goods are offered to consumers at competitive prices and within shorter time; for the world has been reduce to an international "global village" whereby, ideologies, people and goods are no longer confined to borders or limited geographic space. Nevertheless, humans so far failed to build the human prototype of the future by adopting the culture of peace, cooperation, mutual respect for human rights and other sublime objectives.

For many international writers, the ruling devils controlling humanity remain insistently motivated and mobilized by greed, fear, exploitation, violence and mutual destruction.

The much sought global order has not been born yet inspite of the many expressed wishes, attempted regulations and hopes. The jungle law, camouflaged by cultural, economic and ideological masks remains in force. It is indeed the extension of the international "ball of masks" and econo-political-religious adultery: all of which form the tiny prison in the planet.

The main focus of this research revolves around the attempt to clearly define and outline the trends, obstacles, and consequences adopted by diverse actors in the MENA region, particularly the Arab world that once was qualified as "the cradle of civilization", but

recently transformed into the grave of civilization. Furthermore, this world suffers from creepy economic stagnation, generated by the legal-political and military environments that control the region, particularly in the non-oil producing countries.

## **Main Text**

### **The Mena business environmental determinants**

Multinational corporations as well as business firms in general would not be able to globally export their goods and services, unless the market environment proves favorable and attractive; consequently an in-depth assessment of that environment is required in this research. The business environment is not limited to simple transactions or exchange of goods and currencies; it also incorporates transfer of expertise, technology, transportation, communication channels, services, and human resources, all operating under a dome of a socio-political-religious and legal system. It is the international Olympic game between governments and people. The key players set up the rules and the parameters for what is allowed or forbidden. They are the masters with undisputed authority, known by most as the sovereignty to formulate policies and make decisions relating to planning, employment, security, taxation, environmental protection, currency stability, regional and international relations. (Morrison 2009)

The focal issues this paper intends to highlight involve:

The laws governing business transactions in selected Middle Eastern countries to promote and sustain national industrial productivity: including types, levels, and availability of natural and human resources.

The politically stable environment that would reduce immigration flow of skilled labor from one country into another to promote economic growth through intelligent and visionary planning by experts in diverse fields. This environment requires the application of democratic governmental systems based on lawfulness and good governance.

Evolution from a primitive culture based on individualism, violence, revenge, exploitation and slavery into a modern one promoting cooperation, collectivism, partnership and peace.

The promotion of human secularism facing the traditionally blind theocratic dictatorship by few self-appointed leading “generals” of God’s armies to defend his honor and fight his battles.

Governmental policies underlying different types of economic systems such as liberal market model, state planned and controlled economy, or a social market model whereby outcome would be through division among the MENA countries. Some of them are rich in natural resources namely oil and gas such as the Gulf countries, others are struggling with unemployment, low Gross National Income (GNI), dependent on foreign subsidies, aid and borrowed funds, while intermittently they receive a meager portion of foreign direct investment (FDI). Examples of these countries are Egypt, Syria, Jordan, Lebanon; others are torn by civil unrests and wars that destroy their economies businesses and resources such as Egypt, Libya, Syria, Yemen, Iraq etc...

In general, most of these countries are classified as importers rather than exporters, once oil and gas are excluded. Lebanon’s imports for example reached in 2013 over 16 billion U.S dollars while its exports failed to reach 4 billion.(The National Association For Economic Reforms 2013)

### **Violence in the Arab world**

Most Arab countries, known historically for their geography and cultural traits such as generosity and hospitality, are presently in the process of rapidly losing the positive qualities their people enjoyed, drenched in storms of individualism, materialism and violence.

Kidnapping, assassination, corruption, religious / ideological fundamentalism, terror and wars have become the governing rules of the socio-economic and political games. The examples are numerous starting with those countries that once enjoyed glorious ancient civilizations such as Lebanon, Syria, Iraq, Palestine in its Jewish and Arabic sections, Egypt as well as neighboring Iran and some North African states.

The political- military deadlocks in the region imposed great influence on the socio-economic fibers of those countries as they become immersed with unemployment, poverty and crimes. (Kfoury&Baahous, 2008)

The intense human violent behavior stands as a major cause for political instability and economic deterioration. (Aluede&Imhanlahimi 2004)

This environment of violence adversely affects the business and industrialist ability to take risks and be more creative.

### **The aggressive behavior**

The violent behavior in the sampled countries begins with the child in his mother's womb, expending to family circles, media programs, schools and awkward learning environments, ending with religious and socio-political ones.

The MENA region is more dangerous today than it has ever been, for terrorism has been justified and praised by some as a religious duty of the faithful under the concept of "Jihad", (holy wars) in defense of God's interests on earth.

### **Causes of violence and wars in the MENA region**

Although there are general common causes for violence and terrorism, each region and even country has its own peculiarities and motives. The main reasons for violence, in the Arab world maybe summarized in the following:

The revival of nationalism often blended with cultural intolerance and narrow mindedness. ( Journal of Cultural Studies, 2007)

The fierce conflict lies in the fact that culture is amalgamated with religious taboos and fundamentalism, leading to/or presaging of local, regional and even international conflicts.

The economic conditions since the majority of the countries' populations suffer from unemployment, poverty, and the absence of strategic and adequate economic planning intensifying the economic disparity between states and people. The general environment is one of uncertainty, dictatorial control and mobilization of the masses against a designated enemy in order to preserve the power of the ruling leadership. ( Kairouz 2008)

Terrorism in all its kinds and forms, whether military, psychological, economic, cultural or cyber technological has been justified even confused by many religious, academic and political leaders as "sacred resistance" against the presumed western plan to destroy the Arab Muslim culture, religion and identity threw materialism and secularism. As a result a faithful Muslim has the duty toward God to stand up, carry arms and enlist in "holy wars" (Jihad). God has been promoted to and impersonated as a military "general" with armies, waging wars against innocent humans just because they belong to a different faith. This psychological indoctrination and brain washing wipes out all principles of ethics. The ultimate goal is to subdue and rule land and people under the pretext of serving God. The tools used to reach such objectives are impregnated by fear, uncertainty and feverish emotional mobilization of the masses. In contrast a large number of educated and reasonable rulers as well as religious Muslim leaders call for the adoption of peaceful coexistence with other cultures. They are waging an open, but shy battle with the fundamentalists, trends, movement and armies.

### **The Arab Israeli conflict**

Israel constitutes another unresolved problem in the Middle East. It is viewed, based on teaching transferred from generation to another, as a tool implanted by the great western Satan to destroy Islam and Islamic culture. The Arabs, safe Jordan and Egypt, who signed a peace treaty with Israel, continue since 1947 to boycott Israeli goods and all international firms or businesses that directly or indirectly deal with Israel and in matters including books, newspapers, Christian arabs, visits to the holy lands and participation in international events should the Israelis be present.

This unresolved Arab Israeli conflict displays negative effects on the flow of trade and economic growth in some countries. Lebanon, for example has at its disposal one international route through which it can export its produce to the gulf countries, namely through Syria. However, when the Syrian borders are closed for a variety of unjustified reasons, Lebanon's economy pays dearly a heavy penalty instead of being able to use a substitute route from the south via Israel and Jordan. Furthermore, in the educational system, children are exposed to learn a culture of violence instead of one of peace and conflict resolution.

### **The cult of leadership**

Certain Arab leaders have been worshiped and proclaimed "divine" e.g the case of Jamal Abdel Nasser. They resort to buying the devotion of their followers, through favors, imposed obedience and fear. The main issue remains the continual struggle for power between civil and religious leadership to which no clear path has been yet determined.

### **The arms race and military spending**

The arms race between member states, further contributes to the deterioration of local economies and international businesses. This includes conventional, chemical and recently nuclear weapons.

### **The economic and business consequences of the unstable environment**

The economic and business consequences upon the developing MENA countries have so far been tilting toward negativism and unpleasant trends in different areas due to instability of the region.

### **Lower flow of FDI**

The MENA region embodies an intensified paradox with regard to international business transactions, in a region, still so much backward in its political systems, torn by violence, conflicts and wars, continually destroyed, rebuilt to be re-destroyed and destabilized. As a result, for example the share of FDI flow in 2012 did not surpass the 0.38 of 1%.

This unstable environment and endemic institutional constraints fail to attract but an abysmal flow of investors and FDI (Revlín, 2001). Compared with other regions, the MENA countries received lately less than any other countries foreign investment shares( Sadik& Ballal,2001). The least recipients and beneficiaries are Egypt, Lebanon, Syria, Iraq, Libya, Yemen... (Eid& Paua,2002).

Most of the targeted FDI recipients are countries with petroleum related businesses, in particular producers of hydrocarbons. According to UNCTAD's Inward FDI Performance Index in 2003, 6 of 10 listed countries to receive the lowest FDI percentage were in the MENA region (UNCTAD, 2003).

Consequently, the main factors affecting economic development and FDI flows comprise (a) indecisive and risky return on investment ( ASIEDU, 2002); (b) political and armed revolutions and conflicts; (c) lack of institutional stability and rule of law; (d) absence of proper infrastructure relating mainly to energy, communication, telephones, internet, roads etc... ; (e) bureaucratic corruption and endless red tapes; (f) unattractive investment climate;

(g) human capital shortage, since low benefits and poor security drive skillful elements to immigrate (Rinkin 2001); (h) erratic availability of natural resources due to political unrests excluding oil flow (Moriset 2000); (i) unsound macroeconomic fundamentals relating to inflation, taxation, and external debts that usually increase in times of wars and violence.

### **Restrictions on international trade**

Wars and conflicts result in the counter flow of capital out of the combat zone. Investors as well as businesses closely calculate the risks they might be victims of. Their initial decisions would focus on (a) laying off employees and causing more unemployment in addition to lesser purchasing power among the citizens and higher taxation; (b) more smuggled goods flooding the black market affecting prices and sales; (c) businesses inability to secure loans from banks as they fail to settle their debts, and consequently forfeiting their properties and hard assets. Furthermore, most of the MENA countries have small and poor markets to attract foreign capital. Worst, the overwhelming evidence about the absence of good governance, the rule of law and economic freedom negatively struck any business contemplating to enter the market.

### **Rise in crimes and corruption**

In the absence of an efficient legal system, individualism and uncertainty dominate, terror and the gun replace the government role. Factories, stores, and all business concerns would seek huge profits at the expense of the poor and less fortunate. This unhealthy environment does not attract foreign investors and firms, for (a) the local market is unstable and impoverished except for a handful of promoters; (b) the resources are either destroyed, or confiscated by powerful military groups or difficult to secure; (c) absence of efficiency (Dunning 1993).

### **Poor governance**

Under the revolutionary and violent trends that are sweeping the region, the political and legal authority is concentrated in the hands of a military or civilian dictator dragging the country into economic stagnation and destruction (Kaufman et. Al 2000). Transparency, the rule of law and accountability are non-existent, for the legal system is usurped by fanatic religious leaders (Goberman & Shapiro, 2003). The ultimate risk in any business transaction will be aggravated when fair judicial proceedings are subservient to corrupt political power.

### **Lack of economic freedom**

The basic ingredients of economic freedom such as free competition, protection of the individual and private property, trade liberalization, fair tariffs and taxes, relaxed banking regulations and funds repatriations should not be controlled by militants and warriors. Furthermore international trade contracts must be equitably enforced rather than subjected to fraud (Beck, Levin & Loayza, 2000). The worst is the absence of protection of property rights (Gwatney, 2003) which legally determines the protection of foreign capital and firms' assets from expropriation or nationalization as has been the case when facing wealthy and powerful individual rulers or groups (Globerman & Shapiro, 2003). In this case the enticement for foreign companies to invest is removed and replaced by a multitude of risks (Drabek & Payne, 2001). In addition, costly relations between the investor and the public sector limit all attractions for investment ( World Bank, 2003).

### **Conclusion**

This paper attempted to identify and examine the impact of instability, violence and warfare, as well the absence of the rule of law upon international trade and business with Arab countries in the MENA region.

The analysis clearly confirms the hypothesis that political, legal corruption and unlawfulness do lead to violence, instability, and consequently poor flow of FDI as well as disruption of international business.

Since the MENA region is beleaguered by wars and terrors, its share of FDI flow has been abysmal. Consequently this research suggests several policies to be urgently adopted and implanted to remedy these deficiencies.

Reduction of corruption, bureaucratic red tapes and trade closure (Batra et al 2000).

Reduction of governmental role in endorsing privatization and liberalization of trade by removing barriers.

Improvement of the macroeconomic performance to sustain the fundamentals of economic growth.

Promotion of the culture of peace at all levels of education to trigger a real evolution from the ancient Middle Eastern human mentality and cultural values through secularization and peace.

Time is running short before reaching the point of self destruct. The MENA governments and societies are urged to apply a surgical evolutionary change to the rigid and outdated legal, political and economic systems.

### References:

- Batra G.,D. Kaufmaan and A. Stone. 2000. "The Investment Climate Around the World: Voices of Firms from the World Business Environment Survey." Technical Report. Washington, DC: The World Bank.
- Becchetti, L. and Hasan, I. (2004) "The effects of (within and with EU) regional integration: Impact on real effective exchange rate volatility, institutional quality and growth for MENA countries," Working Paper, University of Rome Tor Vergata, Rome, Italy.
- Beck, T. Levine, R. and Loayza, N (2000). Financial intermediation and growth: Causality and causes, *Journal of Monetary Economics*, 46 (1) : 31-77.
- Drabek, Z and Payne, W. (2001).The impact of transparency on foreign direct investment.World Trade Organization, Economic Research and Analysis Division Working Paper # ERAD-99-02.
- Dunning, J. (1993). *Multinational enterprises and the global economy*.Workingham: Addison- Wesley.
- Dunning, J. (2002). Determinants of foreign direct investment globalization induced changes and the roles of FDI policies. Paper presented at the Annual Bank Conference on Development Economists in Europe, Oslo, mimeo.
- Eid F. and F. Paa. 2002. "Foreign Direct Investment in the Arab World: The Changing Investment Landspace". Working Paper Series, Beirut: School of Business, The American University.
- Globerman, S. and Shapiro, D. (2003). Governance infrastructure and U.S foreign direct investment. *Journal of International Business Studies*, 34: 19-39.
- Gwartney, J. ; Lawson, R. and Emerick, N. (2003). *Economic Freedom of the World: 2003 Annual Report*.
- Kaufmann, D. Kraay, A. and Zoido- Lobaton P. (2003). Governance matters III, updated indicators 1996-2002. World Bank, Working Paper.
- Morrisset P. 2000. "Foreign Direct Investment to Africa: Policies also Matter". *Transnational Corporation*, Vol. 9 (2): 107-125.
- Rivlin P. 2001.*Economic Policy and Performance in the Arab World*. London: Lynne Rienner.
- The World Bank: World Economic Indicators Database. GDP (PPP) 2008.Data for the year 2008.Last revised on July 1, 2009.

UNCTAD.1997, 1998, 1999, 2000, 2003.*World Investment Report*.Geneva: United Nations Conference on Trade and Development.

# IMPACT OF CORPORATE NETWORK COMPETENCES ON THE COMPETITIVENESS OF COMPANIES

*Zoltan Veres, PhD*

*Katalin Feher, PhD*

*Adel Balogh*

Budapest Business School, Research Centre, Hungary

---

## Abstract

According to our research companies that have closer connections with their clients, suppliers and research institutes use the latest digital/network tools proactively, their organizational and inter-organizational relations are technology oriented, they are more likely to achieve success in research and development (innovation). Existence and development of network competences have a positive impact on corporate culture, inter-organizational technical co-operation, on openness and integration as well as on further innovations. The research plan envisaged making 30 interviews. In the preparation of the sample, we planned to interview in 80% representatives of companies where either digital innovation or the use of digital networks plays a crucial part in their business profile. The remaining 20% were intended to be made up of manufacturing and service companies. The analysis of the sample monitored the way companies and organizations allocated supplementary resources on behalf of information management in order to develop competences and to implement digital innovations. From the results - as suppositions for a future quantitative survey to test - we can state the followings: Using digital network solutions for the purposes of networking is mostly typical of large B2C enterprises, or firms and organizations where the development of (natural) networks plays a crucial part in their business profile (non-governmental organizations). The staff of companies with a “digital profile” play a leading role in terms of utilizing informal professional communities and networks (both online and offline). This mostly involves professional communities, professional platforms and meetings.

---

**Keywords:** Network, competence, digital embeddedness, education

## Introduction

Our goal was to examine both online and offline networks mapping them on an interface of two measurable success-indicators. One of these indicators had been defined as a set of achievements gained by a competitor. It is related to figures of effectiveness, growth and sales. We had labelled this indicator as the “*competitive advantage*”. We had labelled the other indicator as the “*visible success indicator*”. The indicator of visible success had been generated from the results of marketing, brand awareness, PR and to partners’ and consumers’ loyalty. The analysis of the sample monitored the way companies and organizations allocated supplementary resources on behalf of information management in order to develop competences and to implement digital innovations. We assumed a close correlation between the results of measurable success-indicators, investments and developments. Furthermore, this research also focused on the size of companies, industrial embeddedness and on the profiles of the analyzed networks for a deeper understanding. A literature review preceded the empirical work in order to clarify the conceptual framework of the hypotheses and in order to set up the framework of the questionnaire.

## **Network competence**

The basic category of the research is network competence which we analyze with reference to activities both online and offline. Business and organizational networks have been facing the breakthrough of online communication, growing data resources and vulnerability, the transparency of partner and trust-based networks and, also, security risk. In a digital environment the continuous development of networks and network competences as well as the redefinition of offline networking channels and competences are also important for an effective and successful operation of networks.

A network is conventionally understood as the sum of hubs and that of the hubs' linkage. Within each framework we analyze the connections among digital social, business and sophisticated users' networks. These are dynamically changing systems built on network competences or via developing network competences. Quantity, quality, centralization or decentralization of linkages in close correlation with digital-technological innovations, with the use of online networks will all determine the rationale of these complex networks.

We assume that the function and decision-making processes of offline networks are under the influence of digital platforms and online networks primarily because the Internet is a scale-free network. Besides, scale-free frameworks are extremely resisting to occasional errors, so a great number of randomly chosen points can be removed without ruining the coherence of the framework. However, on the other hand, these frameworks are really vulnerable in case of a targeted attack because the removal of relatively few points could ruin the biggest hubs of networks – and they might disintegrate. We analyze networks with reference to their spots of risk, vulnerability and effectiveness: we map how much they attend the logic of scale-free networks in the use of online networks.

To operate a network or organization network competences are needed that manage processes of decision, promote effective organizational communication and the competitiveness of the company concerned. As long as progressive and interactive understanding and skills cooperate on various levels of an organization, network competences can prevail (Edgar – Lockwood, 2008), and effectiveness as well as competitiveness improve. The use of digital tools and the rapidly changing digital environment deconstruct certain network competences, and set up or weaken the importance of others.

Digital tools and platforms, online networks and ICT innovations rely exclusively on digital and network competences, and their continuous improvement is of uttermost importance because accumulating amount of data and their supply chains within the organization and in inter-organizational relationships are determinative. The online data collection and the interpretation of the results on the organization or that of the partner/concurrent organization imply separately analyzable competences. Our indirect target is to point to an emerging effect that makes the analysis of network competences indispensable: this is the so called big data or data boom. The network of data and contents are facing a serious challenge in the digital environment. The growing amount of data, that come from sensors, social media networks, online knowledge sharing and from lots of other resources, brings up basic questions for the handling of data resources and induction, network innovations and network education.

## **Basic questions**

Our research questions are the following: How do social and business networks, that use the Internet as a scale-free network, measure the vulnerability and risk of digital/online networks? Furthermore, how are they getting ready for big data's effects, how can they make advantage of them. Do communication and education decrease vulnerability and risk? How much does it depend on the size of the company/firm/organization/network? How much does it depend on the industrial or other embeddedness of the company/firm/organization/network? How determinately do they consider the technical-digital embeddedness and how much do

they consider the human/organizational decisions? Which one of these two promotes effectiveness? What is the connection between the size of the network and the level of competence?

### **Theoretical Background**

#### **The Framework of Networks: Relatedness, Tight Bonds and Vibrations**

The network, as defined above, is the sum of the hubs and the links connecting them. Due to the infrastructural development of digital environments various and effective tools are available via online and social networks (Gloore et al., 2012). Within business and organizational networks, the nodes belong to the same sector's interconnections or to that of different sectors. The wiredness or a particular node involvement makes the organization more sensitive and influential in the network information flow. Theories of competitiveness emphasize the importance of taking care that a company or organization would not keep the network under control, otherwise it will be less effective and innovative and they would be seeking profit with the help of others' initiatives and creative solutions. It is important to try to understand: they need to see and know how the network operates in terms of the associated partners, and how they see their positions from there (Anderson – Håkansson – Johanson, 1994; Dodgson, 1993; Håkansson – Ford, 2001; Mattsson, 1997; Wilkinson – Young, 1994).

The relationship of these companies and organizations can be divided into online and offline networks, and can be examined according to these dimensions. Information management, the most recent digital network services, the use of digital tools and programs require additional resources. The question is how much these resources can be regarded as an investment, and how they support the company's or organization's competitiveness. The offline networking competence from this viewpoint is also indispensable because traditional fiduciary and risk mitigation tools have an important role. The so-called network quakes according to their extent and strength have various effects on the operation and effectiveness of companies and organizations. It is therefore an important issue for the members of the network how they can reduce this kind of vulnerability and what crisis management solutions are used online and offline concerning their networks in order to be able to preserve their position and innovative capacity (Csermely, 2009).

#### **Offline and Online Networks: After the Digital Turn**

As we have mentioned earlier, exploiting the potential of online networks is crucial for corporate and organizational relationships, and, presumably, for their business and social communication and decision-making chains, that use the most recent digital and online tools and competencies, they might become more competitive compared to the sector's other companies and the organizations. However, we assume that the online network extensiveness, its importance for the company, using the latest digital tools, and the importance of the education all depend on the profile of the company, its size, and on the staff generations represented.

Trusting a network (Krackhardt - Hanson, 1993) the legitimacy and strength of nodes, streamlined network management, issues of safety versus effectiveness are present both in online and offline networks, but in different ways, and - at the same time - also interconnected with one another. Innovations and effectiveness support the openness, and trust and security supports increasingly exclusive and restricted network solutions. So when we talk about offline and online networks after the digital revolution, it is a fundamental question where the boundaries of the development of the network, of the point of view and that of online-offline network competences are. To what extent does competitiveness strengthen the node's place within the network and the trust, and when should restrictions be launched for cost cutting, returning investments in order to save security functions? How should competitiveness and

the proportion of expenditure, the investments of the communicable and demonstrable competitiveness be optimized?

Operating along algorithms generate common platforms and network management for companies' management, logistics, organizational development, project management, administration and other corporate and organizational functions' online associate frameworks. They are less flexible between two stages of development, their codification limits usability, and their infrastructural vulnerability could lead to the vulnerability of human network as well.

Information economy, knowledge economy and the network economy model was to call attention to the fact that networks are resources in themselves: within a network technological innovations can spread more easily, and it is easier for companies and organizations to adapt to each other, they have a greater influence on each other to increase their effectiveness and competitiveness (Bharadwaj, 2000; Seltzer - Bentley, 1999; Vergeer - Pelzer, 2009).

### **Network Competence, Education and Connectivism**

Competence as a sum or as a framework of skills is closely related to the concept of a network. Social capital, the Internet or the digital community - professional platforms' management - just to name a few – assume complex capabilities. Network management capabilities and skills (Möller - Svahn, 2003; Ritter - Gemünden, 2003) define a definite competence-portfolio (Vlasyuk, 2010).

The concept of network competence applies to offline and online network management and network control, to self-learning solutions and to organized education at the same time. Traditional offline forms are moving to some extent to online networks and online frameworks are newer, platform-oriented stage among competences.

The sustainability of digital networks and the increase the competitiveness altogether assume continuous innovation and competence development as well as education: recent developments represent at the same time pre-studies, research and the company's/organization's opportunities or expectations to ease its whole network's competence. The development of competence is in this sense system-levelled and includes within the network all those who are involved in the innovation. Developed or adapted solutions are therefore not solely individual components: they also operate as restructuring devices (Henderson - Clark, 1990). Along proper network and digital competences in the digital environment, rapid changes make it possible for companies and organizations to achieve competitive advantage fast and/or on the long run (Grover - Kohli, 2013), and their success can be communicated, marketed, visible, and – in terms of marketing and in partner/customer loyalty – a leverage. As far as the involvement of related resources is concerned it is the process that is in the focus (Partanen - Möller, 2012: 491), where it is important to develop competences continuously. In operation management of networking competence co-operation, collaboration, competition and perceptibility (Vlasyuk, 2013: 970-971) – all enhance the visibility and representation of success. Within networks an online community space or a knowledge-sharing portal can have a featured terrain that is being co-developed by an increasing number of organizations based on social media and interactive content services. The activity started earlier in forms of mailing lists and, later, via forums provided some space for communication, and by now social network sites have largely shifted to this type of activity.

### **Competitiveness, Network Trust, Vulnerability**

Networking competences are in a dynamic interaction with one another and they promote corporate competitiveness for a strategic vision (Edgar - Lockwood, 2008 and Wang et al, 2012.). It is based on the thesis that a strategic network development approach is needed

which is built on the so-called ICT fund (Partanen - Möller, 2012), and that also represents value creation (Msanjila - Afsarmanesh, 2009: 4769).

Trust is a collection of personal beliefs (Berners-Lee et. 2006: 88): competitiveness and the level of trust are fundamentally interlinked within networks. The results that mark a higher quality and creativity assume networks based on trust (Gloore et al., 2012). Trust and loyalty can be built and can feature among companies and organizations in multiple ways, but according to our study the most important question is a sustainable level of online reliability – can it be as reliable as its offline counterpart, or can the online discourse of reliability strengthen offline trust. A further question is how much these factors depend on digital tools and platforms, how much on the human factor, and what impact they would have in online and offline networks in the presence and absence of trust. What does risk imply within these networks?

Without trust the majority of online activities would not be viable. Lack of trust can have many reasons, the most significant of which is incorrect communication and information sharing and the unwillingness to share risks (Alawamleh - Popplewell, 2010). This question – among others – is answered by the MESH of companies, a response to the rapid evolution of technology solutions by results built on networks and sharing. In such networks proper resources are only available until the company, the organization or consumers need it. So these are trust products and services, where the credibility of the members of the network and their reliability are standard (Gansky, 2010). As far as trust is concerned networks' informal relationships are important. Their mapping makes the understanding of important and strong linkages possible. In the restructuring of networks and via the network dynamics these linkages may get damaged or they could develop (Sellitto, 2011: 27).

Trust also implies vulnerabilities – both in case of trust on tools and on human relations. Vulnerability can be reduced on the network level if the network is scale-free, so it has enough strong bonds and therefore it is more resilient to random errors, and if targeted attacks can be prevented. These formal and informal bonds on corporative and organizational level are needed to be treated carefully, their removal may be critical. So networks quakes can be prevented.

### **Network Competence, Strategic Co-Operation, Collaboration**

The size of the organization and the organization's position within the business-network concerned provides its functional networking status quo (Wang et al., 2012). Position and linkage might only be qualified after entering into co-operation (Partanen – Möller, 2012: 491). Insight, analysis, the integration of networking competences for this are indispensable both in case of nodes with tight linkages and in case of nodes with loose ones investigating separately the speed and methodology of a node's connectedness (Watson et al., 2004). Only an overall system can be error tolerant.

Networking competence is consequently the basic question of strategic co-operation and its analysis requires the monitoring of the quality of collaboration (Partanen – Möller, 2012: 491) and that of a shared or alternative strategy (Grover, V. - Kohli, R. 2013). Competitive advantage within this networking complexity is viable via a strategic point of view supported by education.

### **Networking Visibility and Reputation**

Visibility is a basic requirement for the nodes within networks: the extent of visibility depends on corporate profile, business embeddedness, vulnerability, risk factors and on communicational strategies and marketing/PR targeting. Competition and visibility together (Vlasyuk, 2013: 970-971) enhance the visibility of success – c.f. above. The extent of visibility has become even significant within online embeddedness: the organization, people working within these organizations, the ones in collaboration with the organization all

produce, share and traffic masses of digital data. It is of strategic importance what and which segments of these data will become available, visible, recognizable and with what implications. Just think of the fact that the good reputation of a corporation can be ruined on account of a piece of information that has gone viral on an online social platform: the impact and the vulnerability of visibility are obvious.

The online visibility of networks consequently constitutes issues of reputation and vulnerability – and these rely on organizational and inter-organizational collaboration. This implies the availability of marketing, PR, HR and data security functions and the development of competences that are needed for these for effectiveness and competitiveness.

### **The research**

Subject of the interviews: level and impact of corporate network competences (innovative digital technologies, online networks) on the competitiveness of companies.

Survey methodology: semi-structured interviews

Population: Middle managers of dynamically changing companies based on or engaged in the development of network competences. These managers have relevant information about the subject of the research.

Sampling: Planned number of interviews between 25 and 30, specified later on by saturation analysis.

Preparation of the sample, recruiting respondents: The research plan envisaged making 30 interviews. In the preparation of the sample, we planned to interview in 80% representatives of companies where either digital innovation or the use of digital networks plays a crucial part in their business profile. The remaining 20% were intended to be made up of manufacturing and service companies.

According to the planned sampling procedure, the respondents were contacted through personal channels (in person, by phone, by e-mail) with 10% of the planned sample. After the first interviews, we asked them to recommend people from their own networks who could be relevant in terms of the research topic (snowball sampling). In the sampling procedure, first we contacted 10% of the planned total sample – a tool manufacturing company, an online agency and a company that develops portals for posting media content. At the end of the interviews, we asked the subjects to recommend experts or organizations where it would be useful to ask our questions. In this way, we contacted additional respondents. Snowball sampling worked well in the sense that one participant led us to another; the experts interviewed recommended respondents who worked in the same or a related domain. This method also helped us to include companies of different sizes in the sample, since small companies can relate to bigger ones, and the big ones are also in connection with small ones, thus we reached participants from all levels of the networks identified.

Final number of interviewees: 26 middle managers (senior managers in small companies) who have relevant information about the competences of their own company networks and could give useful answers to our questions.

### **Analysis**

#### ***Basic data***

The answers of the interviewees to each question depart along certain parameters – more specifically, some characteristics of the company determine what the respondents think of the questions we examined.

The usefulness of the interviews largely depended on whether we managed to interview companies of different sizes, with different activities and clientele – since in terms of networks, different problems arise in organizations with different parameters, and the individual companies can give answers to such problems based on their own characteristics.

With regard to the scope of activities, we divided the 26 companies we had contacted into two groups according to whether there were any IT products or services that played a crucial role in their business profile. More than half of the companies had a “digital profile”.

The companies employing our experts have contacts with mostly corporate clients: 76% can be regarded as purely B2B suppliers, four companies serve retail/private customers as well, but their corporate customer base is more important. Only two of the experts interviewed reported that their companies focused primarily on retail customers, but their networks included corporate clients as well.

In terms of company size, almost one out of four companies employ less than 10 people, more than one third have between 11-50 employees, i.e. almost every second firm is a small enterprise. One company with 51-250 and one with 251-500 employees belonged to medium sized enterprises and there were 5 large companies: one with 501-1,000 employees and four employed more than 1,000 people.

### **Summary**

Our research aimed to describe the system of business relations of companies through network dynamics. The wide-ranging networks of companies – the main components of which include the customer base, the partner base and the employee base – can be described with the characteristics of the networks, since the basic definition can be related to these systems. However, these systems or certain parts thereof do not always and not necessarily bear the typical characteristics of networks; for example, a customer base is not necessarily organized in a network, there are not necessarily relationships between the individual customers (nevertheless, the entire system of relationships of the company can be considered as a network).

Thus the extension of this system of relationships does not always happen with network tools. For the companies, the most important thing is to attract and retain customers – to this end, they employ various marketing methods but, apart from a few exceptions, network dynamics in the extension is less typical. Many companies perform networking-like activities to extend their networks – here, however, formal networks and their nodes play an increased role.

### **Competitive advantage and visible success**

Based on the basic hypothesis of the research, those companies, which employ the latest digital and online tools, are both measurably (efficiency, growth, sales) and observably (marketing/brand awareness, PR, partnership and consumer loyalty) more successful than their competitors.

The interviews showed that companies that employ digital innovation appropriately can indeed gain an advantage over their competitors by using modern technology. The key question, however, is what technologies they integrate into their operation and how – the general principle in this area is “the right tool for the right purpose”. Our respondents find that the applications supporting operational functions, coordination, and project management make work more efficient. Our experts attached the greatest importance to network applications that enable efficient joint work from home or in the form of teleworking – thus the digital innovation brought the greatest breakthrough in the field of resource management.

However, the introduction and operation of these systems requires an expertise that many companies lack among their resources – therefore, it is becoming more and more common that IT systems are operated by a third-party or outsourced.

In the “visible success” dimension, the online and network tools have proved to be as useful as offline methods – in this respect, our respondents did not report of any difference. Maintaining an online presence, which belongs to the dimension of “visible success”, also

consumes resources; accordingly, such campaign activities are mainly performed by large companies.

### **Development of competences**

We assumed that the networks of the analyzed segments regularly use external and internal solutions for development and self-education in the areas of digital and online innovation and competences.

In our sample, companies with a “digital profile” are firms where some kind of network or digital innovation as a provided service plays a major role in their business profile. Predominantly, these companies constantly develop their digital competences through organized and informal training, but mainly through self-education using online tools. Among traditional companies, digital innovation does not play such a crucial role in their course of business for digital training to be important. Instead, training into system management is provided when the company governance, task management or database management system are introduced.

The companies consider it more important that their main activity be smooth and profitable – training at traditional companies mostly focuses on sales or foreign languages.

### **Digital innovation**

We also assumed that companies use competence development to be able to introduce new tools, make the increasing amount of data and the data explosion manageable as well as to allow risks to be reduced. Education is provided in several channels in several related networks.

Network competences – and here, for the time being, we are only talking about natural networks – enable individuals to find their way in the relationship net surrounding them and identify those groups and individuals who, if contacted, can help them get closer to their goals. In this sense, the interviews showed that the most important network competence development method can be found within the organizations. They show the job of the individual work groups or divisions to other divisions, or, within a division, the work of colleagues to each other. Network competences are more in focus in companies where networking activities play a crucial part in their business profile. These include: non-governmental organizations and companies providing financial services.

Training preparing or accompanying digital developments is not so much about the development of network competences (unless in a specific IT technical sense), but about understanding systems that support work processes and effectively mastering their use. Such training really appears outside the internal networks of companies as well: an essential condition for effective co-operation between companies is to be able to satisfactorily manage each other's IT systems (especially in the case of the suppliers of a multinational company). The main aim of digital networks employed by non-governmental organizations developing small enterprises is exactly to develop the digital competences of its members.

Apart from this, another aim of digital developments is mostly to support work processes, to enable joint work and teleworking, database management – technical solutions play an elementary role in eliminating the increasing data quantity and vulnerability – except for the companies where, due to their activity, data handling is a particularly sensitive area: banking sector, nationwide providers with high customer traffic.

To protect the data and to reliably manage the increasing amount of data, special technical solutions are developed that require high level of special expertise (in mathematics, information technology) to introduce and manage such solutions. Thus, companies either fully outsource these tasks (a big data commission can be rather costly), or entrust the management of systems to an in-house system administrator. What the employees absolutely need to know

about the technical part of IT will reach them through the company's IT department or through organized corporate training.

### **Competence development and competitiveness**

At the beginning of our research we thought that companies find it essential to understand and develop online network competences in order to become competitive and efficient, but offline networks are treated above all by using traditional tools to build trust and reduce risks.

Understanding and developing online network competences is really fundamental in the sense that the popularity, usefulness and efficiency of IT systems based on network solutions makes day-to-day orientation more efficient, faster and less resource intensive. As a result, the companies that use these solutions can enjoy a "competitive advantage" in this area. These network solutions are basically not aimed at expanding and building the network but rather support work processes and enable operative communication in connection with work processes.

The natural networks are indeed managed and maintained mostly in person. The interviews showed that at the international level, but more importantly in a local context business relationships are determined by the quality of personal relationships and professional values (there is the risk that personal relationships invade business life and loyalty overrides professional considerations).

### **Digital innovation as an investment**

We assumed that the introduction and operation of digital innovation requires additional resources, which the examined segments view as an investment, and develop their material and intellectual resources accordingly.

Depending on the segment examined, the experts have a rather varied opinion of digital and network developments. It is the companies with a "digital profile" that realize the importance of developments, in particular the applications supporting work processes. However, since most of them widely use open source software, the issue of return on investment is less important.

Among the traditional companies, it is the large enterprises active in a special market environment that pay the most attention to this area. Medium sized companies generally follow the big ones after some delay, whereas the level of digital competences of small enterprises largely lags behind both at international levels and compared to local large companies. Generally speaking, traditional companies spend on digital development if it is required by their market position, or if the development is so efficient that it enables them to save resources, thus they can reduce their costs.

### **Vulnerability**

The vulnerability of natural networks is mostly reduced by the management or an appointed company division by keeping personal contact with the customers and preserving good personal relationships.

The vulnerability of digital networks has a totally different meaning: on the one hand, technical problems, loss of data, and on the other, deliberate external attacks can cause destruction. As already mentioned, the protection of digital networks usually involves using specific technical solutions. These are not the kinds of issues that non-technical staff could manage. Therefore, the management of digital networks is either outsourced or dealt with by the company's system administrator.

### **Segmentation differences**

As suppositions for a future quantitative survey for testing we can state the followings:

Using digital network solutions for the purposes of networking is mostly typical of large B2C enterprises, or firms and organizations where the development of (natural) networks plays a crucial part in their business profile (non-governmental organizations). The staff of companies with a “digital profile” play a leading role in terms of utilizing informal professional communities and networks (both online and offline). This mostly involves professional communities, professional platforms and meetings.

### **Acknowledgement**

This research was supported by the Ministry of Human Resources (No. 26130-2/2013/TUDPOL), Hungary.

### **References:**

- Alawamleh, M. and Popplewell, K.: Interpretive structural modelling of risk sources in a virtual organisation, Coventry University, Department of Engineering Manufacture and Management. *International Journal of Production Research*, 2010, 49(20), 6041-6063.
- Anderson, J. C., Håkansson, H. and Johanson, J.: Dyadic business relationships within a business network context. *Journal of Marketing*, 1994, 58(4), 1-15.
- Berners-Lee, T. et al.: A Framework of Web Science. *Foundations and Trends in Web Science*, 2006, 1(1), 88.
- Bharadwaj, A.S.: The Resource-Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation, *MIS Quarterly*, 2000, 24(1), 169-196.
- Csermely, P.: *Weak links, The Universal Key to the Stability of Networks and Complex Systems*. Springer, London, 2009
- Dodgson, M.: Learning, trust, and technological collaboration. *Human Relations*, 1993, 46(1), 77-95.
- Edgar, W. B. and Lockwood, C. A.: Organizational Competencies: Clarifying the Construct. *Journal of Business Inquiry*, 2008, 7(1), 21-32.
- Gansky, L.: *The Mesh: Why The Future of Business is Sharing*. Portfolio Penguin, London, 2010
- Gloore, P. A. et al.: Measuring social capital in creative teams through sociometric sensors, *International Journal of Organisational Design and Engineering*, 2012, 2(4), 380-401. Online: <http://www.ickn.org/documents/IJODE020403%20GLOOR.pdf> (last downloaded 28 11 2013)
- Grover, V. and Kohli, R.: Revealing Your Hand: Caveats in Implementing Digital Business Strategy. *MIS Quarterly*, 2013, 37(2), 655-662.
- Håkansson, H. and Ford, D.: How should companies interact in business networks? *Journal of Business Research*, 2001, 55(2), 133-139.
- Henderson, R. M. and Clark, K. B.: Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms, *Administrative Science Quarterly*, 1990, 35(1), 9-30.
- Krackhardt, D. and Hanson, J.R.: Informal Networks: The Company Behind the Chart. *Harvard Business Review*, 1993, 71(4), 104-117.
- Mattsson, L.-G.: Relationship marketing in a network perspective. In: Gemünden, H.G. – Ritter, T. – Walter, A. (eds.): *Relationships and Networks in International Markets*. Elsevier Science, Oxford, 1997, 37-47.
- Möller, K., and Svahn, S.: Managing strategic nets — A capability perspective. *Marketing Theory*, 2003, 3(2), 209–234.
- Msanjila, S. S. and Afsarmanesh, H.: On development of TrustMan system assisting configuration of temporary consortiums. *International Journal of Production Research*, 2009, 47(17), 4757–4790.
- Partanen, J. and Möller, K.: How to build a strategic network: A practitioner-oriented process model for the ICT sector. *Industrial Marketing Management*, 2012, 41(3), 481–494.

- Ritter, T., and Gemünden, H. G.: Network competence: Its impact on innovation success and its antecedents. *Journal of Business Research*, 2003, 56(9), 745–755.
- Sellitto, C.: Organisational Structure: Some Observations on the Importance of Informal Advice and Trust Networks. *International Journal of Interdisciplinary Social Sciences*, 2011, 6(2), 23-34.
- Seltzer, K. and Bentley, T.: *The Creative Age: Knowledge and skills for the new economy*. Demos, London, 1999
- Vergeer, M. and Pelzer, B.: Consequences of media and Internet use for offline and online network capital and well-being: A causal model approach. *Journal of Computer – mediated communication*, 2009, 15(1), 189-210.
- Vlasyuk, G.V.: *Resources of Social Enterprise*. Sage, ACB, Moscow, 2010
- Vlasyuk, G. V.: On Competitiveness of Enterprise. *Middle-East Journal of Scientific Research*, 2013, 14(7), 969-978.
- Wang, N., Liang, H., Zhong, W., Xue, Y. and Xiao, J.: Resource Structuring or Capability Building? An Empirical Study of the Business Value of Information Technology, *Journal of Management Information Systems*, 2012, 29(2), 325–367.
- Watson, R. T., Zinkhan, G. M. and Pitt, L. F.: Object-Orientation: A tool for enterprise design. *California Management Review*, 2004, 46(4), 89–110.
- Wilkinson, I.F. and Young, L.C. (1994): Business dancing: The nature and role of interfirm relations in business strategy. *Asia-Australia Marketing Journal*, 1994, 2(1), 67-79.

## **COST STICKINESS IN LATIN AMERICAN OPEN COMPANIES FROM 1997 TO 2012**

*Alessandra Vieira Cunha Marques, Master Degree Accounting Student,  
Cassius Klay Silva Santos, Master Degree Accounting Student,  
Francielly Dornelas Correia Lima, Fourth-year Undergraduate Accounting Student,  
Patrícia de Souza Costa, PhD Prof.  
Federal University of Uberlândia, Brazil*

---

### **Abstract**

This study aims to analyze whether open company costs in Latin America countries do vary asymmetrically. We used a 669 open companies sample in nine countries of that region from 1995 to 2012. We applied log linear regressions estimated by Ordinary Least Squares (OLS) for panel data, assembling time series to transversal data (cross-section). The results suggest that the behavior of selling, general and administrative (SGA) expenses is asymmetric with respect to changes in sales revenue (SR). This research shows that on average, when sales revenue increases by 1%, SGA 0.56% increase, but when the SR decreases by 1%, SGA decrease only 0.45%. The study confirmed the hypothesis of a possible reversal of the asymmetry when considering lags. However, this asymmetry seems to decrease when considering longer than one year. The results partially corroborate the results of the research of Anderson et al. (2003) performed with U.S. companies; He, Teruya and Shimizu (2010) who analyzed Japanese companies, and Costa, Medeiros and Silva (2005) that investigated Brazilian companies.

---

**Keywords:** Sticky costs, Latin America, panel data

### **Introduction**

Three characteristics define traditionally cost behavior: they are proportional to the activity level; they can be fixed or variable concerning activity volume; it is asymmetrical the relationship between cost and activity volume (Noreen & Soderstrom, 1994). However, empiric studies on cost behavior (Brasch, 1927, Anderson, Banker, & Janakiraman, 2003, Costa, Medeiros & Silva, 2005, Balakrishnan & Gruca, 2008, He, Teruya, & Shimizu, 2010, Banker, Byzalov & Chen, 2013) suggest an asymmetrical variation on costs related to activity volume. In other words, the magnitude of in the cost increase changes is greater than the magnitude of this variation equivalent to a reduction of revenue. A company with sticky costs shows a greater drop in income when their activity level drops when compared with companies with less sticky costs (Weiss, 2010, Guenther, Riehe, & Röhler, 2013).

Cost asymmetrical behavior is consistent to the argument that managers tend to adjust deliberately their resources as an answer to activity volume changes (Anderson et al., 2003). These authors identified that with selling reduction, managers tend to purposely delay the decision to reduce costs and expenses until they have greater certainty about the permanence of the decline in demand, keeping unused resources to avoid personal consequences when the retrenchment. Moreover, there may be a time gap between the cost reduction decision and achieving reduction.

Asymmetry hypothesis was confirmed for samples formed by companies in the United States (Anderson et al., 2003), in Brazil (Costa et al., 2005); in the United States, England,

France and Germany (Calleja, Steliaros, & Thomas, 2006), in Japan (He et al., 2010), in Germany, Australia, Austria, Belgium, Canada, Denmark, Finland, France, Ireland, Italy, Japan, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States of America (Banker et al., 2013), among some others. The legal system of the origin countries of these open companies can influence the magnitude of this asymmetry. For example, Calleja et al. (2006) and Steliaros and Thomas (2006) found that the variation in costs in France and Germany (country code-law regime) is more asymmetric than the variation in costs in England and the United States (countries of common arrangements law).

This cost variation is defined not only in function of the selling volume, because some other factors are determinant in its formation, such as: the location and size of the company, management incentives, corporate governance level, timing, macroeconomic factors, institutional factors, the legal system of the country of origin of the company, among others (Calleja et al., 2006, Banker & Chen, 2006, Baumgarten, Bonenkamp, & Homburg, 2010, Weiss, 2010; Chen, Lu, & Sougiannis 2012).

Via Dalla and Perego (2012) analyzed Italian companies not listed in micro and macro level including specific business characteristics, magnitude of activity, performance sector. They Adapted to both the base model to analyze the asymmetric behavior of the proposed by Anderson et al. (2003) costs. The survey results suggest the absence of sticky costs in the Italian context behavior, corroborating the traditional literature that defines the behavior of costs as symmetric.

Thus, the research problem arises as follows: do the Latin America company costs vary asymmetrically? This study aims to analyze whether the costs of Latin America open companies do vary asymmetrically. We used the methodology proposed by Anderson et al. (2003) in order to verify cost stickiness in panel data and log linear regressions estimated by OLS (Ordinary Least Squares). The sample consists of 669 public companies from nine countries in Latin America, from 1995 to 2012

This research aims to analyze the asymmetry of costs, but will only examine the variation in selling, general and administrative (SGA) expenses in relation to the sale level. According to Chen et al. (2012), these expenses represent a significant portion of the cost of business operations and they are aligned with management interests and are susceptible to manipulations from corporate governance.

Knowing cost behavior is essential for an efficient management in a company (Anderson et al., 2003). This is because many management decisions are based on knowledge of cost behavior in relation to the activity level in the company (Costa et al., 2005). Thus, the results of this research can be useful for practicing managers, shareholders, investors, analysts and especially for allowing the reduction of agency conflicts. Furthermore, this research can contribute to the overall literature on standard costs. Costa et al. (2006) argue that researches that contributes to understand the economic environment of the jurisdictions are required, as they bring out the similarities and differences between these countries, assisting in understanding this new globalized reality

These surveys become important also in Latin America countries, because they have many common characteristics: the legal framework of the countries based on the code-law legal system, strong regulatory accounting exerted by governments, ownership structure based on stakeholder's system, without accounting profession prestige, strong impact of tax laws on accounting, funding provided mainly by financial institutions (Costa et al., 2006). Among studies on symmetric costs we did not identify any comparative study on this behavior in Latin America countries, which have besides those characteristic have several blocks of economic integration, such as Latin America Integration Association (LAIA), Mercosul – South Common Market and Andean Community.

This paper has six sections. After this introduction we present the literature review on cost behavior, Third section shows the search hypothesis; the fourth one describes the study methodology; the fifth one present the results the last one the conclusions.

### **Cost Behavior**

Studies on cost behavior are relevant to scholars, academicals and every professional involved in management activities (Oliveira, Lustosa, & Sales, 2007). These professionals make decisions which require knowing cost behavior related to the activity level. (Costa et al., 2005). Garrison and Noreen (2001) state that management decisions made without knowing cost and their behavior can lead the company to insolvency.

Cost behavior is used to describe how this resource responds to changes in activity level (Garrison & Noreen, 2001). According to Anderson et al. (2003), managers handle the increasing volume of expenses in that increased sales. However, when the volume of sales decreases, managers assess the possibility of such sales decline is temporary, opting to keep costs rather than incur adjustment costs.

These managers decisions to maintain the same level of costs can also be caused by personal interests, resulting in a form of agency costs (Anderson et al., 2003). Jensen and Meckling (2008) define agency costs as the expenses incurred by the company caused by decisions of calculating managers who seek to maximize their personal utility, without taking into account the interests of shareholders. These administrators can keep unnecessary expenses to avoid personal consequences of containment, such as loss of status when the company is lowered, or the anguish of firing employees, contributing to the asymmetric cost behavior.

The cost stickiness occurs when managers decide to keep idle rather than adjusting the cost resources when there is a decrease in sales volume (Anderson et al., 2003). The reasons that lead managers to incur stickiness of costs are listed by Anderson et al. (2003): the agency costs that occur when the manager makes decisions according to their personal well-being, psychological adjustment costs that occur with layoffs, causing negative impact on the image of the administrator, and the need of time to confirm the reduction in market demand and, consequently, the volume of business activity.

Anderson et al. (2003) analyzed industrial firms in the United States, where the main variables used were: selling expenses, general and administrative (SGA) and net sales. The authors found the prevalence of sticky costs for SGA behavior, showing the importance of managers in adapting resources in response to changes in market demand, while reducing the level of activities that utilize these resources

The results of the research developed by Costa et al. (2005) corroborate partially the findings of Anderson et al. (2003). The Brazilian open companies that comprised the sample of this study showed an asymmetric elasticity of costs in relation to revenue and this asymmetry is partially reversed over time, corroborating the hypothesis of cost stickiness. However, these authors did not confirm the hypothesis that the asymmetry observed reduced over the years, justifying this as being possibly caused by more rigid labor laws applied to Brazilian companies. Countries with a more rigid (code-law) legislation may have a degree of asymmetry of the steeper costs (Banker et al., 2013).

In Japan, public companies also showed an asymmetrical relationship of costs (He et al., 2010). Despite the Japanese labor laws do not be as rigid as the layoffs, the decision to fire the employees takes time, since managers tend to wait for confirmation of permanent demand reduction to reduce costs (He et al., 2010). To these authors, the asymmetrical behavior may be justified for two main facts: 1) managers believe that the market reacts negatively to a reduction of costs, 2) the image of managers may be compromised in the face of reduced expenses with hand labor. This attitude can be characterized with a conflict of agency, since the manager favors personal interest. Nonetheless, not only would the agency theory a

possible explanation for this fact. To Banker et al. (2013), a possible explanation for the asymmetrical behavior of costs in relation to revenue would be the economic theory of optimizing the decision, stating the search managers for a great decision on the adjustment costs. Managers can also have great conviction future demands, and the decision not to "cut" the excess costs in preparation for these future increases in activity level (He et al., 2010).

Kama and Weiss (2013) show that agency theory can be adjusted by smoothing cost stickiness. Encouraging managers to align their personal goals with the institution can be considered a technical maneuver in designing Kama and Weiss (2013), since the incentives for optimization of results, as subsidies, driving managers to achieve the goals and defined objectives. Thus, the company can minimize the agency conflict, providing also the reduction of the asymmetry between the costs.

We emphasize that manager influence is related to expectations on future demands for their products (Anderson et al., 2003, He et al., 2010, Kama & Weiss, 2013). This is due to the decision makers in maintaining or not the surplus spent, material, labor, and other elements of the production process, the time of these decisions reduction may be related. For Kama and Weiss (2013) the results show that when future sales expectations are perceived by managers as more "pessimistic" a reduction is observed in the asymmetry of costs, since there is a more immediate reduction in production costs to reduced revenues. In the opposite situation, managers are "optimistic" about the future market behavior and even with the drop in revenue, they tend to keep the costs of production for a longer period, thus boosting the asymmetry of costs.

## Hypothesis

Following the model proposed by Anderson et al. (2003), which was adapted by Costa et al. (2005) for the investigation of sticky costs, four hypotheses will be tested in this research. The first one is that cost behavior is asymmetric in relation to revenue. This may be caused by the fact that changes in the volume of sales are not accompanied by the managers' decision making, suggesting that weak demand variation does not lead to a decision to reduce or increase the immediate costs by managers (Costa et al., 2005). Thus, our first hypothesis is that:

H1: The magnitude of the increase in SGA expenses due to increased sales in publicly held companies in Latin America in the period 1997 to 2012 was greater than the magnitude of its reduction in case of falling sales in the same period

The considered divergence between the reduction or increase of costs against the behavior of increase or decrease in income, may also be linked to other reasons such as agency conflict, which may be indicated in this case because the managers have a concern about your image social, in order that a wrong decision may over time prove the most appropriate, impairing its performance. As shown by Anderson et al. (2003) and Costa et al. (2005), changes in demand can be something momentary. In this case, a wrong decision could incur higher costs, since the reversal of the situation may or may not occur quickly.

The temporal question then is another item that should be checked when it is expected to make the analysis of a single period alone does not take into account the adjustment costs in relation to the variation of the amount of revenues that are more permanently, thus these conditions the asymmetry tends to be more conspicuous. In order to evaluate this presupposition, we formulate the second hypothesis:

H2: The level of asymmetry of SGA expenses in publicly held companies in Latin America in the period 1997-2012 is mitigated with the aggregation of periods

The equalization of costs to fluctuations in sales volume cannot be limited to the contemporary environment, but still lagged way, i.e., the expectation is that cost stickiness is reduced when it is observed in lag of one period. With the intention to test this has been the third hypothesis:

H3: The investigated Public companies in Latin America underwent adjustment of expenditure SGA regarding changes of sales.

When managers note the occurrence of a variation in sale volume they tend to wait for a final decision regarding cost variation. Labor laws rigidity can also hamper efforts to minimize costs given the decline in the level of activities, resulting in cost stickiness. Considering the possible delay in decision making cost reduction on the reduction in the volume of activities, the stickiness observed in one period may be reversed in subsequent periods. Thus we formulate the fourth hypothesis to be checked for this search:

H4: Public companies from Latin America revert the cost stickiness in subsequent periods.

## Methods

This is a descriptive quantitative research using the methodology developed by Anderson et al. (2003) to measure cost stickiness. This methodology involves log-linear regressions estimated by Ordinary Least Squares (OLS) for panel data, assembling temporal series to transversal data (cross-section). To ensure the robustness of this research results were tested three types of models for panel data: the constant coefficient (pooled), the fixed effects) and random effects (random effects). As the sample involves a variety of different industries and sizes of companies, the log-linear specification improves the comparability of variables between firms and reduces the potential for heteroskedasticity (Anderson et al., 2003).

Anderson et al.'s methodology (2003), used in this study, was effective in identifying cost stickiness to revenue for U.S. companies. The work carried out by Costa et al. (2005) with Brazilian companies also demonstrated that the model is effective to measure the sticky costs. Later, other authors have also confirmed the effectiveness of this methodology for the measurement of sticky costs (Calleja et al., 2006, He et al., 2010, Kama & Weiss, 2013).

Models I and II, developed by Anderson et al. (2003) to assess asymmetry costs are shown in Equations 1 and 2, respectively.

$$\log \left[ \frac{VGA_{i,t}}{VGA_{i,t-1}} \right] = \beta_0 + \beta_1 \log \left[ \frac{RLV_{i,t}}{RLV_{i,t-1}} \right] + \beta_2 Dummy_{i,t-1} * \log \left[ \frac{RLV_{i,t}}{RLV_{i,t-1}} \right] + \varepsilon_{it} \quad (\text{Eq.1})$$

$$\log \left[ \frac{VGA_{i,t}}{VGA_{i,t-1}} \right] = \beta_0 + \beta_1 \log \left[ \frac{RLV_{i,t}}{RLV_{i,t-1}} \right] + \beta_2 Dummy_{i,t-1} * \log \left[ \frac{RLV_{i,t}}{RLV_{i,t-1}} \right] + \beta_3 \log \left[ \frac{RLV_{i,t-1}}{RLV_{i,t-2}} \right] + \beta_4 Dummy_{i,t-1} * \log \left[ \frac{RLV_{i,t-1}}{RLV_{i,t-2}} \right] + \varepsilon_{it} \quad (\text{Eq.2})$$

Dummy variable assumes value 1 when the sale liquid revenue (SLR) decreases between t and t-1 periods, and zero when the contrary happens.  $\beta_1$  coefficient measures the percent change, sale, general and administrative expenses (SGA) with an increase of 1% in SLR. The sum of  $\beta_1$  and  $\beta_2$  coefficients results in percentage change in VGA with a 1% reduction in RLV. For the first research hypothesis (H1) is not rejected, the coefficient  $\beta_1$  must be greater than zero and the coefficient  $\beta_2$  should be significantly less than zero.

To test the second research hypothesis (H2), that stickiness cost of public companies from Latin America decline with the aggregation of periods, the model I regressions were estimated for aggregate periods of 1, 2, 3 and 4 years.

Model II (Equation 2) is used to test the third and the fourth hypotheses. The coefficient  $\beta_3$  indicates the lagged effect of the variation in costs of revenues (H3). It is expected that this coefficient is significant and positive. The coefficient  $\beta_4$  measures the reversal of asymmetric costs in subsequent periods (H4).

The conditions for the research hypotheses are not rejected are summarized in Table 1

Table 1: Conditions for not rejecting hypothesis

Hypothesis	Expected effect
H <sub>1</sub>	$\beta_1 > 0, \beta_2 < 0, \beta_1 + \beta_2 < 1$
H <sub>2</sub>	$\beta_2$ decreases in absolute value with the aggregation of years per
H <sub>3</sub>	$\beta_3 > 0$
H <sub>4</sub>	$\beta_4 > 0, \beta_4 <  \beta_2 $

Source: Costa et al. (2005)

To test the research hypotheses we used a set of unbalanced panel data of listed companies in nine countries in Latin America (Argentina, Brazil, Chile, Colombia, Costa Rica, Jamaica, Mexico, Peru, Venezuela) with available data on the basis of Thompson Reuters data for the period 1995-2012 (Table 2).

Table 2: Countries, company and observation amount

Country	Acronym	Company	Observation
Argentina	ARG	56	896
Brazil	BRA	225	3.600
Chile	CHL	130	2.080
Colombia	COL	45	720
Costa	CRI	3	48
Jamaica	JAM	17	272
Mexico	MEX	81	1.296
Peru	PER	92	1.472
Venezuela	VEM	20	320
<b>Amount</b>		669	10.704

Source: Elaborated by the searchers

Initially, this database had 1,364 listed companies located in Latin America, and only 868 had data for net sales and selling, general and administrative disclosed for the period of study. We excluded companies that did not have data in at least eight years of the time horizon of the study, resulting in a sample of 669 companies and 12,042 data. We also excluded the observations in 1995 and 1996, because they were used only for calculating lagged variables, resulting in a final sample of 10,704 observations and 669 public companies. Due to the different currencies of each country in the sample, data were collected in U.S. dollars. Thus, the research sample consists of listed companies of Latin America accounting information disclosed in that currency.

## Results and Discussions

Table 3 presents the descriptive statistics segregated by country component of the sample.

Table 3: Descriptive statistics per country

Country	Variable	Quant.	Average	%	Pattern	Minimum	Median	Maximum
ARG	RLV	731	0,043		0,216	-2,142	0,046	3,113
	VGA	724	0,029	67%	0,198	-1,131	0,038	1,788
BRA	RLV	3.068	0,031		0,189	-2,229	0,040	1,790
	VGA	3.037	0,022	70%	0,186	-1,360	0,029	2,056
CHL	RLV	1.697	0,037		0,219	-2,911	0,042	2,619
	VGA	1.669	0,029		0,223	-2,538	0,033	2,219
COL	RLV	585	0,049		0,208	-0,630	0,041	3,817
	VGA	582	0,031	64%	0,165	-0,820	0,038	1,478
CRI	RLV	32	0,063		0,153	-0,356	0,075	0,317
	VGA	32	0,061		0,163	-0,441	0,041	0,408
JAM	RLV	219	0,017		0,156	-0,923	0,030	0,425
	VGA	218	0,016	93%	0,169	-0,741	0,025	0,569
MEX	RLV	999	0,036		0,285	-3,726	0,044	3,074
	VGA	991	0,027		0,223	-2,438	0,033	2,278
PER	RLV	1.209	0,031		0,190	-1,183	0,035	1,442
	VGA	1.204	0,024	79%	0,186	-1,340	0,028	2,172
VEM	RLV	305	0,033		0,119	-0,379	0,034	0,691
	VGA	305	0,026	77%	0,136	-0,448	0,036	0,544
América	RLV	8.845	0,035		0,209	-3,726	0,040	3,817

Latina	VGA	8.762	0,025	73%	0,196	-2,538	0,031	2,278
--------	-----	-------	-------	-----	-------	--------	-------	-------

Source: Elaborated by the searchers

The total valid for the variable 'net sales' (SRV) observations is 8,845, whereas the Latin American region, and 8,762 for the variable 'selling, general and administrative' (SGA). Brazil is the country with the largest number of observations in the sample (3,068 to 3,037 for SRV and SGA). On the opposite side is Costa Rica with 32 observations for SRV variation of listed companies in Latin America averaged 0.035, i.e. the SRV increased on average 3.5% from 1995 to 2012. This variable has a median of 0.040, close to the average value of 0.035, which suggests that the average is not affected by extremely high or low values of SRV (Table 3). The mean change from SGA was 0.025, suggesting that the costs of sales, general and administrative of public companies in Latin America increased by 2.5% on average over the time horizon of the study. The variation of the SGA of the listed companies in Latin America represents 73% of the variation of the SRV. The lowest average SRV was the listed companies of Jamaica (0.017), but the SGA expenses represent 93% of RLV.

Descriptive statistics of the SRV and SGA, segregated by sampling period are presented in Tables 4 and 5, respectively.

Table 4: Descriptive statistics per year SRV

Year	SRV					
	Quant.	Averag	Pattern	Minimum	Median	Maximum
1997	266	0,034	0,176	-1,486	0,027	1,137
1998	337	-0,003	0,168	-1,121	-0,005	1,062
1999	406	-0,038	0,271	-1,345	-0,034	3,817
2000	450	0,041	0,253	-1,169	0,028	3,113
2001	475	-0,015	0,170	-1,778	-0,010	1,089
2002	512	-0,087	0,193	-1,504	-0,052	0,613
2003	550	0,069	0,175	-1,104	0,078	1,196
2004	590	0,090	0,140	-1,372	0,084	1,442
2005	636	0,084	0,186	-2,229	0,082	1,613
2006	648	0,069	0,157	-1,366	0,058	1,146
2007	657	0,088	0,298	-3,726	0,090	3,074
2008	662	0,008	0,155	-0,957	-0,002	1,153
2009	663	0,052	0,189	-0,659	0,051	1,788
2010	665	0,081	0,213	-1,182	0,069	2,619
2011	664	-0,006	0,258	-3,078	0,018	0,899
2012	664	0,016	0,163	-1,094	0,028	1,324
Total	8.845	0,035	0,209	-3,726	0,040	3,817

Source: Elaborated by the searchers

We noticed that the number of observations for SRV (Table 4) and SGA (Table 5) variables increased over the time horizon of the study. In addition, the mean change in net income and the change in selling, general and administrative expenses are negative for the years 1998, 1999, 2001, 2002, 2011 (2012 only for VGA).

Table 5: Descriptive statistics per year SGA

Year	sGA					
	Quant.	Averag	Pattern	Minimum	Median	Maximum
1997	258	0,036	0,176	-0,814	0,023	1,646
1998	326	-0,002	0,151	-1,128	0,000	0,821
1999	400	-0,041	0,179	-0,869	-0,041	1,478
2000	442	0,016	0,186	-1,001	0,011	1,788
2001	469	-0,003	0,158	-0,905	-0,007	0,949
2002	506	-0,091	0,191	-1,340	-0,068	1,640
2003	541	0,046	0,191	-2,538	0,047	1,150
2004	585	0,070	0,175	-0,536	0,064	2,278
2005	633	0,083	0,163	-1,131	0,072	2,056
2006	647	0,084	0,160	-0,688	0,059	1,690
2007	652	0,087	0,217	-1,186	0,074	1,624
2008	661	0,004	0,178	-1,017	-0,006	2,149
2009	661	0,065	0,160	-1,096	0,063	0,839
2010	659	0,051	0,187	-0,910	0,052	2,219

2011	660	-0,047	0,225	-2,438	-0,007	1,045
2012	662	-0,010	0,254	-1,920	0,020	0,984
Total	8.762	0,025	0,196	-2,538	0,031	2,278

Source: Elaborated by the searchers

Table 6 presents the results of Chow, Lagrange Multiplier (LM) of Brusch and Pagan and Hausman tests for the Latin American sample. The Brusch and Pagan and Chow test suggest that pooled is the most appropriate model. The Hausman test indicates the model as fixed as appropriate. Thus, the test results show that the model common intercept (pooled) is the most suitable for both the Model I (Equation 1), and for Model II (Equation 2).

Table 6: *Chow, LM and Hausman tests*– América Latina

Model	<i>Brusch and Hausman</i>		<i>Chow</i>		Suitable specification
	Chi2	Prob	Chi2	Prob	
I	0,00	1,00	22,90	0,00	0,61 1,00 Pool
II	0,00	1,00	22,81	0,00	0,64 1,00 Pool

Source: Elaborated by the searchers

From the results of Table 6 data, we present the regression results for the three panel data models (pooled, fixed and random), but we will comment only the results of the more suitable, model, pooled. Besides the coefficients and the statistics t, we will present R<sup>2</sup>, F statistics and the observation number.

The results of estimation of model I (Equation 1), using the constant coefficient (pooled regression) are shown in Table 7. For the Latin America country sample, the significant value of the coefficient  $\beta_1$  (0.560) indicates that the cost of sales, general and administrative (SGA) increased 0.56% for a 1% increase in sales (SRV). The negative and significant sign of the coefficient  $\beta_2$  (-0.107) shows that, in a similar way to the United States (Anderson et al., 2003), to Japan (He et al., 2010) and Brazil (Costa et al., 2005), SGA OF Latin America present sticky behavior. The combination of the  $\beta_1$  and  $\beta_2$  values (0.560 to 0.107 = 0.453) shows that the SGA decrease only 0.45% for a 1% reduction in SRV. The fact that  $\beta_1$  and  $\beta_1$  and  $\beta_2$  sum to be significantly smaller than 1 shows that the SGA are not proportional to the variations of the recipe. With this result, considering the sample of listed companies in Latin America, the H1 hypothesis SGA asymmetry with respect to variations of the SRV is also not rejected in this study.

Table 7: Model I - Estimate Coefficients ( T statistics) – Pooled Regression

	Lat Am	ARG	BRA	CHL	COL	CRI	JAM	MEX	PER	VEM
$\beta_0$	0,001 (0,59)	-0,012 (-2,07)	0,004 (1,15)	0,002 (0,47)	0,016 (2,81)	-0,010 (-0,43)	-0,005 (-0,39)	0,005 (0,83)	-0,004 (-0,75)	0,003 (0,31)
$\beta_1$	0,560 (44,61)	0,701 (23,82)	0,427 (16,01)	0,591 (19,84)	0,499 (18,88)	1,016 (6,36)	0,736 (5,78)	0,521 (15,98)	0,709 (20,90)	0,750 (10,41)
$\beta_2$	-0,107 (-5,6)	-0,224 (-4,24)	-0,091 (-2,28)	-0,102 (-2,21)	0,291 (3,82)	-0,211 (-0,70)	-0,200 (-1,15)	-0,494 (-1,16)	-0,152 (-2,87)	0,065 (0,42)
F	1,926	402,87	268,92	359,45	297,56	46,02	51,00	368,55	437,86	124,91
R	0,307	0,528	0,152	0,303	0,508	0,760	0,322	0,431	0,422	0,453
N	8.701	719	3.013	.655	580	32	218	978	1.201	305

Source: Elaborated by the searchers

Although the results of Chow, Lagrange Multiplier (LM) of Brusch and Pagan and Hausman tests suggest that common intercept model (pooled) is the most suitable for the research sample (Table 6), the results of the estimation of Model I (equation 1), using the fixed effects model, a random effects and are shown in Tables 8 and 9, respectively, for comparison purposes.

Tabela 8: Modelo I - Coeficientes Estimados (estatística t) – *Fixed Effects*

	ALATINA	ARG	BRA	CHL	COL	CRI	JAM	MEX	PER	VEM
$\beta_0$	0,001 (0,50)	-0,010 (-1,95)	0,004 (0,88)	0,002 (0,43)	0,018 (3,05)	-0,005 (-0,20)	-0,002 (0,11)	0,005 (0,81)	-0,006 (-1,05)	0,002 (0,21)
$\beta_1$	0,551 (39,78)	0,694 (22,80)	0,420 (13,82)	0,590 (17,60)	0,481 (17,21)	1,053 (6,12)	0,703 (5,15)	0,500 (14,12)	0,725 (19,21)	0,749 (9,59)
$\beta_2$	-0,118 (-5,36)	-0,212 (-3,83)	-0,115 (-2,34)	-0,105 (-1,95)	0,318 (3,95)	0,018 (0,05)	-0,127 (-0,67)	-0,628 (-1,33)	-0,184 (-3,06)	0,038 (0,22)
F	1,619	377,79	220,12	314,85	259,87	41,24	44,23	285,67	386,71	108,91
R	0,287	0,533	0,137	0,293	0,494	0,753	0,308	0,389	0,411	0,435
N	8.701	719	3.013	1.655	580	32	218	978	1.201	305

Source: Elaborated by the searchers

We noticed that SGA H1 sticky hypothesis regarding variations of the SRV is not rejected using the three models for panel data: pooled (Table 7), fixed (Table 8) and random (Table 9).

SGA H1 stickiness neither is rejected to open companies in Argentina, Brazil, Chile and Peru (Table 7). This is due to the fact that besides the coefficient  $\beta_1$  being positive and significant, the coefficient  $\beta_2$  is negative and significant for these countries. It is noteworthy that the coefficient  $\beta_1$  is positive and significant for all countries in the sample, suggesting that variations in costs are not proportional to revenue changes.

Table 9: Model I – t statistics Estimated Coefficients – *Random Effects*

	ALATINA	ARG	BRA	CHL	COL	CRI	JAM	MEX	PER	VEM
$\beta_0$	0,001 (0,59)	-0,011 (-1,37)	0,004 (1,15)	0,002 (0,47)	0,016 (2,78)	-0,010 (-0,43)	-0,005 (-0,39)	0,005 (0,83)	-0,004 (-0,75)	0,003 (0,31)
$\beta_1$	0,560 (44,61)	0,698 (23,73)	0,4273 (16,01)	0,591 (19,84)	0,498 (18,81)	1,016 (6,36)	0,736 (5,78)	0,521 (15,98)	0,709 (20,90)	0,750 (10,41)
$\beta_2$	-0,107 (-5,60)	-0,224 (-4,23)	-0,091 (-2,28)	-0,102 (-2,21)	0,292 (3,83)	-0,211 (-0,70)	-0,200 (-1,15)	-0,049 (-1,16)	-0,152 (-2,87)	0,065 (0,42)
Wald chi2(2)	3.851	805,8	537,85	718,91	592,65	92,04	102,01	737,09	875,72	249,82
R	0,287	0,533	0,136	0,293	0,494	0,749	0,307	0,389	0,411	0,435
N	8.701	719	3.013	1.655	580	32	218	978	1.201	305

Source: Elaborated by the searchers

H2 Hypothesis that cost stickiness decreases with period aggregation is rejected according to the results of Model I estimative for multiple periods (Table 10). The signs and significance of the  $\beta_1$  and  $\beta_2$  coefficients estimated for periods of 2, 3 and 4 are similar to those estimated for Model I (one year - Equation 1).

The value of the coefficients  $\beta_1$  and  $\beta_2$  decreases with the aggregation of periods. The combination of these coefficients ( $\beta_1 + \beta_2$ ) results in an asymmetric variation of 0.45%, 0.42%, 0.42% and 0.39% for periods of 1 year, 2 years, 3 years and 4 years respectively. These results suggest an increase in the SGA stickiness with the aggregation of periods.

Table 10: Model I – Period aggregation

<b>t statistic estimated coefficients</b>				
<b>Pooled</b>				
	<b>1 year period</b>	<b>2 years period</b>	<b>3 years period</b>	<b>4 years period</b>
$\beta_0$	(0,59)	(1,02)	(0,62)	(1,48)
$\beta_1$	(44,61)	(26,72)	(23,66)	(20,09)
$\beta_2$	-0,107 (-5,60)	-0,084 (-2,74)	-0,088 (-2,64)	-0,079 (-2,20)
F				
N				

Source: Elaborated by the searchers

The rejection of the hypothesis of decreasing asymmetry of VGA open Latin American companies investigated, for 1995-2002 period with period aggregation confirms Costa et al.'s findings (2005) concerning to Brazil. However, it does not confirm those from Anderson et al. (2003) regarding the United States neither those from He et al. (2010) related

to Japan. Costa et al. (2005) suggest greater rigidity of the Brazilian labor legislation as justification for H2 rejection. This justification was also presented by Calleja et al. (2006). For these authors, countries legal system code law (such as Brazil) may have a more pronounced cost stickiness and can take longer to make the decision to reduce costs in the face of reduced revenues. This fact can be explained by these countries present a weak corporate governance system, and a least developed market, which can cause greater agency costs.

Table 11 illustrates the results of estimation of model II (Equation 2) using the pooled regression model (as results of Table 6). The values and significance of the coefficients  $\beta_1$  (0.573) and  $\beta_2$  (-0.107), for Latin America, are similar to those found in Model I (Table 6). The  $\beta_3$  (0.026), positive and significant coefficient suggests an outdated SGA in for a change in the sales effect, corroborating the hypothesis H3. This hypothesis is confirmed in studies carried out by Anderson et al. (2003), concerning to the United States, and that one done by He et al. (2010), in relation to Japan, however, this hypothesis is rejected in Costa et al.'s study (2005), for Brazil. These authors suggest a rigid labor laws in Brazil as justification for this result.

The  $\beta_4$  (0.065) coefficient is positive, significant and smaller than the  $\beta_2$  coefficient leading to non-rejection of the hypothesis H4 that sticky SGA in Latin American open companies are reversed in subsequent periods (Table 11). This hypothesis is neither rejected by Anderson et al. (2003), He et al. (2010) and Costa et al. (2005).

Table 11: Model II – t statistic estimated coefficients - Pooled

	ALATINA	ARG	BRA	CHL	COL	CRI	JAM	MEX	PER	VEM
$\beta_0$	-0,001 (-0,54)	-0,011 (-1,81)	0,002 (0,41)	0,004 (0,66)	-0,013 (-1,86)	0,017 (0,90)	-0,012 (-0,81)	0,009 (1,28)	-0,009 (-1,64)	-0,002 (-0,17)
$\beta_1$	0,573 (39,23)	0,676 (21,66)	0,437 (14,97)	0,546 (17,12)	0,840 (16,35)	1,020 (8,52)	0,772 (5,80)	0,456 (9,48)	0,748 (20,85)	0,761 (10,32)
$\beta_2$	-0,107 (-4,97)	-0,276 (-4,78)	-0,058 (-1,32)	0,006 (0,12)	-0,182 (-1,86)	0,138 (0,58)	-0,391 (-2,01)	0,020 (0,35)	-0,227 (-3,99)	0,037 (0,23)
$\beta_3$	0,026 (2,58)	-0,055 (-1,95)	0,104 (4,56)	0,003 (0,11)	0,030 (1,27)	-0,111 (-1,20)	0,050 (0,70)	0,003 (0,15)	0,009 (0,34)	0,582 (0,92)
$\beta_4$	0,065 (3,62)	0,061 (1,37)	0,032 (0,90)	0,054 (1,14)	0,060 (1,00)	-0,542 (-2,93)	0,090 (0,62)	0,095 (2,24)	0,067 (1,45)	-0,031 (-0,30)
F	839	158	141,11	160,67	133,3	48,3	17,65	142,82	201,22	60,4
R	0,293	0,488	0,166	0,297	0,500	0,885	0,262	0,388	0,421	0,456
N	8.096	668	2.818	1.525	539	30	204	907	1.112	293

Source: Elaborated by the searchers

For comparison, Tables 12 and 13 present the results of the estimation of Model II (Eq. 2) using the fixed effects model and random effects respectively.

Table 12 – Modelo II - t statistic estimated coefficients - Fixed

	ALATINA	ARG	BRA	CHL	COL	CRI	JAM	MEX	PER	VEM
$\beta_0$	-0,001 (-0,54)	-0,009 (-1,44)	0,001 (0,27)	0,005 (0,89)	-0,010 (-1,37)	0,033 (1,69)	-0,008 (-0,51)	0,011 (1,62)	-0,012 (-2,10)	-0,004 (-0,41)
$\beta_1$	0,569 (35,31)	0,665 (20,52)	0,437 (13,39)	0,535 (14,78)	0,814 (14,80)	0,926 (7,66)	0,745 (5,20)	0,409 (7,84)	0,778 (19,40)	0,779 (9,61)
$\beta_2$	-0,121 (-4,94)	-0,230 (-3,75)	-0,079 (-1,52)	0,028 (0,50)	-0,143 (-1,36)	0,562 (2,06)	-0,297 (-1,37)	0,036 (0,56)	-0,284 (-4,38)	-0,027 (-0,15)
$\beta_3$	0,008 (0,77)	-0,048 (-1,62)	0,081 (3,29)	-0,010 (-0,38)	0,029 (1,17)	-0,028 (-0,26)	0,042 (0,54)	-0,028 (-1,24)	0,002 (0,08)	0,054 (0,81)
$\beta_4$	0,087 (4,53)	0,034 (0,74)	0,063 (1,65)	0,068 (1,34)	0,025 (0,39)	-0,592 (-3,47)	0,206 (1,25)	0,129 (2,91)	0,089 (1,84)	-0,012 (-0,12)
F	699	151	114	140	114,03	46,95	15,56	105,08	178,9	52,17
R	0,274	0,499	0,150	0,286	0,482	0,891	0,254	0,338	0,413	0,437
N	8.096	668	2.818	1.525	539	30	204	907	1.112	293

Source: Elaborated by the searchers

Table 13: Modelo II - t statistic estimated coefficients - *Random*

	ALATINA	ARG	BRA	CHL	COL	CRI	JAM	MEX	PER	VEM
$\beta_0$	-0,001 (-0,54)	-0,010 (-1,47)	0,002 (0,41)	0,004 (0,66)	-0,012 (-1,80)	0,017 (0,90)	-0,012 (-0,81)	0,009 (1,28)	-0,009 (-1,64)	-0,002 (-0,17)
$\beta_1$	0,573 (39,23)	0,673 (21,51)	0,437 (14,97)	0,546 (17,12)	0,839 (16,30)	1,021 (8,52)	0,772 (5,80)	0,456 (9,48)	0,748 (20,85)	0,761 (10,32)
$\beta_2$	-0,107 (-4,97)	-0,272 (-4,70)	-0,058 (-1,32)	0,006 (0,12)	-0,181 (-1,85)	0,139 (0,58)	-0,391 (-2,01)	0,020 (0,35)	-0,227 (-3,99)	0,037 (0,23)
$\beta_3$	0,026 (2,58)	-0,056 (-2,00)	0,104 (4,56)	0,003 (0,11)	0,030 (1,27)	-0,111 (-1,20)	0,050 (0,70)	0,003 (0,15)	0,009 (0,34)	0,058 (0,92)
$\beta_4$	0,065 (3,62)	0,057 (1,29)	0,032 (0,90)	0,054 (0,14)	0,059 (0,97)	-0,543 (-2,93)	0,090 (0,62)	0,095 (2,24)	0,067 (1,45)	-0,031 (-0,30)
Wald chi2(2)	3.356	630	564	643	530,75	193,18	70,61	571,27	804,89	241,58
R	0,273	0,499	0,150	0,286	0,482	0,876	0,251	0,337	0,413	0,437
N	8.096	668	2.818	1.525	539	30	204	907	1.112	293

Source: Elaborated by the searchers

Table 14 shows the results of the hypotheses tested in this study (current column) compared the results found by Anderson et al. (ABJ, 2003), He et al. (HTS 2010) and Costa et al. (CMS, 2005).

Table 14: Result synthesis

	Current	ABJ (2003)	HTS (2010)	CMS (2005)
H1 – SGA stickiness related to SRV	Not	Não	é Não	é Não
H2 - Cost stickiness decreases with period aggregation	Rejected	Not rejected	Not rejected	Rejected
H3 – SGA lagged setting forth variations of	Not	Not rejected	Not rejected	Rejected
H4 – reversal of SGA stickiness subsequent periods.	Not rejected	Not rejected	Not rejected	Not rejected

Source: Elaborated by the searchers

## Conclusion

This research analyzed cost behavior, investigating the existence of cost sticky behavior of listed companies in Latin America. The survey sample consists of 669 public companies from nine countries in the region, from 1995 to 2012.

Our findings highlight the asymmetric cost behavior in relation to changes in sales revenue for the listed countries of Latin America object of study companies. In other words, on average, when the sales revenue (SRV) increases 1%, selling, general and administrative expense (SGA) increased 0.56%, but when the SRV decreases by 1%, SGA decrease only 0.45%. These results are consistent with those found for public companies in the United States, Brazil and Japan found respectively by Anderson et al. (2003), Costa et al. (2005) and He et al. (2010).

Considering specifically the results of the sample of listed companies in Latin America, H1 hypothesis, on cost stickiness in relation to changes in revenue, is confirmed in this study. H2 hypothesis that cost stickiness decreases with addition of periods is rejected since the results show an increase in the asymmetry of the cost of adding periods. A conjecture for the fact that this hypothesis has not been confirmed in this study may be the rigidity of labor laws of code-law countries. H3 hypothesis that there is a lagged adjustment costs in relation to revenue variations, is neither rejected. H4 hypothesis, that stickiness costs are reversed in subsequent years, was confirmed.

The results of this study show the importance of facing the development of new models of analysis of cost behavior scientific research. The inclusion of quantitative methods in cost analysis can assist accountants, shareholders, managers, analysts and other professionals involved in the review process to identify the asymmetric cost behavior, committed to adjusting the level of activities and resources more effectively timing.

Furthermore, monitoring asymmetric costs can reduce agency costs, since the reluctance to adjust resources in response to changes in demand may involve personal considerations.

Latin America currently has about twenty countries, but the sample of this research consists of nine of these countries, which prevents generalization of results. For future research, we suggest to investigate the magnitude of the cost stickiness in relation to contingent factors, such as size, sector, strategy, perceived stage of life cycle and environmental uncertainty as well the intensity level of competition, production technology and technology management. Moreover, it could be relevant to conduct researches to identify factors that could determine the reversion, or not, the asymmetry in lags and also to identify why the asymmetry decreases in costs not exceeding one year.

### References:

- Anderson, M. C., Banker, R. D., & Janakiraman, S. N. (2003). Are selling, general, and administrative costs “sticky”? *Journal of Accounting Research*, 41(1), 47-63.
- Balakrishnan, R., & Gruca, T. S. (2008). Cost Stickiness and Core Competency: A Note. *Contemporary Accounting Research*, 25(4), 993-1006.
- Banker, R. D., & Chen, L. (2006). Predicting earnings using a model based on cost variability and cost stickiness. *The Accounting Review*, 81(2), 285-307.
- Banker, R. D., Byzalov, D., & Chen, L. T. (2012). Employment protection legislation, adjustment costs and cross-country differences in cost behavior. *Journal of Accounting and Economics*.
- Banker, R. D., Byzalov, D. & Plehn-Dujowich, J. M. ( 2011). Sticky cost behavior: theory and evidence. 2011. Retrieved <<http://astro.temple.edu/~dbyzalov/sticky.pdf>>, from: 20 jul. 2013.
- Banker, R., Byzalov, D., & Plehn-Dujowich, J. M. (2010). Sticky cost behavior: theory and evidence. Unpublished working paper, Temple University.
- Brasch, H. D. (1927). Zur Praxis der Unkostenschwankungen und ihrer Erfassung. *Betriebswirtschaftliche Rundschau*, 4, 41.
- Calleja, K., Steliaros, M., & Thomas, D. C. (2006). A note on cost stickiness: Some international comparisons. *Management Accounting Research*, 17(2), 127-140.
- Chen, C. D., Lu, H., & Sougiannis, T. (2012). The Agency Problem, Corporate Governance, and the Asymmetrical Behavior of Selling, General, and Administrative Costs. *Contemporary Accounting Research*, 29(1), 252-282.
- Da Costa, F. M., Lopes, A. B., & Costa, A. C. D. O. (2006). Conservadorismo em cinco países da América do Sul. *R. Cont. Fin.–USP, São Paulo*, (41), 7-20.
- Dalla Via, N., & Perego, P. (2013). Sticky cost behaviour: evidence from small and medium sized companies. *Accounting & Finance*.
- Guenther, T. W., Riehl, A., & Rößler, R. (2013). Cost stickiness: state of the art of research and implications. *Journal of Management Control*, 1-18.
- He, D., Teruya, J., & Shimizu, T. (2010). Sticky selling, general, and administrative cost behavior and its changes in Japan. *Global Journal of Business Research*, 4(4), 1-10.
- Janakiraman, S. (2010). The Information Content of the SG&A Ratio. *Journal of Management Accounting Research*, 22(1), 23-30.
- Jensen, M. C., & Meckling, W. H. (2008). Teoria da firma: comportamento dos administradores, custos de agência e estrutura de propriedade. *Revista de Administração de Empresas*, 48(2), 87-125.
- Kama, I., & Weiss, D. (2013). Do earnings targets and managerial incentives affect sticky costs?. *Journal of Accounting Research*, 51(1), 201-224.
- Medeiros, O. R. D., Costa, P. D. S., & Silva, C. A. T. (2005). Testes empíricos sobre o comportamento assimétrico dos custos nas empresas brasileiras. *Revista Contabilidade & Finanças*, 16(38), 47-56.
- Noreen, E. W., & Garrison, R. H. (2001). *Contabilidade gerencial*. Rio de Janeiro: LTC.

- Noreen, E., & Soderstrom, N. (1994). Are overhead costs strictly proportional to activity?: Evidence from hospital departments. *Journal of Accounting and Economics*, 17(1), 255-278.
- Oliveira, P. H. D., Lustosa, P. R. B., & Sales, I. C. H. (2007). Comportamento de custos como parâmetro de eficiência produtiva: uma análise empírica da Companhia Vale Do Rio Doce antes e após a privatização. *Revista Universo Contábil*, 3(3), 54-70.
- Weiss, D. (2010). Cost behavior and analysts' earnings forecasts. *The Accounting Review*, 85(4), 1441-1471.

# USING SERIOUS GAMES TO RECRUIT, INTEGRATE AND TRAIN YOUR EMPLOYEES: AN EXPLORATORY STUDY OF PRACTICES

*Oihab Allal-Chérif, PhD in Management Sciences*  
Head of Operations Management and Information Systems Department  
Kedge Business School, Bordeaux, France

---

## Abstract

Serious games are used in various sectors, including car industry, defense, aeronautics, pharmaceuticals, healthcare, banking, and media. They seem to have reinvigorated and expanded the field of corporate simulations. Different from e-learning tools, they are relying on new information and communications technologies; they have borrowed from the universe of video games to offer players/learners a new kind of experience. Much more than a simple fashion, serious games have become ubiquitous in the field of recruitment, ranging from the integration of new employees to interactive training, benchmarking and institutional communications. Serious games have had a major effect on human resource management in the companies that use them, and their generalization augurs some major and lasting changes in this function. The present text aims to study several cases of serious games and demonstrate the different ways in which these games are used as well as their impact on individual and collective performance and on human resource management practices. The article will pursue a prospective approach that also gives consideration to potential developments affecting these gaming-educational platforms and the corporate roles they can be expected to fulfill in the future.

---

**Keywords:** Serious games, human resource management, recruiting, collaboration, training.

## Introduction

Joseph Chilton Pearce wrote that, "Play is the only way the highest intelligence of humankind can unfold" (Pearce, 1993). Organisations may appreciate the higher intelligence produced through gaming but most refuse to acknowledge this openly and many view the prospect with disdain. Games are equated with entertainment and therefore not taken seriously by managers who generally refuse to accept their usefulness. In this view, games are vulgar and futile whereas management is noble and attends to important issues. Yet serious games are already being used by most multinationals (and more than half of all companies listed on the CAC40 stock index of leading French companies). Born in the United States during the 1990s and having grown ever since in sectors such as health care or aeronautics, games enable new modes of recruitment, training, evaluation and management based on virtualization and enhanced reality.

Role-playing games are often criticized, especially in their mass online multi-player form, for imprisoning young persons in a virtual reality where they escape from real life. It is true that in certain extreme cases, teenagers spend so much time gaming that they stop sleeping and studying. Yet above and beyond the social malaise manifested through some Internet users' cyber-addictions, the pathological vision of online games should not be generalised. The growth of serious games highlights a change in managers' vision of video gaming practices, which are no longer perceived as a form of alienation and pathology but as a way of stimulating young talents' creativity and competitiveness, making training

programmes more attractive and immersive and communicating more effectively about sensitive subjects that may otherwise be difficult to treat holistically.

With nearly one billion people in the world playing at least occasionally, serious games are geared towards a population that is relatively familiar with online gaming - particularly Generation Y, which is very used to gaming and the leading consumer of training and coaching. At the same time, serious games have been designed to be accessible to as many as possible. Many people have benefited from this democratisation of video games, a recent phenomenon that has touched all generations and social classes thanks to new approaches such as FarmVille on Facebook or Dr Kawashima's Brain Training or WiiFit on Nintendo Wii. Teenagers no longer dominate the world of gaming, which has been able to attract new audiences by means of new devices that can be categorised in different ways.

Like traditional games, serious games offer scenarios that encourage players to move from one stage to another by overcoming any challenges they meet and improving their scores and levels. The widespread use of avatars, which serve as players' digital doppelgängers, encourages involvement and interaction. Serious games' design combines competencies held by game designers, developers, infographic specialists, scenario writers, community managers, trainers, business experts and human resource directors. All have helped to develop a tool that is entertaining, at the cutting edge of current technologies and corresponds to specific objectives that are relevant to a company's different businesses, global strategy and human resource management modes. It generally takes between one and two years to develop a serious game.

Once the present article has defined and categorised serious games, its first section starts by trying to enhance understanding of their impact on human resource management practices. The second section then presents the origins and definition of serious games' different forms and uses, describing how such tools are employed to recruit and integrate employees, enhance training and benchmarking, encourage internal collaboration and disseminate corporate values. The third section is devoted to exploratory methodology based on exploration and observation. The fourth section describes serious games' impact on recruitment practices, training, integration, observation and telecommunications in the human resource function. Finally, after signaling the dangers and limitations associated with serious games, the conclusion summarizes the lessons that might be drawn from this research work.

### **Serious games: playful work or professional game**

Research and publications on serious games remain few and far between given the novelty and relative immaturity of these objects. However, some publications specialising in how to educate and train people to use video games did begin to appear in 2010 in places such as the International Journal of Gaming and Computer-Mediated Simulations (IJGCMS), or in 2011 in the International Journal of Game-Based Learning. Note that the term "serious games" covers a wide variety of realities, meaning that confusion reigns in this domain. Hence the need to clarify what we mean by serious games while offering a more precise definition of their role and how they affect human resource management.

Back in 1968, Clark C. Abt wrote a book entitled "Serious Game" where he presented his research findings and explained how games constitute a training method that helps to develop industrial projects' management competencies, diffuse marketing messages, disseminate corporate cultures and familiarise people with business processes. The scientific community does not have one single definition for serious games. This would be relatively difficult to establish given the way that this term varies depending on the actors or countries involved. A consensus exists that these are games used for something other than entertainment, but they are often confused with e-learning software or virtual environments.

E-learning is an interactive teaching tool that generally relies on a number of different media modes featuring written and visual support devices such as commented slide shows,

audio or video recordings and tests or checks on people's acquisition of knowledge. Note that some virtual reality games such as Second Life are not the same thing as serious games due to their lack of rules, objectives, modes, levels and competition, or the fact that they do not try to construct knowledge that would be useful in the real world (Derryberry, 2007). Without "learning goals" and an educational dimension, some games are little more than simulations.

There are many terms referring to serious games, attesting both to the diversity of the actors involved and the range of approaches followed. "Educational games, Simulation, Virtual Reality, Alternative Purpose Games, Edutainment, Digital Game-Based Learning, Immersive Learning Simulations, Social Impact games, Persuasive games, Games for Change, Games for Good, Synthetic Learning Environments, Games with an Agenda..." (Alvarez and Djaouti, 2010). These terms exemplify the diversity of perspectives regarding objects that are both similar and different in their structures and uses (Sawyer and Smith, 2008 ; Kasbi, 2012).

The border between serious and non-serious games is very hard to determine. Some games that are generally considered serious are little more than competitions designed to stir people up but do not possess any truly educational dimension. One of the main reasons why serious games seem impossible to characterise and define with any precision is because of the multitude of very heterogeneous sources that have spontaneously produced increasingly similar objects that have converged to such an extent that they can gradually be categorised as serious games.

For Alvarez and Djaouti, a serious game is an "IT application whose initial purpose is to get serious aspects including but not limited to teaching, learning, communications or information, to combine coherently with playful aspects derived from video games" (Alvarez and Djaouti, 2010). According to Noah Falstein, President of the Serious Game Summit, serious games are intended to "make training more passionate and immersive" (2010 Innovations and international Perspectives of the Serious Game).

For the purposes of the present article, serious games will be defined as interactive video games whose main purpose is to teach practices and types of knowledge, irrespective of their organiser. Although they exist for playful purposes, their main objective is multimedia training and not entertainment, whether or not the participant is aware of this. This definition, despite being relatively precise, nevertheless requires a few precisions to better account for the diversity of serious games and associated challenges.

Although standard products do exist, serious games are usually customised projects specifically developed for each customer depending on their needs and corporate culture. The budget can be less than €50,000 for basic projects sold to small entities or anywhere between €100,000 and more than €1 million for sophisticated applications targeting larger groups. Some serious games in certain sectors are even much more expensive, one example being Pulse, a game developed by BreakAway that reproduces a complete hospital in 3D. Considered the most expensive series game ever, it supposedly cost more than €7 million to develop.

### **A paradox that managers can find hard to accept**

Throughout their education, children, teenagers or young students are taking part in a very versatile world that is subject to constant innovation and where they can use each developmental phase to construct their intelligence, discover modelling and develop creativity by means of more or less playful experiences. This is nothing new. Baudelaire already noted that, "Children use games to demonstrate their great capacity for abstraction and powerful imagination. They play without toys" (Baudelaire, 1868). Today this ability is being vastly expanded through the use of information and communications technologies. Yet companies remain reluctant to engage in activities that are based on gaming or do not mesh with their current organisations.

"Talking about science fiction in areas such as economics or enterprise seems incongruous but it is anything but that. Science fiction constitutes one of several keys for opening new doors to people's imagination, providing a form of questioning that encourages lateral thinking or new perspectives towards the daily framework within which a company operates" (Tcheng et al, 2009). Note that science fiction authors' predictions have often been correct, inspiring and stimulating their contemporaries while warning against potential deviations and helping people to understand changes that might otherwise be too violent and therefore painful to experience at the individual level. Games enable a form of anticipation and simulation that is very realistic, to the extent that some people can lose themselves in games and spend even more of their life in a virtual world than in the real one.

As Bernanos wrote, "As children show us every day, you can be very serious about something you think is fun" (Bernanos, 1949). Yet since games are entertainment, managers often refuse to see them as anything serious or useful. In this view, games are vulgar and futile whereas management is noble and attends to major challenges. At the same time, as Heracles already explained 2,500 years ago, "People only reach their maturity when they rediscover the seriousness that was part of the games they played in their youth". Similarly, Plato wrote that, "You can discover more in an hour of playing than in a year of conversation". As for Jung, in 1936 he wrote that, "Creating something new is not achieved by intelligence but through the gaming instinct".

Some of the intelligence possessed by today's young managers is not welcome in companies where it is considered difficult to exploit. This is because intelligence of this sort may not mesh well with the institutional constraints accompanying current working methods. Nor do they lend themselves to rigorous monitoring; they can seem silly; and they often appear unprofessional. This is the type of intelligence that is developed, *inter alia*, through the use of video games mobilising new practices rooted in the rise of web 2.0 (and 3.0 and 4.0). In particular, it is characterised by (1) extensive knowledge of information and communications technologies (ICT), (2) the ability to find one's way through virtualised environments, (3) a capacity for combining talents in a way that makes it possible to achieve, working collectively, objectives that are inaccessible to people operating alone, (4) digital communications between very divergent social cultural profiles, and (5) the art of managing several tasks in parallel while zapping from one to the other without losing in productivity.

Digital intelligence is therefore already available and satisfies many companies' needs. Yet executives tend neither to measure it nor to give it serious consideration. Given the gap between young graduates' aspirations and the professional circumstances they are offered, the conditions they experience when arriving in the work world is likely to become crucial. Newcomers often feel that they are being crushed, constrained and excluded. They may feel that they are in the wrong place, and that little is done to make them feel valuable or capture the product of the new form of intelligence that they bring. In traditional companies where young recruits are offered a very specific function, they do not find the communal mindset that they were looking for and have to settle for suffocating verticality.

At the same time, the most innovative multinational firms do use virtual work teams and information systems rooted in modern technologies. The problem is that these intelligent new tools imply that users possess a different kind of intelligence, one that is complementary and not redundant. Brains are capable of more qualitative analytical tasks whereas computers store, combine, calculate and suggest solutions. It is the ability to control available technologies and the ease with which managers manipulate virtual objects that determines their ability to evolve in an environment, analyse it, take strategic decisions, improve professional performance and ultimately make progress.

## Methodology

Our purpose is to characterise a phenomenon that is relatively new while increasing understanding of how it operates. As such, our goal is not only to come up with an exact image or representation of an emerging reality but to identify the properties of certain complex events. Based on the elements studied here, we will try to develop hypotheses that have an analytical vocation. By identifying relevant variables, the present study can then be extended through more quantitative approaches featuring more explanatory ambitions. To be precise, research at this level can be defined as hybrid exploration based on initial knowledge and seeking to "give meaning to empirical materials by undertaking frequent iterations between the empirical material that is gathered and theory" (Charreire and Durieux, 1999).

Regarding the study's fundamentally exploratory vocation, two limitations can be noted. From a descriptive perspective, the basic goal here is to describe things so as to understand them from inside out. As for the exploratory aspect, our aim is to determine under what conditions a human resource analytical matrix can be validly applied to the phenomenon of serious gaming. There is no attempt here to establish a causal framework but instead to enhance the emergence or characterization of key variables that might subsequently be tested along more deductive lines. This identification of possible causalities and explanation of possible causal variables remains key (Yin, 1981).

"In general, cases comprise a leading strategy for questions beginning with 'how' or 'why'; when the researcher has very little control over events; and when the focus is on a contemporary phenomenon in a real life context" (Yin, 1993). The use of serious games is very recent phenomenon with such games constituting a particularly unstable, innovative and complex evolution in human resource management modes. The application of a case method therefore fits the traits of our particular object of study.

The main purpose behind exploring complex situations through immersion in several cases is to clarify the interactions between different actors and enhance understanding of certain phenomena. This is because, "It is very doubtful that sociology can formulate so-called 'causal' laws given the unbridgeable discontinuity between cause and effect. Between an antecedent and its consequence exists a margin of uncertainty that is too intense to affirm a repetition of causes and especially to justify the assumption that these causes will produce the same effects in frameworks and circumstances that are fundamentally variable and fluctuating" (Gurvitch, 1962).

The contextualization of a phenomenon and its positioning in social, economic and historical circumstances is what allows researchers and then analysts to comprehend the origins and evolution of an object of research, the processes associated with it and the situation itself (Hlady-Rispal, 2000). This method enables a detailed examination of contemporary phenomena - serious games in the present case - with a view towards distinguishing them from their context. It is in this sense that the use of different data sources can be justified. Although this method may enable a modicum of flexibility, throughout its design phase it also requires reassurances as to the internal and external validity of its construction and reliability. Ensuring that the data used is reliable can mean implementing several different methods (Wacheux, 1996).

A multitude of serious games-related initiatives exist and are both polymorphic and highly spontaneous. In the practices and relationships being implemented through serious games, there are a large number of parameters that influence actors' behaviours. Moreover the strategies and interactions between actors can be extremely diversified. Observing these mechanisms in context and achieving global vision of everyone's motivations implies greater understanding and better performance measurement while enabling more qualitative analysis of the human resource management methods and processes being impacted in this way.

"The number of cases depends on the research objectives. If the purpose is to explore new practices or discuss an original line of questioning, one or several cases suffice to satisfy

the logic of discovery" (Wacheux, 1996). The choice of studying four cases is based on the need to have a sample that is both sufficiently small to enable in-depth qualitative analysis but also large enough for comparison purposes. Moreover, each case specifically corresponds to recruitment, training or the promotion of corporate values. It is the encounters and opportunities that arose over the course of the research that have conditioned the choice of cases. To be honest, whereas each corresponds to a particular human resource management activity, it is also the consequence of our research ambition as well as the result of a favourable set of circumstances.

The first reason for choosing this field of study is because it allows access to some companies. Having worked for a serious games editor has made it easier to get interviews with certain parties. This has involved participant observation (since the co-author also designs cases used in serious games); a compilation of secondary documents; and semi-directive interviews. To supplement this observation, questions were asked of serious games editors, customers and users to enhance understanding of the human resource management modes they face when using such games.

To ensure the responses' relevancy, the case method is validated by a triangulation of collected information, thus confrontation of data, narratives and theories from different sources. Management has triangulated methods for many years (Campbell and Fiske, 1959). Combining several methodologies largely provides the assurance that any variance will derive from the phenomenon under study and not from the method being used. Triangulation is often recommended either to deal with phenomena that are in the process of emerging or else with complex situations (Eisenhardt, 1991, Yin, 1981). With serious games, both of these conditions apply.

### **Serious games' impact on HR management practices and performance**

To maximise the new tools' potentialities, a new form of intelligence will have to be implemented, one characterised by specific competencies such as extensive knowledge of ICT, an ability to find one's way around virtualised environments, a capacity for identifying and combining talents, digital cooperation between highly divergent socio-cultural profiles and the art of multitasking and zapping from one task to another without losing in productivity. Future managers from Generation Y – and soon Generation Z – can develop these competencies through video games or web 2.0 and 3.0 applications. Serious games are a natural extension of these processes (Solnet, Kralj & Kandampully, 2013).

Serious games play an important role in the evolution of HRM practices and the improvement of their performance in terms of new employees' recruitment, training and integration. The games are new brands sparking great interest and attracting audiences that are young, desirable and feature big potential for tools of this kind - and who are therefore attracted by the companies that offer them. This is the goal of games such as Ace Manager or Citizen Act that compete to detect the most brilliant finance students worldwide with a view towards their ultimate recruitment. The most talented applicants seek to face the challenges they are presented to demonstrate their superiority. Including serious games in top universities' training programmes attests to an academic acknowledgment of their educational power.

Serious games have also proven their usefulness for recruitment purposes. Having caused a real buzz online, Moonshield is publicising Thales's brand as a potential employer all across the world. As for L'Oréal and its Reveal game, the aim here is to uncover new talents by attracting students seeking an internship. Before playing, participants have to pass tests that a recruitment agency has designed. These games enable an initial triage of resumes followed by a recruitment selection based on objective performance comparison criteria. "Recruitment interviews increasingly involve role-plays. L'Oréal, which is particularly concerned with the quality of its human resource marketing, relies on this strategy with

business games that enable it to communicate about its business lines and talk about future possibilities. For instance, L'Oréal Brainstorm asks players to re-invent the group's brand" (Trotureau, 2008).

In a recruitment conference, serious games are primarily used to test players' ability to analyze situations, take the right decision in a limited period of time, improvise when the unexpected arises, optimize resources, coordinate competencies and propose new solutions while thinking out of the box. Potential recruits, even if they do not systematically make the right choice, must demonstrate that they are learning from their mistakes and have a strong ability to adapt. In addition to playing a game rooted in a variety of economic, political, social or ecological environments, other interactions can also be included, either involving virtual personalities characterized by heterogeneous profiles or else situations where players are pitted against one another. In turn, this causes random events to which people will need to respond appropriately.

"TF1 and Bouygues Télécom have launched an adventure called Virtual Regatta, where competitors sign up for a free virtual boat race. Participants choose the boat bearing the colors of one of the 25 companies that are present. If they win the race, they are guaranteed to meet the recruitment staff of the company whose colours they carry" (Trotureau, 2008). Serious games of this kind have benefited from considerable R&D and communications investments. They mobilize a very large number of managers who visit universities to enlist students, choose themes, create cases, run sessions, coach players, analyze performance and select the best teams.

America's Army is a game that has had a more positive impact on the enlistment of new recruits than all of the US military's other methods of communication or promotion combined, for a total cost of 3.4 million dollars in 2009, equal to 0.0006% of the nation's military budget (nofrag.com). Any manager would be happy if their company performed as well.

The playful dimension of serious games-based training is a very effective method for transforming an activity that can often be very boring and turning it into something fun. This is much more motivating for training game players since they will be able to read things, watch cartoons and videos, interact with the virtual environment thanks to their avatars and even take online tests (Ulicsak and Wright, 2010). Using multimodality to teach knowledge and practices involves visual memory, auditive memory, logical memory and motor memory in simulation games that involve, for instance, piloting or surgery, thus situations where each gesture is important.

Using repetition and permanent feedback motivates players to correct and perfect themselves. This is because serious games offer extremely realistic role-plays as well as challenges that put players in a position where they must stretch their knowledge and competencies. Players are particularly motivated when they can measure progress and analyze any errors they or their virtual partners make. Benchmarking young and old employees can also lead to a transfer of good practices, something that happens with Cash Detectives.

The Qoveo Company has designed a serious game called "A la recherche des données perdues" ("In search for lost data") where participants are plunged into a crime novel to learn good practices in the area of sensitive data protection. The idea here is to produce something that is accessible to everyone while building a catalogue of shelf products for an operating license of less than €60 per user. Note additionally that game engines can also be recycled nowadays, a development that will reduce design costs considerably. Refurbished with new stories and a new virtual environment, from now on other companies will be able to reuse older games.

Ostensibly, serious games are tools that encourage remote groupwork thanks to the many different digital tools that they offer: shared documents, blogs, video conferencing, etc. This makes it possible to integrate behavioral objectives more or less explicitly into the

learning objectives that are associated with a particular business. Serious games expose users to ideas, behaviors, processes, changes and tools. They help people to measure and correct their reactions in certain situations and signal mistakes in an entertaining manner, motivating participants to improve and surpass themselves.

“In the future, one of the most complicated challenges that HRM faces will be managing talents individually but in light of people’s different personalities, competencies and ambitions, while getting them to adhere to a collective project” (Added et al, 2007). The new information technologies have created an illusion of equality between managers who become part of a community and can therefore no longer be singularized by their age, color, beauty, gender, level of education or accent. People can create new identities for themselves, protected behind their computer screen from any prejudice, using their extensive knowledge of tools to prove themselves. The balance of power is no longer determined by the same criteria. Long years of study are much less empowering nowadays than mastering certain virtual universes and new qualification and evaluation codes.

The next step may well be to add a layer of 2.0 to drive the further emergence of interactive learning communities that exchange and enrich contents by means of a collaborative approach. If so, gaming will find itself enriched by social learning. The cost of this solution is currently prohibitive, however: a game called "Conduire un entretien de vente" (“Carrying out a sales interview”) cost Renault the tidy sum of €150,000. As for Thales, it spent more than €500,000 on Moonshield.

Cooperating on the monitoring protocol is crucial for a game’s success, even if this is a dimension that is totally different from what the players’ experience. In a classroom, teachers are in a position to respond immediately to learners’ questions and correct any mistakes detected during an exercise. Tracking more than 13,000 players remotely is much more complex, however. The chosen system is intended to respond as quickly and precisely as possible to the questions that teams ask, whether this happens while the cases are running or after the solution has been given.

To get the answers to their questions, students must check a Facebook page, being a user-friendly site with which they are all very familiar. It remains that the front office is the only body in direct contact with customers. Its function is to orient and sort players’ requests and diffuse any and all instructions. The monitoring team is committed to responding to players’ queries within 24 hours. These requests can involve missing elements that impede the resolution of the case, errors in the way things are enounced, disputed outcomes or complaints about scoring processes. The number of queries usually rises as the game advances since the stakes are getting higher all the time.

All in all, the game could not exist without collaboration between players and designers alike. Even more intriguing is another dimension that is usually not envisioned at the beginning – the Facebook discussion threads that player teams also use to help one another. Teams get together to discuss solutions and share explanations once the results have been given. Under the circumstances, the things that people tend to look for (and which can be hard to determine in a classroom of ca. 20 students) often tend to develop spontaneously. Despite widespread belief in serious games’ usefulness, they also have a number of limitations, first and foremost being that they cannot train all audiences in all practices from all sectors. Human resource managers and trainers must try identify areas where serious games are real tools for improving practices and optimising individual or collective performance, and not just about gadgets or ways of communicating about a company’s supposed modernity, exemplified through its use of games.

Games are not exclusive solutions but must be a part of a comprehensive training system, implementing transferable and transposable knowledge in virtual situations resembling daily life. "People often wrongly imagine that the game will be powerful enough to cause changes or create the kind of learning whose products are automatically useful to

decision-making. This is rarely the case" (Mayer and Bekebrede, 2006). Games are just one method among many others and should not be considered as anything other than one aspect of an overall approach to training as well as a medium that can be used to convey and transmit practices and knowledge (Klawe and Phillips, 1995; de Freitas and Oliver, 2006; Sisler and Brom, 2008; Ulicsak and Wright, 2010).

To obtain the best results, applicants or employees neither can nor must be happy to merely play. This is what happens in other sectors like healthcare, where Triage Trainer, a game developed by TruSim to train doctors and nurses to classify victims in the aftermath of catastrophe, is part of a training programme whose target audiences have received a manual, attended classes, participated in groupwork and carried out simulations. Tests show that players who went through an entire training programme and found the time to discuss their gaming experiences perform significantly better than those who engage in serious gaming alone (Ulicsak and Wright, 2010).

The knowledge and know-how acquired when using a serious game must be easily transferable and transposable to learners' daily practices. If the game is too different from their professional environment and if the players cannot connect virtual practices to real ones, the game's effectiveness is undermined. It is also important to measure whether a game's educational aims have been achieved. Given that serious games are open and offer players a great deal of freedom, this measurement is hard to do and is often neglected. In this case, the only thing that can be controlled is the players' involvement in the game and their performance - without it ever being really clear whether they have learned to master the game's tools, processes or situations in a way that will enhance their work (Chin et al, 2009). One of the main defects with serious games is that they can seem like gadgets. The fact that these tools are games can undermine their credibility for some people who become dubious as to their usefulness. It is important that a game be rigorously defined in terms of people's needs. Serious award-winning games will also be attracting players who will try to get around the rules. As with all games, participants can always cheat and play in a way that maximises their gains without their necessarily being very interested in the game itself.

## **Conclusion**

With some serious games, it is possible to achieve business objectives by learning and benchmarking the different techniques associated with a specific function. In others, the objectives are more behavioural in nature since what is being encouraged is shared knowledge, collaboration, involvement and rigour. Where games are linked to a specific business and can therefore only be used in certain sectors, games of a more behavioural nature become quite easy to adopt and can be transposed to different types of companies.

Serious games have had considerable impact on human resource management practices in terms of recruitment, training, the integration of new employees, careers management or the promotion of corporate values and culture. Gaming information systems also permit new practices that improve HRM performance. These include benchmarking and the capitalisation of collective knowledge; the identification of exceptional talents that merit being integrated or promoted; greater employee awareness of topics that might normally be of little interest to them; and the simulation of extreme situations that can be difficult or impossible to create in the real world.

With external communications that mesh with the things that Generation Y wants, and/or by adapting the games to employees' working patterns, firms seem to have adopted serious games to the extent that these now appear as extra tools in their arsenals. Further research deepening our interviews and observations should enable a better characterisation of serious games' contribution to the field of human resource management.

**References:**

- Abt C. C. (1968) – *Serious Game*, Viking Press.
- Added E., Raffard W., Dartiguepeyrou C., Saloff Coste M. (2007) – *Le DRH du 3<sup>ème</sup> millénaire*, 2<sup>ème</sup> édition, Village Mondial, Pearson Education France, Paris.
- Alvarez J., Djaouti D. (2010) – *Introduction au Serious Game*, Ludoscience, août 2010.
- Baudelaire C. (1868) – *Curiosités esthétiques*, Garnier Classiques.
- Bernanos G. (1949) – *Dialogues des Carmélites*, Seuil, Paris.
- Campbell D.T. Fiske D.W. (1959) – "Convergent and discriminant validation by the multitrait-multimethod matrix" *Psychological Bulletin*, Vol. 41, N°2, March 59, p. 75-89.
- Charreire S. et Durieux F., (1999), "Construction de l'objet de la recherche", in Thiétart R.A. et coll., *Méthodes de recherche en management*, Dunod, pp 57-80.
- Chin J., Dukes R., Gamson W. (2009) – "Assessment in Simulation and Gaming: A review of the last 40 Years", *Simulation & Gaming*, Vol. 40, N°4, p. 553-568.
- Derryberry A. (2007) – *Serious Games: online games for learning*, Adobe whitepaper, available at <http://seriousgames.ning.com>.
- Eisenhardt K. M. (1991) – "Better stories for better constructs: The case for rigor and comparative logic", *The Academy of Management Review*. Vol. 16, N°03. p. 620-627.
- de Freitas S., Oliver M. (2006) – "How can exploratory learning with games and simulations within the curriculum be most effectively evaluated?", *Computers & Education*, Vol. 46, N°3, p. 249-264.
- Gurvich G. (1962) – "Les règles de l'explication en sociologie : les variations des formules du déterminisme sociologique", *Traité de Sociologie*, PUF, Paris, p. 236-251.
- Hlady-Rispal M. (2000) – "Une stratégie de recherche en gestion : l'étude de cas", *Revue française de gestion*, janvier - février, p. 61-70
- Kasbi, Y. (2012), *Les Serious Games. Une Révolution*, Edipro : Paris, 320 p.
- Klawe M., Phillips E. (1995) – "A classroom study: electronic games engage children as researchers", in *CSCI '95 Conference Proceedings*, p. 17-20.
- Mayer I., Brekebrede G. (2006) – "Serious games and simulation based e-learning for infrastructure management", in *Affective and emotional aspects of human-computer interaction: emphasis on game-based and innovative learning approaches*, (ed.) M Pivec, Amsterdam, IOS Press BV.
- Pearce J. C. (1993) - *Evolution's End: Claiming the Potential of Our Intelligence*, HarperOne, October 1993.
- Sawyer B., Smith P. (2008) – "Serious Game Taxonomy", Serious Game Summit 2008, Game Developer Conference.
- Šisler V., Brom C. (2008) – "Designing an educational game: Case study of Europe 2045", in *Transactions on Edutainment*, Springer Berlin/Heidelberg, p. 1-16.
- Solnet, D., Kralj, A. & Kandampully, J. (2013), "Generation Y Employees: An Examination of Work Attitude Differences", *The Journal of Applied Management and Entrepreneurship*, Vol. 17, n°3, p. 36-54.
- Tcheng H., Denervaud I., Huet J.-M., Delange N. (2009) – "Pour être créatif, mettez-vous à la science-fiction !", *L'Expansion Management Review*, Décembre 2009.
- Trotureau A. (2008) – Quelles innovations pour recruter et manager la Gen Y ? *Business Digest*, N°184, avril 2008.
- Ulicsak M, Wright M. (2010) – *Games in Education: Serious Games*, A Futurelab Literature Review, FutureLab, June 2010.
- Wacheux D. (1996) – *Méthodes Qualitatives et Recherche en Gestion*, Paris, Economica.
- Yin R.K. (1981) – "The case study crisis: Some answers". *Administrative Science Quarterly*, Vol. 26, N°1, p. 58-65.
- Yin R. K. (1993) – *Applications of Case Study Research*, Sage, Newbury Park.

# FOREIGN AID DECREASE – THREAT FOR MILLENNIUM DEVELOPMENT GOALS?<sup>16</sup>

*Kludia Lindtnerova, Ing.*

University of Economics in Bratislava, Faculty of Commerce

---

## Abstract

This paper investigates the relationship between foreign aid and growth in real GDP per capita in Africa in the period 1980 – 2012 using regression. It examines whether foreign aid flows have any effect on the effectiveness of foreign aid and Millennium Development Goals. The results show that the effect of aid on economic growth in Africa is not significant. The paper concludes that the quantity of foreign aid flows is not a significant determinant of GDP growth in Africa. The recent decrease of foreign aid flows should not pose any threat to achieving Millennium Development Goals.

---

**Keywords:** Aid Effectiveness, economic growth, regression analysis, Africa, millennium development goals

## Introduction

The international dispute concerning Official Development Assistance (ODA) has increased significantly over the last decade. This has been caused largely by recent economic and financial crisis and by the international attention towards achieving Millennium Development Goals in 2015. The debate on the effectiveness of foreign aid is still ongoing as there is no clear consensus between the scholars whether or not foreign aid is effective in promoting growth in recipient countries.

African continent is one of the major recipients of ODA since 1960. The largest proportions of ODA are channeled to Sub-Saharan Africa. The level of ODA to Africa doubled over last 10 years. Africa is the continent where most LDCs are located but unfortunately where most countries “off track“ towards the MDGs can be seen. The African continent has been widely criticized for misusing the foreign aid. This paper investigates aid-growth relation at the macro level as it emerges from regression using large data sets (39 African countries, investigated period 1980 – 2012).

The previous literature relies on three different views identifying the effects of aid on growth: there is no relationship (or negative); a positive relationship (usually with diminishing returns); or a conditional relationship in which aid works in some circumstances depending on the procedures of the recipient country or the donors' practice. Griffen and Enos (1970) found negative correlation between aid and growth in 27 countries. Many scholars followed and showed a negative relationship between aid and growth (Mosley, 1980; Mosley et al, 1987; Dowling and Hiemenz, 1982; Singh, 1985; Boone, 1994). Several studies found a positive relationship between aid and growth (Papanek, 1973, Levy 1988). Positive relationships have been found by scholars investigating whether aid might spur growth with diminishing returns (Hajimichael, et. al, 1995; Durberry et al, 1998; Dalgard and Hansen, 2000; Hansen and Tarp 2000 and 2001; Lensink and White, 2001; and Dalgard, et al, 2004). The third view representing conditional relationship in which aid works in some circumstances depending on

---

<sup>16</sup> This paper is a part of a scientific research project VEGA no. 1/0391/13 (Dpt. of International Business, Faculty of Commerce, University of Economics in Bratislava, Slovak Republic - The importance of third countries for the strategic development objectives of the EU in the post-crisis period (with implications for the Slovak economy).

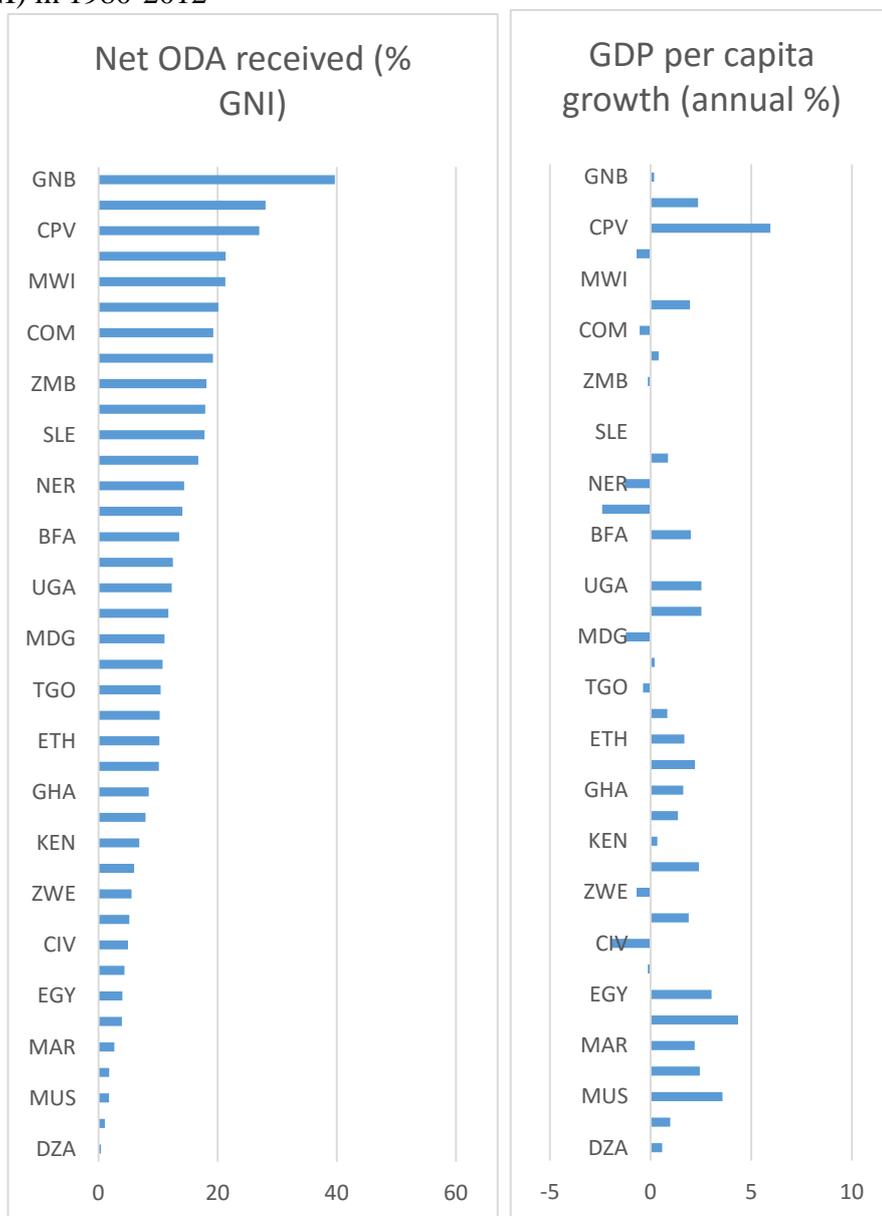
the recipient and the donor characteristics was supported by (Isham, Kaufmann, and Pritchett, 1995; Burnside and Dollar, 2000; Collier and Dehn, 2001; Dalggaard, 2004).

According to statistics there are many reasons to expect that there is a negative relationship between aid and growth in Africa; therefore we turn to empirics to answer this question.

### Causality between aid and growth in Africa

In our research we set two hypotheses: (1) There is no significant relationship between foreign aid and economic growth in Africa; (2) The African countries receiving the most aid do not show any significant growth. In our analysis we use the World Bank data (World Development Indicators) covering most African countries (39) in the period 1980 – 2012. Figure 1 provides a first impression of the data. The patterns are in line with our assumptions (hypothesis 2).

Figure 1 Causality between GDP per capita growth (annual %) and net ODA received (% GNI) in 1980-2012



Source: Calculated by the author using World Bank Data (World Development Indicators) <<http://www.data.worldbank.org>>.

We summarized the results of the above analysis into a table (Table 1). The criterion for indentifying the countries receiving the most aid was set to  $\geq 15\%$  of GNI. This criterion has been selected according to the Center for Global Development<sup>17</sup>, which proves that if foreign aid reaches more than 15% GNI, it becomes ineffective and loses its motivation character.

Table 1 Causality between GDP per capita growth (annual %) and net ODA received (% GNI) in 1980-2012

Country	Net ODA received (%GNI)	GDP per capita growth
1. Guinea - Bissau	40%	0,20%
2. Mozambique	30%	2,40%
3. Cape Verde	27%	6%
4. Burundi	21%	-0,70%
5. Malawi	21%	-0,03%
6. Rwanda	20%	2%
7. Comoros	20%	-0,50%
8. Mauritania	20%	0,40%
9. Zambia	18%	-0,10%
10. Gambia	18%	0,00%
11. Sierra Leone	18%	-0,03%
12. Mali	17%	0,90%
13. Niger	15%	-1,30%
14. Democratic Republic Congo	15%	-2,40%

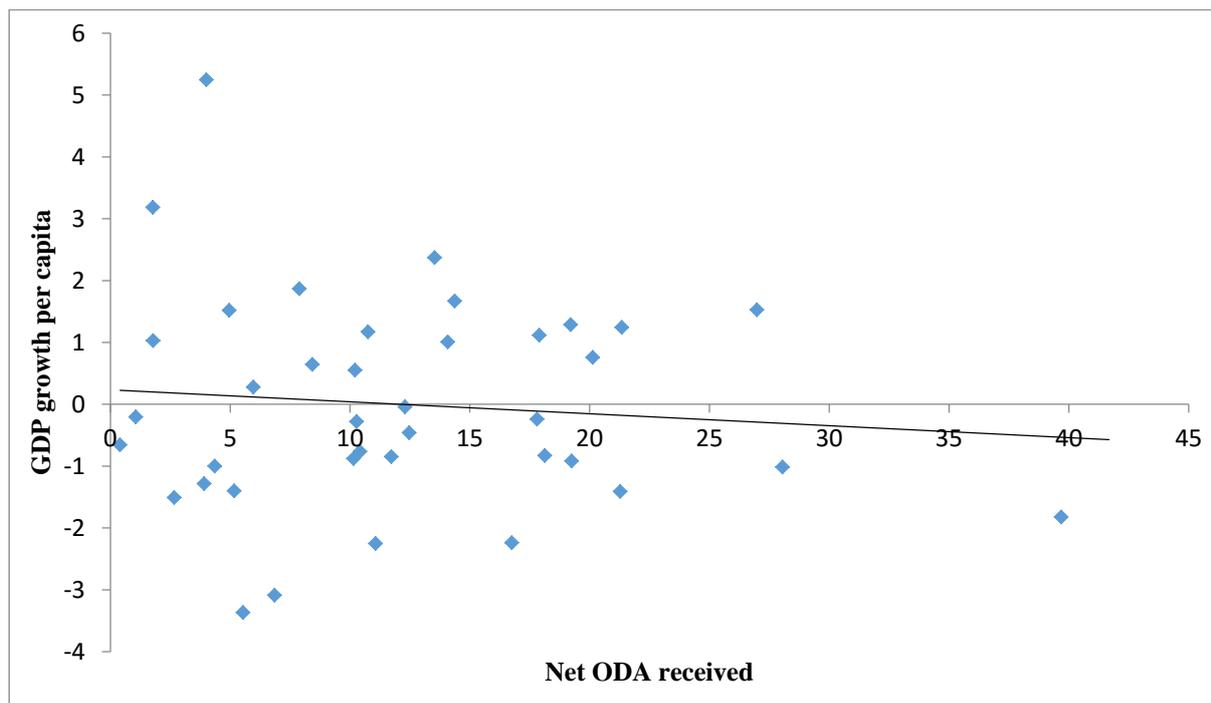
Source: Calculated by the author using World Bank Data (World Development Indicators) <<http://www.data.worldbank.org>>.

The analysis shows, that the foreign aid effectiveness is not significantly determined by economic growth in African countries. The countries which received the most foreign aid (as a percentage of GNI) show negative or very low economic growth. The only exception is Cape Verde that shows GDP growth per capita 6% while receiving foreign aid of 27% of GNI. The results suggest that the African countries receiving the highest share of aid have negative or very low economic growth. In summary, we can conclude that the hypothesis 2 can be accepted. In terms of increasing the effectiveness of aid we conclude that the foreign aid might overarch the absorbing capacity of the countries (the ability of the countries to use the foreign aid effectively). We suggest decreasing the level of foreign aid under 15 % of GNI.

Further, we used regression analysis to determine the relationship between the net ODA and GDP per capita growth. Graphical representation of the regression analysis is presented in the figure below (Figure 2).

<sup>17</sup> ROODMAN, D. 2006. Aid Project Proliferation and Absorptive Capacity. Centre for Global Development Working Paper 75. Washington: Center for Global Development.

Figure 2 Regression analyses between net ODA and GDP per capita growth (1980 – 2012)



## SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0,096121
R Square	0,0092393
Adjusted R Square	-0,0175381
Standard Error	1,7402264
Observations	39

Source: Calculated by the author using World Bank Data (World Development Indicators) <<http://www.data.worldbank.org>>.

The Pearson coefficient is very low (0,096), the X and Y variables are independent. R square equals to 0,0092 ( $R^2$  indicates that 0,09 % of GDP growth is correlated to the growth of foreign aid). The regression analysis shows that there is a negative relationship between growth and aid. As a result, the first hypothesis can be accepted.

### Conclusion

Despite the fact that the financial crisis started in the West, the developing countries are being affected in many ways. The ODA levels reached its peak in 2010, but decreased by - 2.7 % in real terms compared to 2012. This drop was caused by the financial constraints in several DAC countries which have affected the ODA budgets. Bilateral aid to sub-Saharan Africa in 2012 was USD 28.0 billion, representing a fall of -0.9 % in real terms compared to 2011.

Some economists are warning of “lost decades for development” which could have negative consequences for rich and poor countries alike. The World Bank described the crisis as a “development emergency”.

Such aid statistics always impose a threat for achieving Millennium Development Goals in 2015. But is it really ODA volumes that matters? Our regression statistics show that

there is a negative causality between foreign aid and GDP growth per capita since 1980. Despite the fact that the ODA volumes increased significantly since 1980, this masks the extent to which relatively little aid actually reaches recipient countries.

The evidence shows that aid has little impact on development outcomes and the MDGs. The international efforts such as Paris Declaration and Accra Agenda for Action aim to improve the effectiveness of ODA. Progress, however, has so far been very little.

In summary, we can conclude that donors provide aid for a variety of reasons not necessarily related to poverty reduction and the MDGs. On the recipient country side, much aid has been wasted and misused. We recommend monitoring recipient and donor countries practices in order to increase the quality and the effectiveness of foreign aid.

### References:

- Alesina, A., Dollar, D. Who Gives Foreign Aid to Whom and Why? In *Journal of Economic Growth*. 5, 2000.
- Alesina, A., Weder, B. Do Corrupt Governments Receive Less Foreign Aid? In *American Economic Review*, 2002.
- Aryeetey, E. Getting to Zero: Finishing the Job the MDGs started. Geneva: World Policy Institute, 2012.
- Boone, P. Politics and the Effectiveness of Foreign Aid, In *European Economic Review*, 1996.
- Burnside, C., Dollar, D. Aid Policies and Growth. In *American Economic Review*, 2000.
- Cassen, R. Does Aid Work? : Report to an intergovernmental task force. Oxford and NY: Clarendon Press. , 1994.
- Chenery, H.B., Carter, N.G. Foreign Assistance and Development Performance, 1960-1970. In *The American Economic Review*. 63(2), 1966.
- Collier, P., Dehn J. Aid, Shocks and Growth. World Bank: Policy Research Paper, 2001.
- Corden, M.W., Neary, P.J. Booming Sector and De-Industrialisation in a Small Open Economy. In *The Economic Journal*, 1982.
- Chen, S., Ravallion, M. The Developing World is Poorer Than We Thought, But No Less Successful in the Fight Against Poverty. In *Quarterly Journal of Economics*, 2010.
- Chenery, H., Strout, A. Foreign assistance and economic development. In *The American Economic Review*, 1966.
- Dalgaard, C., Strulik, H. Energy Distribution and economic growth. In *Resource and Energy Economics*, 2011.
- Dollar, D. Outward-Oriented Developing Economies Really Do Grow More Rapidly: Evidence from 95 LDCs, In *Economic Development and Cultural Change*, 1992.
- Dollar D., Alesina, A. *Who Gives Foreign Aid to Whom and Why?* National Bureau of Economic Research, 1998.
- Dollar, D. Easterley, W. The search for the key: aid, investment and policies in Africa. In *Journal of African Economies*. Centre for the Study of African Economies, 1999.
- Dollar, D., Pritchett, L. *Assesing Aid: What Works, What Doesn't and Why?* The World Bank Policy Research Report, 1998.
- Doucoulagos, H. , Paldam, M. *Development Aid and Growth: An association converging to zero*. Economic Working Papers. School of Economics and Management, University of Aarhus, 2009.
- Dreher, A. *Geopolitics, aid and growth*. CESifo Working Paper, Series No. 4229, 2013.
- Easterley, W. Can foreign aid buy growth? In *Journal of Economic Perspectives*, 2001.
- Fayissa, B., El-Kaissy, M. Aid and Economic Growth of Developing Countries: Further Evidence. In *Studies in Comparative International Development*, 1999.
- Griffin, K.B., Enos, J.L. Foreign Assistance: Objectives and Consequences. In *Economic and Cultural Change*, 1970.
- Green, D. *Global economic crisis and developing countries: Impact and Responses*, 2010.

- Gylfason, T. Institution and economic performance. In *CESifo DICE Report*, 2004.
- Hadjimichael, M.T. *Sub-Saharan Africa: Growth, savings, and investment, 1986-93*. Washington, DC: International Monetary Fund, 1995.
- Hansen, H., Tarp F. Aid and growth regressions. In *Journal of Development Economics*, 2001.
- Harford, T., Klein, M. *Aid and the Resource Curse: How can Aid be Designed to Preserve Institutions?* Washington DC: World Bank, 2005.
- Hayami, Y., Godo, Y. *Development Economics: From the Poverty to the Wealth of Nations*. Oxford University Press, 2005.
- Heller, P.S. A Model of Public Fiscal Behavior in Developing Countries: Aid, Investment, and Taxation. In *American Economic Review*, 1975.
- Karver, J., *MDGs 2.0: What Goals, Targets and Timeframe?* Working Paper 297, Washington: Center for Global Development, 2012.
- Lensink, R., White, H. Aid allocation, poverty reduction and the Assessing Aid report. In *Journal of International Development*, 2000.
- Levy, V. Aid and Growth in Subsaharan Africa: The Recent Experience. In *European Economic Review*, 1988.
- Minoiu, C., Reddy, G.S. *Development Aid and Economic Growth: A Positive Long-Run Relation*. IMF Working Paper. WP/09/118, 2009.
- Morgenthau, H. A Political Theory of Foreign Aid. In *American Political Science Review*, 1962.
- Mosley, P. Aid-effectiveness: The Micro-Macro Paradox. In *IDS Bulletin*, 2009.
- Moyo, D. *Dead Aid: Why Aid is Not Working and how there is a Better Way for Africa*. Farrar, Straus and Giroux, 2009.
- Rajan, G.R., Subramanian, A. *Aid and Growth: What Does the Cross-Country Evidence Really Show?* IMF Working Paper, WP/05/127, 2005.
- Ramachandran, V., Walz, J. *Haiti: Where Has All the Money Gone?* CGD Policy Paper 004, 2012.
- Rosenstein-Rodan, P.N. International Aid for Underdeveloped Countries. In *Review of Economics and Statistics*, 1961.
- Svensson, J. Aid, Growth and Democracy. In *Economics and Politics*, 1999.
- Van der Veen, A.M. *Ideas and interests in foreign policy: The politics of official development assistance*. Harvard University press, 2000.
- White, H. The Macroeconomic Impact of Development Aid: A Critical Survey. In *Journal of Development Studies*, 1992.
- Weisskopf, T.E. The Impact of Foreign Capital Inflow on Domestic Savings in Underdeveloped Countries. In *Journal of International Economics*, 1972.
- Yumkella, K. K., *Agribusiness for Africa's prosperity*. Austria: UNIDO, 2011.

## IS HIERARCHY RELATIVELY FIXED?

*Maoguo Wu, PhD*

Shanghai University, China

---

### Abstract

This paper examines one main assumption of the tournament theory, *i.e.*, hierarchy is relatively fixed. Using personnel records from a large British financial sector firm, this paper empirically tests to what extent hierarchy in the sample firm is fixed. Empirical tests find that external hiring number, promotion into level number, promotion out of level number, and exit number are closely related, and therefore argue that hierarchy is relatively fixed.

---

**Keywords:** Hierarchy, internal labor markets, vacancy

### Introduction

The theory of tournaments, put forth by Lazear and Rosen (1981), models promotion as a relative competition. Instead of observing workers' absolute performance outcomes, ordinal rank of workers is considered to determine promotion, which is associated with wage increase. The compensation at one level of the firm, in addition to motivating workers at that level, motivates workers at lower levels. Since promotion is only given to the highest ranking workers, the number of promotion, more often than not, is limited. For the same reason, promotion is indivisible. Hence, a main assumption of the tournament theory is that the structure and the number of jobs in a hierarchy are relatively fixed.

It is a stylized fact that the operation of the internal labor market is governed by the number of job slots. For example, promotion/recruitment decision is influenced by the number of available jobs. In other words, promotion into level numbers/external hiring numbers depend on the number of vacancies. If there is no vacancy at all, then promotion/recruitment cannot take place unless the structure of hierarchy changes. On the contrary, more promotion/external hiring would occur if more vacancies emerged.

Consider the opposite. If a number of workers at a hierarchical level replaced themselves/terminated their employment, and their positions got vacated, then promotion/recruitment (or both) into this hierarchical level would subsequently occur. Therefore, vacancies are to be filled in once they emerge. However, due to the fact that the number of vacancies is limited, if more incumbents are promoted, then less external candidates can get hired. On the contrary, if more external candidates are recruited, then fewer incumbents can get promoted.

Despite all kinds of labor movement in organizations, hierarchy of organizations tends to be relatively fixed. For example, in an organization with several hierarchical levels, in each hierarchical level, workers leave their jobs through promotion to upper levels or termination of their employment. Meanwhile, positions are filled by incumbents promoted into this level and people hired from outside. Because of these two opposite forces, the number of job slots in a hierarchical level tends to be relatively fixed. In other words, the size of a hierarchical level does not substantially expand or shrink.

Although there is a large amount of literature on internal labor markets, very little research has been done to investigate the variation of hierarchy. Hierarchy is assumed to be fixed with no theoretical background or empirical test. Using a small cross-section data set,

Gibbs (1995) makes the first attempt in testing to what extent hierarchy is fixed. Table 1 below presents the result of Gibbs (1995).<sup>18</sup>

Table 1 Gibbs (1995)

Correlation	Adjusted P. Rate <sup>19</sup>	External H. Rate <sup>20</sup>	Exit Rate
Promotion Rate	0.93*	-0.054	0.25*
Adjusted P. Rate		-0.054	0.31*
External H. Rate			0.26*

If the number of job slots available for internal promotion is fixed, then promotion into level rate should vary closely with promotion out of level rate and exit rate. As seen in the table, promotion into level rate does change positively with exit rate<sup>21</sup>, but not with very high correlation. Furthermore, fixed job slots should mean that promotion into a job is negatively correlated with hiring from the outside. This is observed, but the correlation is very small. Using adjusted promotion rate strengthens the predicted correlations, but not by much<sup>22</sup>. Such low correlations provide little evidence that job slots are relatively fixed in the sample firm.

This paper investigates the aforementioned assumption of the tournament theory. The empirical test estimates to what extent hierarchy in the sample firm is fixed by examining the movement of workers across 6,214 departments in a unique data set from a large British financial sector firm. The results indicate that promotion into level number is positively correlated with promotion out of level number and exit number, while negatively correlated with external hiring number. The incentive of controlling movement across levels is influenced by the number of available job slots and also by competition from the external labor market. This paper provides empirical evidence indicating that hierarchy of the sample firm is relatively fixed.

### Main Text

Prior economic studies on how firm hierarchy evolves have been limited by the lack of data with detailed information on the entire structure of firms. In much of the analysis that follows, the focus is on a “level” or rank. In order to study transitions across levels, it is necessary to have very detailed and consistent data on job levels.

The data are gathered from a database constructed from a major British financial sector firm. The firm varies in size over the time it is observed, but it has around 40,000 full-time employees, and 20,000 part-time employees.

The database consists of data from the personnel and payroll archives that have been maintained since 1988, referring to the firm’s British operations. The data used for the paper run from June 1989 to November 2001, giving 150 monthly observations. Each observation includes an employee ID number, age, gender, marital status, number of children, ethnic origin, job code, work unit code, salary, bonus, hierarchical level, date of entry into current spell of employment, performance rating, partial post code of home and work, and, for those employees at their post in March 1991, some indicators of educational attainment. The data include both clerical and managerial levels. All of these observations appear in at least two consecutive months.

The firm operates a well-defined internal labor market. It has an explicit hierarchical structure in which workers can be assigned to one of 14 levels. Two of these levels seem not to be a part of the hierarchy; level 1 is unclassified staff, and level 7 is unclassified manager. Of the remaining 12 levels, level 2 deserves some special consideration. Level 2 is an

<sup>18</sup> Correlations are for each variable of each title in each year. Sample sizes vary from 902 to 1,174. Correlations indicated by \* are significant at better than 1%.

<sup>19</sup> Adjusted P. Rate is short for Adjusted Promotion Rate.

<sup>20</sup> External H. Rate is short for External Hiring Rate.

<sup>21</sup> Promotion out of level rate and quit rate are composed into one variable, exit rate.

<sup>22</sup> Adjusted promotion rate is promotion rate adjusted to correct for fluctuations in total employment, by subtracting the firm’s overall growth rate each year.

induction level, which contains different types of individuals, often earning significant salaries. Individuals can transit from level 2 into almost all the other levels. The hierarchical structure can thus be considered simply as levels 3 - 6 (clerical levels S02 - S05) and levels 8 - 14 (managerial levels M93 - M99). All of the 11 levels, along with level 2 (S01), are included in the estimation of fixity of hierarchy.

United Kingdom is a country that implements compulsory education. It is illegal to hire people under 16 years old. Besides, United Kingdom also enforces mandatory retirement. Therefore, the analysis uses only individuals between 16 and 65 years of age who worked full time (at least 30 hours per week). In addition, individuals with missing information or imputed data in the variables included in the analysis are not considered.

Table 2 Summary Statistics

Variable	Mean	Standard Deviation	Observations
No. of Employees	3277.478	3539.23	1788
No. of Promotion into	41.873	50.372	1628
No. of Promotion out	41.891	50.675	1628
No. of External Hiring	35.144	51.197	1776
No. of Exit	34.077	63.996	1776

One advantage of this data set over other data sets that have been used to study promotion is that the paper does not rely on changes in the job code that result in higher consequent pay or movement up an empirically determined job ladder to determine whether a promotion has taken place. Each individual's job level, the number of reporting levels, is provided monthly, unlike in some other papers where it must be empirically determined. Promotion in this paper reflects an upward movement in the firm's hierarchy.

The definition of promotion can be characterized by the equation below. The aim of the model is to make inference about individual promotion histories from a sequence of rank levels (within a firm) occupied by individuals. The sequence contains up to 150 months of data. Promotion is defined as a positive change in level (a rise to a higher rank in the hierarchy); *i.e.*,

$$L_{it} - L_{it-1} > 0, \tag{1}$$

where  $L_{it}$  is the level of individual  $i$ , at time  $t$ . In total, this results in 10 potential promotion outcomes per individual. This paper does not distinguish between demotions and absence of promotions. Similarly, promotions for more than 1 level (a very rare event) and standard promotions taking place when an individual reaches the next level are considered the same. In order to minimize the impact of measurement error, if the level in the month subsequent to a promotion reflects a demotion, the original improvement in level is regarded as a coding error and no promotion is recorded. This means that promotions that last just one month are not coded. Similarly, if a worker is demoted in one month and promoted in the next month to the original level, this return to the original level is not recorded as a promotion. Last, promotions are only recorded when they constitute an improvement over the worker's initial level in the data. This ensures that promotions are recorded only when they constitute a net upward movement over all observations and not just upward movement over the previous month.

The operation of the internal labor market can be simply characterized by the number of individuals at each level. The number of individuals in one hierarchical level varies in the following form,

$$N_t = N_{t-1} + H_{t-1} + PI_{t-1} + DI_{t-1} - PO_{t-1} - DO_{t-1} - E_{t-1}, \tag{2}$$

where  $N_t$  is the number of individuals in the current period,  $N_{t-1}$  is the number of individuals in the previous period,  $H_{t-1}$  is external hiring number,  $PI_{t-1}$  is promotion into level number,  $DI_{t-1}$  is demotion into level number,  $PO_{t-1}$  is promotion out of level number,  $DO_{t-1}$  is demotion out of level number, and  $E_{t-1}$  is exit number. If the hierarchy is relatively fixed, then the number of people at each level should remain roughly the same,

$$N_t = N_{t-1}, \quad (3)$$

so movements in levels can be described by

$$H_{t-1} + PI_{t-1} + DI_{t-1} = PO_{t-1} + DO_{t-1} + E_{t-1}. \quad (4)$$

Demotion only occasionally takes place. Hence, both demotion into level number and demotion out of level number are ruled out due to their insignificance. Rearranging the equation gives

$$PI_{t-1} = PO_{t-1} + E_{t-1} - H_{t-1}. \quad (5)$$

Equation (5) indicates that promotion into level number is positively related to promotion out of level number and exit number, while negatively related to external hiring number.

If the number of job slots available for internal promotion is fixed, then promotion into level number should vary closely with promotion out of level number and exit number. Furthermore, fixed job slots should mean that promotion into level number is negatively correlated with external hiring number. In the estimation of fixity of hierarchy, promotion into level number, promotion out of level number, exit number, and external hiring number are calculated respectively at each level in each month<sup>23</sup>.

In order to calculate the four variables, three consecutive months are needed. For example, promotion into level number and external hiring number of July 1989 are calculated by comparing June 1989 data with July 1989 data, while promotion out of level number and exit number of July 1989 are calculated by comparing July 1989 data with August 1989 data.

The empirical test of this chapter follows the example of Gibbs (1995) and investigates the relation among four variables, *i.e.*, external hiring number, promotion into level number, promotion out of level number, and exit number. However, instead of testing the correlation among variables as in Gibbs (1995), promotion into level number (PI) is regressed on promotion out of level number (PO), exit number (E), and external hiring number (H),

$$PI = \beta_0 + \beta_1 \cdot PO + \beta_2 \cdot E + \beta_3 \cdot H + \varepsilon. \quad (6)$$

Correlation does not make a prior assumption as to whether one variable is dependent on the other(s). Besides, it is not concerned with the relation among variables. Instead, it gives an estimate as to the degree of association among the variables. In fact, the simple and multiple regression coefficients will be the same if the explanatory variables are uncorrelated. As regression attempts to describe the dependence of a variable on one (or more) explanatory variables, it implicitly assumes that there is a one-way causal effect from the explanatory variable(s) to the response variable, regardless of whether the path of effect is direct or indirect. As discussed above, promotion decision is influenced by the number of available positions, *i.e.*, how many workers can an employer promote into a job level depends on the number of vacancies in that job level. If there is no vacancy at all, then promotion cannot take place unless the structure of hierarchy changes. Hence, only if workers at higher levels vacate their positions can workers at low levels fill the vacancies. If more incumbents vacate their positions through further promotion or quit, then more incumbents one level below can get promoted. On the contrary, if more external candidates are recruited, then fewer incumbents can get promoted. The time line of a promotion into level is as follows. First of all, incumbents at one level vacate their positions through further promotion or quit, then promotion into level will take place. Incumbents one level below will replace themselves. Simultaneously, vacant positions are filled by external candidates.

Consider two variables, promotion into level number and promotion out of level number. These two variables are calculated independently. As discussed above, promotion into level number is calculated by comparing data of the current month with data of the preceding month, while promotion out of level number is calculated by comparing data of the

<sup>23</sup> Again, here the unit is per level per month.

current month with data of the succeeding month. Although it is reasonable to acknowledge that correlation analysis might show a high degree of association between these two variables, regression analysis would be able to demonstrate the dependence of promotion into level number on promotion out of level number. Likewise, regression of promotion into level number on exit number would also be able to demonstrate a causal effect. The estimation tests the hypothesis that promotion out of title number, exit number and external hiring number are significant against the opposite.

Table 3 below presents the regression results.

Table 3 Estimation Results

Variable	Coefficient	(Standard Error)
No. of Promotion out of Title***	0.542	(0.028)
No. of Exit***	0.249	(0.029)
No. of External Hiring***	-0.114	(0.019)
Intercept	16.779	(1.398)

Gibbs (1995) argues that if the number of job slots available for internal promotion is fixed, then promotion into level rate should vary closely with promotion out of level rate and exit rate. Such result is not found in Gibbs (1995). Instead, it shows low correlation between promotion into level rate and exit rate. Nevertheless, the regression results in Table 3 indicate that promotion into level number is highly and negatively dependent on external hiring number. Besides, promotion into level number is significantly influenced by exit number. 1 unit increase in external hiring number is associated with a decrease of 0.114 in promotion into level number, assuming that promotion out of level number and exit number are held constant. Similarly, holding external hiring number and exit number constant, 1 unit increase in promotion out of level number is associated with an increase of 0.542 in promotion into level number. The high parameter values provide support for the hypothesis of fixed hierarchy.

Gibbs (1995) also argues that fixed job slots should mean that promotion into a job is negatively correlated with hiring from the outside. The result is observed in Table 1 on Page 2, but the correlation is very small. As seen in Table 3, 1 unit of increase in exit number is associated with an increase of 0.249 in promotion into level number, *ceteris paribus*. The parameter value indicates that the causal effect is quite significant. Therefore, the number of slots available for internal promotion is influenced by external hiring number.

Gibbs (1995) concludes that the low correlations found in the estimation provide little evidence that job slots are relatively fixed in the sample firm. On the contrary, the regression results, as presented in Table 2, find significant coefficients. Such significant coefficients provide evidence that hierarchy is relatively fixed.

## Conclusion

This paper investigates one main assumption of the tournament theory, *i.e.*, hierarchy is relatively fixed. It empirically tests to what extent hierarchy in the sample firm is fixed. The data for empirical analysis of the paper are gathered from a database constructed from a major British financial sector firm. Promotion history is well documented for the sample firm unlike other papers in which promotion must be empirically determined. Promotion in this paper reflects an upward movement in the firm's hierarchy. The empirical results reveal that external hiring number, promotion into level number, and exit number are closely related, and therefore argue that hierarchy is relatively fixed. The empirical results contribute to empirical studies of fixity of hierarchy.

**References:**

- Audas, R., Barmby, T. and Treble, J.: 2004, Luck, Effort, and Reward in an Organizational Hierarchy, *Journal of Labor Economics* 22(2), 379-395.
- Azariadis, C.: 1988, Human Capital and Self-Enforcing Contracts, *The Scandinavian Journal of Economics* 90(4), 507-528.
- Baker, G., Gibbs, M. and Holmstrom, B.: 1994, The Internal Economics of the Firm: Evidence from Personnel Data, *The Quarterly Journal of Economics* 109(4), 881-919.
- Bognanno, M. L.: 2001, Corporate Tournaments, *Journal of Labor Economics* 19(2), 290-315.
- DeVaro, J.: 2006, Internal Promotion Competitions in Firms, *Rand Journal of Economics* 37(3), 521-542.
- Doeringer, P. B. and Piore, M. J.: 1971, *Internal Labor Markets and Manpower Analysis*, D.C. Heath, Lexington, MA.
- Ehrenberg, R. G. and Smith, R. S.: 1988, *Modern Labor Economics*, Scott Foresman, Glenview, IL.
- Gibbons, R. and Waldman, M.: 1999, Careers in Organizations: Theory and Evidence, in O. Ashenfelter and D. Card (eds), *Handbook of Labor Economics*, Vol. 3, North-Holland, Amsterdam, pp. 2373-2437.
- Gibbs, M.: 1995, Testing Tournaments? An Appraisal of the Theory and Evidence, *Labor Law Journal* 45, 493-500.
- Lazear, E. P. and Rosen, S.: 1981, Rank Order Tournaments as Optimal Labor Contracts, *Journal of Political Economy* 89(5), 841-864.
- Lazear, E. P. and Oyer, P.: 2004, Internal and External Labor Markets: A Personnel Economics Approach, *Labour Economics* 11(5), 527-554.
- Lazear, E. P. and Shaw, K. L.: 2007, Personnel Economics: The Economist's View of Human Resources, *Journal of Economic Perspectives* 21(4), 91-114.
- Malcomson, J. M.: 1984, Work Incentives, Hierarchy, and Internal Labor Markets, *Journal of Political Economy* 92(3), 486-507.
- Treble, J., van Gameren, E., Bridges, S. and Barmby, T.: 2001, The Internal Economics of the Firm: Further Evidence From Personnel Data, *Labour Economics* 8(5), 531-552.

# METHOD AND EPISTEMOLOGY IN MARX'S THEORY OF STATE AND ECONOMY IN THE *GRUNDRISSE*: REDUCIONISM, SYSTEMS AND COMPLEXITY

*André Folloni, PhD*

Pontifical Catholic University of Paraná, Brazil

---

## Abstract

This article aims to show Marx's methodology thought as it is exposed in his *Grundrisse der Kritik der politischen Ökonomie*, ordinarily referred as *Grundrisse*. This methodology lies behind his theories of economy and State. The paper examines only the parts of the *Grundrisse* where Marx explicitly writes about methodology and describes how his intellectual way is walked. These objective of the paper is to compare Marx's methodology conceptions to the contemporary issues of the systems and complexity epistemology. By doing that, the article perceives that in some aspects Marx's epistemology is ahead of its time, working with some conceptions that would be later developed by the 20<sup>th</sup> and 21<sup>st</sup> centuries epistemology. In other aspects, however, Marx appears as a product of his time, and some other conceptions present in his works are now overcome by the development of methodology and epistemology thoughts.

---

**Keywords:** Karl Marx; state; economy; epistemology; complexity

## Introduction

The Marxism as a political theory and as a guide for an action often overshadows other aspects of Marx's philosophy. One of the interesting aspects is the methodology that Marx follows and the epistemology that lies beyond it. Some people commonly understand Marx's method as "true" or "definitive" science, as if it could achieve "real truth". Others find that some kind of definitiveness is impossible in science. Others simply refuse to think about Marx's methodology because they are against Marxist politics. And by remaining on this statement, some interesting aspects of Marx's method that could be related to contemporary epistemology are not exposed.

This article aims to show Marx's methodology thought as it is exposed in his *Grundrisse der Kritik der politischen Ökonomie*, ordinarily referred as *Grundrisse*. These scripts contain preparatory works that would make its final shape in *Das Capital*, as much as other ideas that would not be published by the living Marx.

To pursue this objective, this article will examine the parts of the *Grundrisse* where Marx explicitly writes about methodology. The book studied was the Brazilian translation into Portuguese made by Mario Duayer and Nélio Schneider, published in 2011 by Boitempo Publishing House.<sup>24</sup> Also, this paper will make use of Enrique Dussel's *La producción teórica de Marx: un comentario a los Grundrisse*, in its fourth Mexican edition of 2004.<sup>25</sup>

In the end, the paper will show how Marx's epistemology incorporates elements of an epistemology of complexity based on the theories of systems. This is interesting because the theories of systems would develop later, in the twentieth century, but it is noticeable how some of the worries of the complexity epistemologies are present in Marx's work.

---

<sup>24</sup> Marx, Karl. *Grundrisse: manuscritos econômicos de 1857-1858; esboços da crítica da economia política*. São Paulo: Boitempo, 2011 – edição eletrônica.

<sup>25</sup> Dussel, Enrique Domingo. *La producción teórica de Marx: un comentario a los Grundrisse*. 4 ed. México, D.F.: Siglo Veintiuno Editores, 2004 – available at <<http://ifil.org/dussel/html/18.html>>

*1. The method from reality to abstract determinations and from them to concrete totality:*

One of the biggest problems of human cognition is the relation between our thoughts and ours linguistic knowledge, in one side, and reality itself, in the other side. Knowledge is always a linguistic thought or a linguistic expression that tries to explain reality. When I want to understand the computer I'm working on, I'll make linguistic sentences about it. These linguistic sentences are not the computer itself, but are somehow related to it. When this relation match, we say knowledge is true; when it doesn't, knowledge is false. When this relation is comprehended as impossible and the Philosophy conceives real as the manifestation of thought itself, this Philosophy is a form of idealism. When this relation is comprehended as possible and so the work of the knowledge is to make thought as related to real as it is possible, or that reality is a condition of possibility of the thought and the understanding, this Philosophy is a form of realism.

Hence knowledge is always an abstraction of something that can be concrete (this computer) or abstract (my thoughts). In a special metaphor, we say that knowledge is above, that it rises from the concrete to the abstract. Concrete is in reality, abstraction is in thought. But Marx says that the concrete appears in thought as a result, not as a bottom line. He also says that, notwithstanding, the concrete is the bottom line of the intuition and the representation. And Marx also talks about the method of to ascend from the abstract to the concrete.<sup>26</sup> What does that mean?

According to Marx, reality we see is the "real" and "concret" (*Realen und Konkreten*).<sup>27</sup> But this reality is different and something that remains out of the representation, something exterior, an externality. Representation is an abstraction of reality. As Marx says, for example, population or social classes are abstract representations of reality because when we think or say "population" we leave unadvised the real people that form real population.<sup>28</sup> Hence "population" is something abstract, in our heads, and not reality itself. So far we have two different things: reality (concrete) and the representation (abstract).

This representation is chaotic because it is not yet simplified by abstract concepts. The next step in knowledge is to take this representation and work in abstraction and analysis, separating the different parts of the representation and taking each one of them as a whole. Now we have determinations.<sup>29</sup> Hence from concrete to representation and from representation to determinations there are three steps in Marx's method. But only this second movement, from representations to determinations, is really theory, because representation itself is the pre-scientific knowledge, common sense.<sup>30</sup> Also it is scientific knowledge because it should be able to explain why some thing is as it is. To explain what are the relations that determines the phenomenons. This is why this knowledge is not only description, but also explanation: it explains what makes a thing be the way it is.<sup>31</sup>

These multiple determinations, each one a part but taken as a whole to be comprehended, are then understood in the totality. To Marx, this fourth step is the achievement of the concrete totality. And it is also an ascension from abstract (determinations) to concrete (totality). This is the dialectic method: the knowledge of putting the part in a totality. The movement from step three (determinations) to four (concrete totality)

<sup>26</sup> "...o concreto aparece no pensamento como processo da síntese, como resultado, não como ponto de partida, não obstante seja o ponto de partida efetivo e, em consequência, também o ponto de partida da intuição e da representação... método de ascender do abstrato ao concreto" (MARX, *op. cit.*, p. 95).

<sup>27</sup> Dussel, *op. cit.*, p. 49.

<sup>28</sup> Marx, *op. cit.*, p. 93-94.

<sup>29</sup> Dussel, *op. cit.*, p. 51.

<sup>30</sup> Dussel, *op. cit.*, p. 51.

<sup>31</sup> Cardoso, Miriam Limoeiro. Para uma leitura do método em Karl Marx: anotações sobre a "Introdução" de 1857. *Cadernos do Instituto de Ciências Humanas e Filosofia da Universidade Federal Fluminense*. Rio de Janeiro, n. 30, set/1990, p. 20-21.

is the dialectic act.<sup>32</sup> And why this totality, even if it is a thought, is “concrete”? Marx explains: “Concrete is concrete because it is the synthesis of multiple determinations, hence, unity of diversity”.<sup>33</sup>

Now we can understand why Marx says that the concrete appear in thought as a result of the synthesis procedure. In the first movement of theory (in fact the second movement of knowledge), representation is volatilized in an abstract determination; in the second movement of theory (the third of knowledge), abstract determinations take to the reproduction of the concrete in the through the spirit.<sup>34</sup>

In this fourth plan, of concrete totality, the single determinations are combined. Dussel explains this process with these words:

Lo simple es p.ej. la producción (determinación que puede por su parte ser descrita en sus determinaciones esenciales en sí). Pero al ir elaborando las relaciones mutuamente constitutivas de la producción con el consumo primero, con la distribución posteriormente, y por último con el intercambio, se construyó así un *todo* donde las cuatro determinaciones constituían una nueva totalidad con mutuas codeterminaciones.<sup>35</sup>

Of course this concrete totality is a work of thought and lives in the spirit. Marx is aware of that, but he says this is the only way thought can appropriate reality. Most important, to Marx those concepts that form concrete totality are not a product from concepts themselves, like concepts generating concepts, lying above intuition and representation. They are a product of the elaboration of intuition and representation in concepts. It is possible because of this that Marx says that this procedure is different from art, religion and mental-practical: it maintains a connection with the intuition of reality.<sup>36</sup> So we could say this is a form of empirism: even if science begins in the abstract, with the determinations made from the representations, thought begins with representations that are made from reality.

According to Enrique Dussel’s explanation, this dialectic construction is a double movement. First, it takes the determinations (abstract concepts created by the scientist) and relates one to each other, like the relation between production and consume. Production defines consume and consume defines production, so the opposed co-determines each other. Second, these opposed form a new autonomous totality. A unity formed by oppositions. The simple (determinations) forms now a complex (totality).<sup>37</sup>

Marx sees his method as better than the way other economists worked before him, because he doesn’t take that representation as reality itself. Differently, he knows that the chaotic representation is not the concrete reality, so he cannot work with it. He must know the determinations in an abstraction work and then conceive the concrete totality, a conceptual world that comprehends the determinations that form the concrete, a quality not present in the chaotic representation. To Marx, true science is made when we work with this concrete totality that maintains a connection with reality, once it was created working with the determinations and the representations of reality. So concepts depend on reality and reality is prior to thought. According to Miriam Limoeiro Cardoso, in Marx’s Philosophy the concrete reality preexists, underlies and subsists to thought.

In Marx’s thinking, this way from simplicity (abstract determinations) to complexity (concrete totality), which he regards as an “elevation”, corresponds to history, where more

<sup>32</sup> Dussel, *op. cit.*, p. 52.

<sup>33</sup> “O concreto é concreto porque é a síntese de múltiplas determinações, portanto, unidade da diversidade” (Marx, *op. cit.*, p. 95).

<sup>34</sup> Marx, *op. cit.*, p. 95.

<sup>35</sup> *Op. cit.*, p. 52-53. A free translation to English could be this: “The simple is, for example, the production (a determination which can be described in its essential determinations). But the process of elaborating the mutually constitutive relations between production with consume first, with distribution next and at last with exchange, constructs a *whole* where the four determinations constitutes a new totality with mutual codeterminations”.

<sup>36</sup> Marx, *op. cit.*, p. 96.

<sup>37</sup> *Op. cit.*, p. 53.

simple realities develop to become more complex. There would be a match between reality and thought.<sup>38</sup>

Also, Marx thinks about the categories as abstract and general, valid to all times, but as product of historic relations and full valid only to these relations and in its interior.<sup>39</sup> It is like this because the modern categories are more complex and can be compared to ancient categories. The category “work” in the bourgeois society is more complex than in ancient societies, so it can be used to describe and understand these ancient societies and what work meant there. But this use must be made being aware that there are differences between modern world and the previous societies. Bourgeois society is different from others and we should not see bourgeois society in these ancient ones, although the categories stay useful to compare and understand reality in its historical difference. And this method will be productive when the modern society is capable of self-criticism, not comprehending itself as a superior and infallible development of ancient societies.<sup>40</sup>

### **Marx’s method and the contemporary systems and complexity epistemology:**

In this point we can make a partial balance of Marx methodology and try to understand the epistemology that supports it. We can compare it with the contemporary epistemology issues regarded to the opposition between the classic method of reductionism of the 19<sup>th</sup> Century and the needs of an systemic and complex scientific knowledge.<sup>41</sup>

First, is noticeable that Marx is worried with the connection between the science’s abstract propositions and the concrete reality. Marx can be understood as an empirist here. In these methodology scripts, he refuses to create a world of concepts that would be sufficient to science and that would go without reality. This methodology can be read as a partial reaction to German idealism that came before Marx, mainly Hegel, with who Marx seems to dialogue assuming some parts of his Philosophy but repelling others. It could have an ancient reference in Francis Bacon’s epistemological ideas. Contemporary epistemology seems to keep working with empirism, although overcoming the logical positivism of the beginning of the 20<sup>th</sup> century.

On the other hand, it is possible to identify confusion between reality and the metalanguage that describes it. It is noticeable when Marx calls “categories” the abstract concepts but also the reality itself. Also, it is noticeable when he says that the subject exists in reality as well as in the head, hence the categories express forms of being.<sup>42</sup> But it is also possible to understand this identification as a result of the way down, descending from thought to reality, as a step beyond concrete totality. Concrete totality is abstract when compared, for example, with bourgeois society. It is a further level of cognition when we examine modern society with the cognition we developed from representation to concrete totality.

---

<sup>38</sup> *Op. cit.*, p. 98.

<sup>39</sup> *Op. cit.*, p. 102.

<sup>40</sup> *Op. cit.*, p. 103-104.

<sup>41</sup> For these systemic and complex epistemology issues, it is important the reading of Capra, Fritjof. The hidden connections: integrating the biological, cognitive, and social dimensions of life into a science of sustainability. New York: Doubleday, 2002; The turning point: science, society and the rising culture. New York: Bantam Books, 1988; The web of life: a new scientific understanding of living systems. New York: Doubleday, 1997; Le Moigne, Jean-louis. The intelligence of complexity: Do the ethical aims of research and intervention in education and training not lead us to a “New discourse on the study of our time”? *In*: Sísifo: Education Sciences Journal. Available at <http://sisifo.fpce.ul.pt/pdfs/13-ConfIEN.pdf>; Montuori, Alfonso. Complexity, epistemology and the challenge of the future. Available at [http://www.academia.edu/1425652/Complexity\\_Epistemology\\_and\\_the\\_Challenge\\_of\\_the\\_Future](http://www.academia.edu/1425652/Complexity_Epistemology_and_the_Challenge_of_the_Future); Delattre, Pierre. Teoria dos sistemas e epistemologia. Porto: Sousa Martins, 1981; Morin, Edgar. Restricted complexity, general complexity. Available at <http://www.pensamientocomplejo.com.ar/docs/files/Edgar%20Morin,%20Restricted%20Complexity,%20General%20Complexity.pdf>.

<sup>42</sup> *Op. cit.*, p. 104.

Second, is perceptible how Marx does not create only linear cause-effect chains of concepts. One of the greatest perceptions of contemporary theories of systems and complexity is that the multiple elements of reality are connected and influencing each other. Hence we can say that what sometimes is a cause of an effect is affected by this effect as well, in a way that this effect becomes a cause of an effect in the prior cause. Marx conceives a partially systemic and complex relation between some determinations that co-determinates each one another. For example, production determines consume and is determined by consume, as well as consume determines production and is determined by it. There is here something that can be related to the systemic theory that would be developed later, where a system is a totality formed by elements in interaction. But Marx stops here, not going on. It is somehow a step into complexity made by Marx.

Third, Marx method can be interpreted as if the determinations could be understood first on their own and then, in a second moment, integrated in totality, where new determinations appear co-determining each other. It is a method that assumes the possibility to know a part aside from totality and then, later, to insert that part in totality generating a wider knowledge. There is here something that can also be related to the systemic theory, but now as an idea that would be overcome by the complexity epistemology. The theories of systems and complexity often claim that it is sometimes impossible to know parts of reality without the vision of the whole totality. This totality cannot just be thought later, because it determines the parts, that have some emergent characteristics only present when understood as parts of a totality.

Fourth, reality preexisting thought is another problem. This precedence may be often chronological, but the contact with reality is already conditioned by the existence, which, in an ontological sense, preexists the objects and the representations. Some theories of complexity assume existentialism philosophies such as Heidegger's and Sartre's

## Conclusion

Karl Marx exposes some of his methodology conceptions in his *Grundrisse*. These conceptions can be compared to the contemporary issues of the systems and complexity epistemology. When we do that, we can perceive that in some aspects Marx's epistemology is ahead of its time, working with some conceptions that would be later developed by the 20<sup>th</sup> and 21<sup>st</sup> centuries epistemology. In other aspects, however, Marx appears as a product of his time, and some other conceptions present in his works are now overcome by the development of methodology and epistemology thoughts.

## References:

- Capra, Fritjof. The hidden connections: integrating the biological, cognitive, and social dimensions of life into a science of sustainability. New York: Doubleday, 2002.
- Capra, Fritjof. The turning point: science, society and the rising culture. New York: Bantam Books, 1988.
- Capra, Fritjof. The web of life: a new scientific understanding of living systems. New York: Doubleday, 1997.
- Cardoso, Miriam Limoeiro. Para uma leitura do método em Karl Marx: anotações sobre a "Introdução" de 1857. Cadernos do Instituto de Ciências Humanas e Filosofia da Universidade Federal Fluminense. Rio de Janeiro, n. 30, set/1990, p. 20-21.
- Dussel, Enrique Domingo. La producción teórica de Marx: un comentario a los *Grundrisse*. 4 ed. México, D.F.: Siglo Veintiuno Editores, 2004 – available at <<http://ifil.org/dussel/html/18.html>>
- Le Moigne, Jean-louis. The intelligence of complexity: Do the ethical aims of research and intervention in education and training not lead us to a "New discourse on the study of our

time”? In: Sísifo: Education Sciences Journal. Available at <http://sisifo.fpce.ul.pt/pdfs/13-Conf1EN.pdf>

Marx, Karl. *Grundrisse*: manuscritos econômicos de 1857-1858; esboços da crítica da economia política. São Paulo: Boitempo, 2011.

Montuori, Alfonso. Complexity, epistemology and the challenge of the future. Available at [http://www.academia.edu/1425652/Complexity\\_Epistemology\\_and\\_the\\_Challenge\\_of\\_the\\_Future](http://www.academia.edu/1425652/Complexity_Epistemology_and_the_Challenge_of_the_Future)

Morin, Edgar. Restricted complexity, general complexity. Available at <http://www.pensamientocomplejo.com.ar/docs/files/Edgar%20Morin,%20Restricted%20Complexity,%20General%20Complexity.pdf>.

# ECONOMIC ANALYSIS OF OUTDOOR RECREATION

***Jalil Barkhas, Prof.***  
Granada University-Spain  
Faculty Economics and Management  
Department of Applied Economy

---

## Abstract

The objective of the present paper is analyzes important aspects related with the economics of outdoor recreation. Many of these aspects depend on the understanding of the demand for outdoor recreation in general and for determined recreational sites. We considered the general issue of the optimal visitation level at a public parks and brought in the issue of congestion cost. Also, given the growth of the population and income, the paper focused on the ration use of public parks from nonfee and fee charge for entry. Then consider the relationship between prices and revenues. Finally, the paper ended syudying the ecotourism, incuding fee options, the posible ecological impacts and the distribution of the generated rent.

---

**Keywords:** Ourdoor recreational demand, congestion costs, efficient visitation level, rationing use.

## Introduction

In this paper, the objective is apply the economic analisis to get an interesting conclusions about the nowadays increasing sector of the outdoor recreational activities. Of course, in wide meaning, the outdoor activities include all leisure's activities which the people hold outside of their house.<sup>43</sup> Nevertheless, in this paper the focus is those recreational activities where use intensively natural resources, such as forests, lakes, rivers, etc. Now, even there are no clear dividing line between resourse intensive activities and the opposite activities, it is reconizable that activities like picniking in public or national parks are closely linked to the quantity of the natural resources with which the visitors interact, than another activities such as jogging where, in spite of use resources in certain level, the roads in it's case, it does not imply direct demand for natural resources.

The interest of this paper in the outdoor recreational activities arise from the fact that, as could be seen in table.1 which treat as example the case of US, during the last decades there were evidently a quick growth of such activities in the most developed countries. Table.1 shows that excepting few activities all the others have been increased. Besides, during the last decades, there were a growing private markets dedicated to the outdoor recreasional activities. Such markets cover the hunting, fishing, skiing resorts, whale watching, etc. For this reason, in this paper arise the interest in the managing of the public reservations, the good roles of the public and private initiatives, and the managing problems posing for the specialized firms.

---

<sup>43</sup> One recommendable source for outdoor recreation found in Jensen, Clayne R.

Table.1. Participating in outdoor recreational activities 1982-2000 (numbers in millions of persons)

Activities	1982	2000	% change (1982-2000)
Walking	93.6	173.7	85
Bird watching	21.2	69	225
Sightseeing	81.3	111.5	137
Hiking	24.7	69.2	180
Swimming (nonpool)	56.5	90.8	61
Picniking	84.8	114.4	35
Motor boating	33.6	50.6	51
Camping (developed área)	30	52.7	76
Boating	49.5	76.1	54
Camping (primitive area)	17.7	31.9	80
Outdoor team sports	42.4	45.4	7
Backpacking	8.8	22.4	155
Downhill skiing	10.6	17.2	62
Water skiing	15.9	17	7
Snowmobiling	5.3	9.5	79
Cross-country skiing	5.3	8.1	53
Bicycling	56.5	80.8	43
Sailing	10.6	10.6	0
Horseback riding	15.9	20.3	28
Fishing	60.1	70.9	18
Hunting	21.2	22.8	8

*Note:* The table includes the people aged 16 and more.  
*Source:* USDA Forest Service, National Survey on Recreation and the Environment. 1982-2000. [www.srs.fs.usda.gov/trends/nsrr/nsre.html](http://www.srs.fs.usda.gov/trends/nsrr/nsre.html). Accessed 3/12/2007.

## The demand

Understand the demand for the outdoor recreational activities is necessary for different perspective. One of them, is to know the demand for certain type of outdoor recreational activities among one group of people. For example for one company of Granada which is dedicated to the camping equipment it would be important the information about how the demand for backpacking by the residents of Granada (or all Spain, if it sells by mail-order or online) could be grow during the next years. Of course, studying the future growth of the demand could imply the need to estimate the impact of factors such as the growth of the population or the income, and another possible factors which could also determine how many people would engage in the activity. Then, the company might need to determine the implications of this demand growth for the demand growth of certain products it expectto sell. The perspective is interesting also to the public agencies and private individuals who supply parks and areas necessary for the backpackers to pursue their activities of recreation.<sup>44</sup>

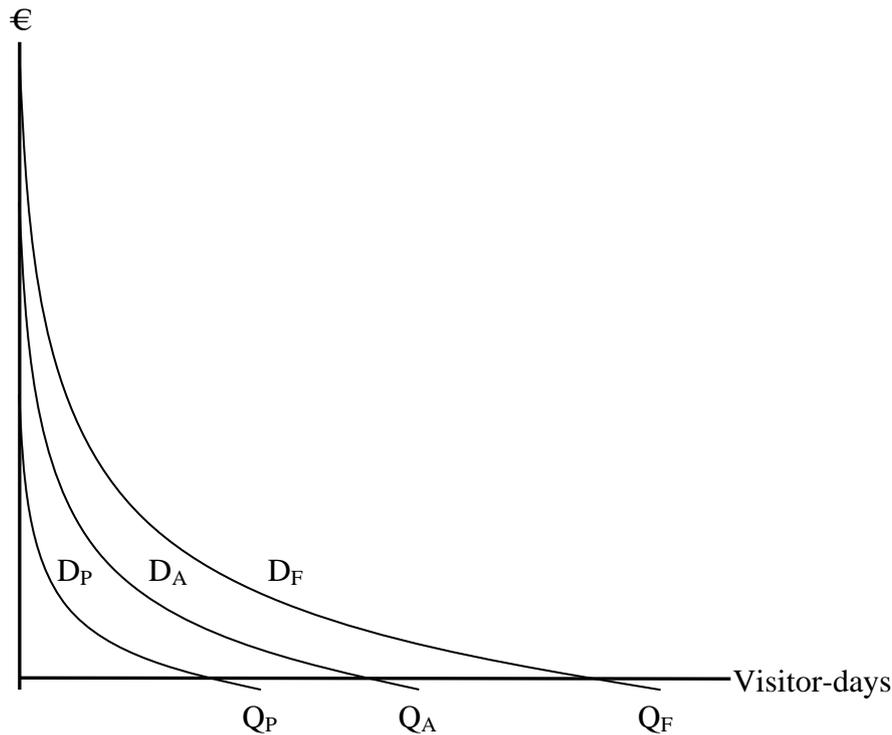
One another perspective is what could be denoted as management of facilities viewpoint. For the in charged of, supposing, a particular park, it is necessary to develop a comprehension of the demand or the park facility which is affected by population, incomes, transportation services and the existence of other competing or complementary areas. A demand curve of the park is shown in figure 1. The horizontal axis has an index of visitor-days, defined as the total number of day-long visits (e.g., two half-day visits make one visitor-day). Note that this may be a significant simplification, since, many parks produce a multiplicity of recreational services, Those include day trips, overnight, longer visits, active recreational visits, sightseeing visits, and others. So, to have manageable study, it is better to

<sup>44</sup> For an interesting article about the recreational demand preferences, see Daniel Wolf-Watz, et al. The article explores the linkage between nature-based recreation and preferences of individuals

boil all these down to one single variable, that is, the choice of visitor days. The vertical axis measure in euros the entrance price to visit the park. Now, even in many cases there are no entrance fee charge, but there are still other costs of visiting the park, specifically, the travel costs of getting there.

In the figure 1, each one of the curves represent different time. Each curve is aggregate demand constructed by the summing all the individual demands curves of the visitors of the park. Now, if we suppose  $D_P$  represents the past demand, for example of the past decade, and  $D_A$  is the actual demand,  $D_F$  represent the future expected demand, perhaps one decade in the future. The most important possible factors behind the shift of the demand curve are the growth of the population and the income, decrease of travel costs, build more and better roads, and change in the personal preferences in favor of the outdoor recreation.

Figure 1.



Naturally, in the absence of direct market, it is not difficult suggest the existense of these demand curves, nevertheless, in reality it is not equally easy measuring them or estimate how they have shifted along the time. In stead, the only what have been successfully developed by the resource economists for assessing the recreational demand functions are techniques of indirect market-price, such as the travel costs as proxies for the normal market prices that are used in market demand analysis.<sup>45</sup>

### Efficiency

In case of areas operating by the private sector, supposedly the area will accepts a visitation level that maximizes the net income. Now, such level of visitation, to be socially efficient or maximizing the social net benefit, it should be exempted from externalities (environmental or nonenvironmental) arising from the operation, no free riders and that the public goods have standard conditions.<sup>46</sup> Nonetheless, we will focus on the publicly supplied outdoor recreational facilities, since along the history such was the general aspect of their supply, and most of the public facilities have not necessitated significant entrance fee. Now,

<sup>45</sup> About the indirect market approaches, see Barry C. Field; Paul Cameron Mitchell & Richard T. Carson.

<sup>46</sup> One good source about the optimal capacity of resource-based recreation, see Fisher, Anthony C., and John V. Krutilla.

following figure 1, if the entrance fee is zero, the past, actual and expected number of visitor-days will be respectively  $Q_P$ ,  $Q_A$  and  $Q_F$ . Where,  $Q_P$  is the historical number, of one decade ago,  $Q_A$  of the actual year and  $Q_F$  represent the expected visiting level of one decade later. Evidently, the result could not be considered efficiently from the social point of view, since, such visitation rates do not cover the operating and maintaining costs of the park. This fact implies a disconnection between the people who pay for the park and those who use it. So, there will be no excuse to accept that the willingness to pay of the marginal user fits the real marginal cost of accomodating that visitor. Then one more possible cost which will not be covered through a zero entrance fee is the cost of the degradation of certain resources especially when the visitors number is big. The another reason for the ineficiente result, is the presence of the congstion externalities, since, if there is not entance fee, the situation will be of open access, which generally leads to use rate above the social efficient level.

In many of the contingent valuation studies of willingness to pay for backpacking experiences, the possiblility of meeting another backpackers significantly affects the valuations showed by the respondents.<sup>47</sup> The quantities  $Q_P$ ,  $Q_A$  and  $Q_F$  of figure 1 show an increase in the open-access use levels of the park. Congestion externalities tend to increase as the demand curve shifts outward, and finally when the visitors number becomes significantly high, might choke off any further increases in visitation despite increases in population and another factors. This situation could has been occurred in certain natural parks, when during the summer time the visitation rates can be so high that physical capacities are reached. Now, in many other parks where the visitation is bellow the maximum supportable level, question has raised about which is the optimal level and how could be achieved.

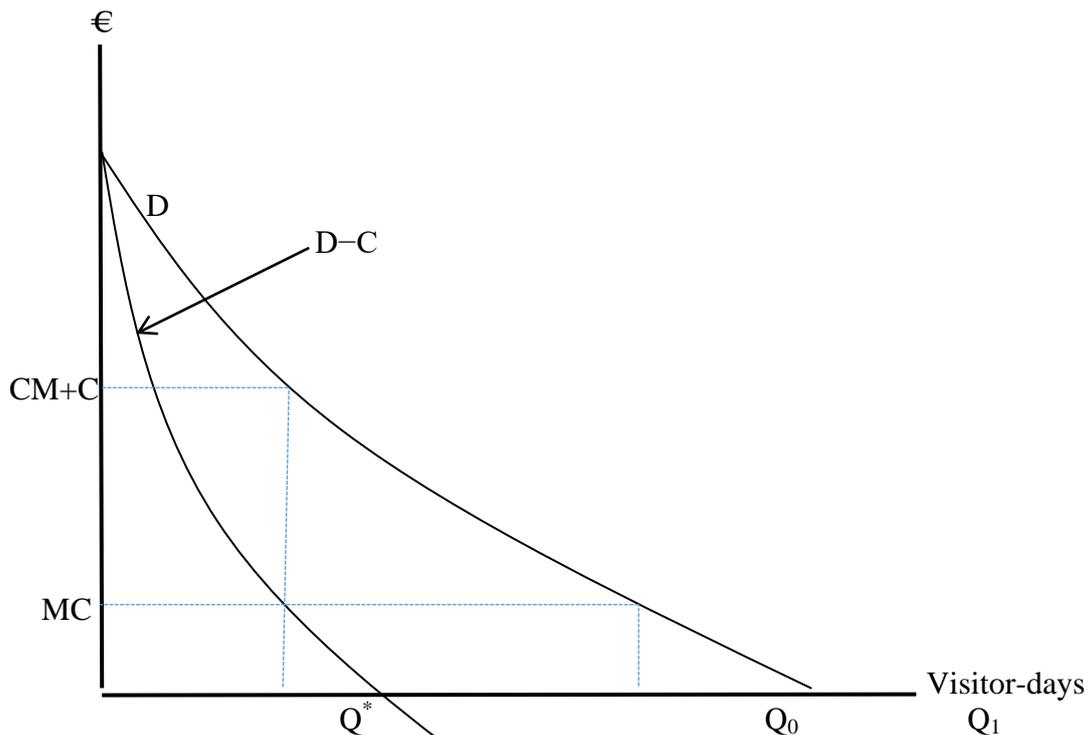
The answer of such question could be met examinig the model presented by figure 2. In the figure we supposed  $D$  is the normal market demand curve of the visits to the public park,  $CM$  is the marginal cost of operating the park and we supposed constant,  $D-C$  is the demand curve minus the externality of the congestion cost. That is, the congestion cost of each level of visitation, as we supposed, is measured by the vertical distance between the curve  $D$  and the curve  $D-C$ .

So, following figure 2,  $Q_1$  would be the open access visiting level,  $Q_0$  is the social optimal visiting level when there are no congestion costs, since it corresponds to the condition  $CM=D$ . And  $Q^*$  is the social optimal level of visitation when there are congestion cost. Now, according to  $D$ , to achieve  $Q_0$ , it would be enough fixing the entrance fee equal to  $CM$  and, according to  $D$ , to acheive  $Q^*$  the entrance fee should be equal to  $CM+C$ .<sup>48</sup>

<sup>47</sup> Regarding the negative relationship between the congestion level and the valuation expressed by the respondents, see Charles J. Cicchetti and V.Kerry Smith.

<sup>48</sup> In Hanley, Nick, W., et. al., found good economic treatment of the demand and other aspects of outdoor recreation.

Figure 2.



### Rationing Possibilities

As could be easily expected, in many recreation areas and public parks the open access causes overuse, congestion and often to the degradation of the natural resources in the area. So, for the managing agency which wish to limit the access till a level consistent with the social efficiency, or exclude all those who would have continued the visits if the open access had maintained, it would be possible the consideration of several options. One of them is limit the entry to certain categories of people. For example many communities limit the access to the town beach only to the residents of the town. The second option is that of the first-come, first served. Determine the level of the visitation one wants, then on a first-arrival basis; when the desired level of visitation has been reached, close the points of entry. The third possible option is charge fee for entry sufficiently that the visitation reduce till  $Q^*$  of figure 2.

The two first options, which are nonprice based, are usually accepted in the name of an equity objective, and normally imply certain amount of wealth distribution, since if the cost of operating the park is not covered by the visitors, it should be attained by other means, for example general tax. This involves that some people will participate in the parks cost and not enjoy their services. Of course, it is possible use the two first options in combination, admitting only the residents of the town up to certain maximum.

The third option based in entrance charge to rationing the use, historically it has not been commonly used given the consideration of the provision of public parks and reservation as an important part of the civic life and cultural identity, so should not be submitted to the market force. Nonetheless, this idea is changing for some factors. One, is the need of revenues to cover the costs of park areas. Another factor is the increase of the ecotourism. The third factor is the fast increase of the privately produced outdoor recreation. And the last factor, beside the increasing interest in protecting the resources, is that entry price and the revenue generated can permit the expansion the park system and reservations quantitatively and qualitatively.<sup>49</sup> But, as can be seen for example in the conference paper presented by Aldo

<sup>49</sup> In 1995 Congress of USA enacted the Recreation Fee Demonstration Program, which allowed some federal agencies, such as the National Park Service, to charge entrance fee. In 2004 this was replaced by the Federal Lands Recreation Enhancement Act (REA), which extended for another 10 years the authorization for entrance

Leopold, this is not means that all the opposition to the entrance price has disappeared. Now, these different positions regarding the entrance fee, in practice, led to the application of entrance fees which are too low for social efficiency if congestion is included and possibly too low to protect ecosystems. Eventhough fees create a revenue, the another justification of the entrance fees is to ration the use of scarce asset and to make sure that people who visit the parks are those who value more the experience than the people who do not visit.

**Revenue Versus Pricing Approches**

In reality a major rationale for the entry fees is to raise revenue, therefore it become importante analyze the connection between revenue and the charged fees. Given the demand function, there are certain revenue for each price. Then, given the elasticity of the demand, an increase of the price by one quantity can lead to increase or decrease in the total revenue. The máximum revenue arrives when the dmand elasticity is unitary. Above that the demand become elastic, so price increses reduce the revenue and bellow that the demand become inelastic so price decreases also reduce the revenue. According to this fact, the prices which lead to maximize the revenue of the visitation of pubic parks are those corresponding to the point where the demand elasticity is unitary. The figures seen in table.2 show the results of a research which undertood to investigate the demand for visitation at three national parks in Costa Rica and the results of fixing different entrance prices.<sup>50</sup>

Table.2. Entrance fees of national parks in Costa Rica (all monetary values are in dolars)

	Parks		
	Volcán irazú	Volcan Poás	Manuel Antonio
Current fee	12.28	9.85	9.56
Length average of visit (days)	1	1	1.45
Willingness to pay for a visit	21.75	21.60	24.90
Fee that visitors think would be acceptable	6.48	6.77	7.37
Demand elasticity	-1.05	-2.87	-.96
Current total revenue (1994-1995)	427,307	669,940	431,371
Entry fee of maximizing revenue	7.06	9.28	13.59
Expected total revenue if revenue maximizzing entry fee has been applied	1,372,844	675,447	518,187
One interesting result of the table is that the demand elasticity is not equal for the three parks, and the current fees in the first and third park are quite different comparing with the fees of maximizing revenue.			
<i>Source:</i> Lisa C. Chase, David R. Lee, William D. Schulze, and Deborah J. Anderson, "Ecotourism Demandand Differential Pricing of National Park Access in Costa Rica", <i>Land Economics</i> , 74 (4), November 1998, pp. 466-482.			

It should be emphasized that maximizing total revenue is not necessarily recomanded as a good strategy for national parks, forests and another reservations. Social efficiency requires the maximization of the net benefit, so the prices which maximize the net benefit may no be those which maximize the total revenue. One important reason of the difference is that the environmental costs should be included when determining social efficiency. They can or can not affect revenues in a consistent way. If willingness to pay of the visitors includes the environmental quality of the sites so the environmental degradation affects the demand, then the environmental costs could be totally deducted from the revenue. Nevertheless, visitors may not necessarily be aware of the ecological disruption, therefore willingness to pay may not be an accurate reflection of the environmental status of the park or the reservation.

One more aspect which also important to take into account, in relation with fixing the access fees, is that parks and reservations generally exisit as system, since states have numerous parks and they like to manage in coordinated way, as does the central government with its network of national parks, forests and monoments. In simiar situations may be it is not

fees. The types of entrance fees used, for example, included the entrance fee used by the National Park Service (NPS) and Fish and Wildlife service (FWS).

<sup>50</sup> For more information about national parks of Costa Rica see (<http://www.gemlab.ukans.edu/cr>)

proper to price each one independently in an attempt to maximize its own total revenue. Prices at the different reservations should be fixed in coordinated way, given the interrelationship among their demands.

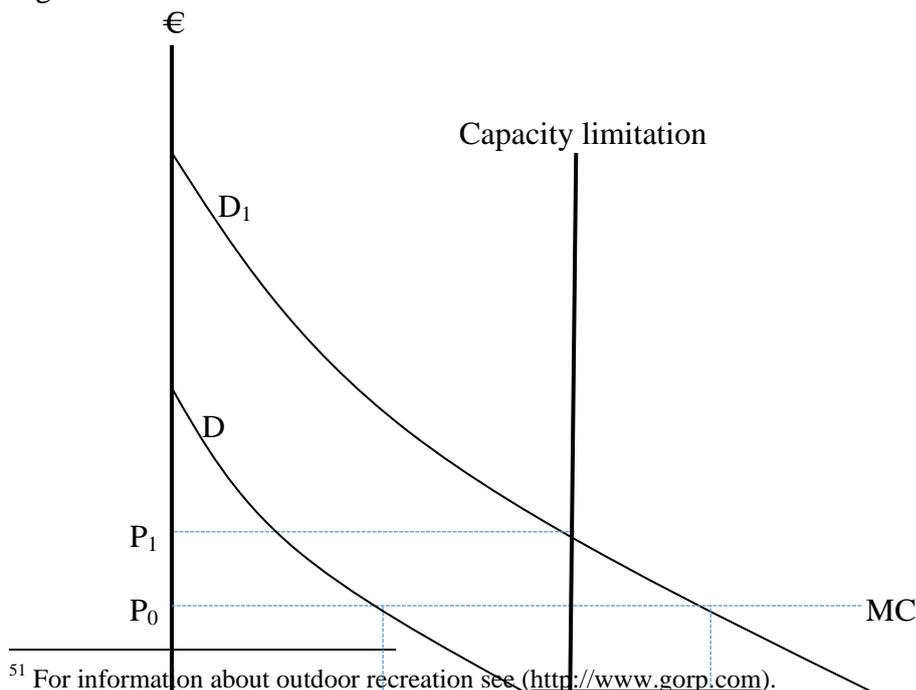
**Preferable pricing approach**

It is obvious that the real world is more sophisticated in comparison with the simple models, since not all visitors have equal preferences and consequently their willingness to pay. So, this leads to the question of, for efficiency and/or equity criteria, when is more convenient the application of equal price and when the different prices. For the answer, first, we should consider the fact that the willingness to pay is higher during the weekend than during the weekdays. Then, different visitors of the same park engage in different activities, and not all parks are equal in environmental value or in their closeness to the urban area.

Now to answer the previous question about the preference between equal price and different prices, we can develop some understandable simple principles to help for considering the issues. The first principle is that if the individual demands have different elasticity of the demand and the marginal cost, MC, is constant, and there are no congestion, the overall social efficiency, requires simply the achievement of the condition  $MC = \text{Marginal willingness to pay}$  of each visitor. This is obtained by setting  $P = MC$ . In this case the social net benefit and/or the aggregate social surplus is maximized. Now, if the MC of serving the different groups is different, achieve the social efficiency requires different prices for the different groups. That is,  $P = MC$  for each subgroup, so, charging higher price for the group of higher MC. An possible example of this case of different MC is that rock climbers need higher costs than picnickers given the necessity for closer supervision, medical attention, etc.

Certain parks have limited capacity, such as campsites or visitation levels where congestion problems start appear. As seen in figure 3, to expose the case we suppose the simple example of one park with constant MC, a number of camping sites indicated as  $Q_1$  and two demands, D for weekday visitors and  $D_1$  for weekend visitors.  $D_1$  is bigger than D given the more availability of time on weekends. In this case efficiency needs two prices.  $P_0 = MC$  for D, which leads to an average of weekday visitation of  $Q_0$ , and  $P_1 > MC$  for  $D_1$ , which leads to  $Q_1$  average weekends visitation. For  $D_1$  can not apply  $P_0$ , because it leads to the demand of  $Q_2$  which is higher than the park capacity. Also,  $P_1$  guarantee that the visitors will be those who value most the visit.<sup>51</sup>

Figure 3.



<sup>51</sup> For information on about outdoor recreation see (<http://www.gorp.com>).

Q<sub>0</sub>Q<sub>1</sub>Q<sub>2</sub>

### Natural resources based tourism

Here we refer to the ecotourism which in our modern time is growing increasingly. Such sort of tourism is that where the visits are linked in certain manner to the natural or environmental resources. Even the ecotourism includes national but possibly has more reference to international tourism, especially from the industrial countries to developing countries whose endowments are uniquely natural resources. In some locales the ecotourism is seen by the people as essential factor for pushing the economic progress. As stimulus it can lead to increase the value of the natural assets which before were out of the markets and in this way encourage people to put more interest on their conservation. Now, if the tourism increase the value of the natural resources there will be less reasons to deforest them, converted to agricultural land or pasture.

Now regarding the ecotourism, If fees such as that for wildlife tour or park entrance are used to increase the revenue or to protect the resources from the overuse, then knowing the demand function is also necessary. This need, which faced all along the private firms in the tourism sector and have supposedly got the necessary knowledge to continue in the market. Nevertheless, such obligation is comparatively recent for the public sector, since historically the access right has been decided by politicians and who at the same time was in charge of the pricing. The problem is not simple, because the countries try to reserve many resources which are significantly different in terms of types of resources, clientele and objective.<sup>52</sup>

Besides the positive aspects of converting the resources areas in sources of income through the ecotourism, we also should highlight one possible inconvenient that opening up resources to touristic impact, particularly the resources which are ecologically sensitive, could reduce them quantitatively and/qualitatively in the long run. A great wish to get revenues could lead to excessive visitation comparing with the long run sustainable ecotourism.<sup>53</sup> Nevertheless, most ecotourism activity is connected with the biological resources, so the question which comes up is about the efficient stock of the resource when used as ecotourism resource. In reality all levels of tourism affects the quantity and/or the quality of the resource. The appropriate quantity and quality of a natural resource submitted to ecotourism will be different from what it would be if there were no tourism. The difference will depend on the trade-off between the value of the biological impact and the economic value of the ecotourism. Adding to that, many ecotourism plans have been undertaken as stimulus to economic progress, which if succeed might become less resource dependent. This should raise the possibility that the efficient stock of the ecotourism resource is not fixed, at least so far. Since, comparatively, economic progress may call for high use in the short run and less in the long run.

Apart from the previous aspects, it is important to have in consideration the institutional elements involved in the management of the ecotourism. One very important is balance that is necessary to be established between the private and the public sectors. In Spain, as many other countries central or regional governments are directly intervene in the management of the accesses to national parks, wildlife refuges, etc. In certain cases, such as wildlife in Africa, private companies have established to manage the ecotourism activities in the market setting. In some cases units of local government function in certain sense as private companies in operating local ecotourism. This is the case of what is known as Campfire (Communal Areas

<sup>52</sup> A good exposition of these differences in terms of Categories, Objectives and Criteria for Protected Areas can be seen in International Union for the Conservation of Nature (IUCN); J. Mackinnon et al., and Gardner Brown.

<sup>53</sup> About the sustainable ecotourism see, for example, Erlet Cater and Gwen Lowman.

Management Program for Indigenous Resources) in Africa allows local communities, acting collectively, to benefit by selling access to local wildlife resources to the operators of safari.

In any particular case, the preferable institutional arrangement should depend on the characteristics of such case. That is, the resource implicated and the political and economic conditions of the countries. Nonetheless, certain general criteria may be possible. When the ecotourism is based on market principles, the supply should be directed at the demand of the ecotourists. Not all resources that are valuable in certain biological terms are valuable for the tourists. In similar cases, it is important that economically significant resources not be favoured to the detriment of less significant, but ecologically important, resources. When decisions are left to the private sector, this problem is known as negative externality or negative costs. On the contrary, when decisions are taken in the public sector, that is, by public agencies responsible for the ecotourism resources, may be made according to the narrow political interests of those in power, at the expense of other values which could be important for the whole society.

Another important aspect of the institutional is the distribution of the resource rent. If the ecotourism is undertaken for the economic progress, it is obvious a difference who accumulates the generated rents. If the state receives them, they are used for objectives that politicians and state planners think necessary. If they go to individuals locally, they are likely to be spent on different goods and services. In many ecotourism projects the motivation is to provide stimulus to conserve the resources in consideration. If this succeeds, the rent must go, at least in large part, to those in the local population who have the power to conserve the resource. As an example, the best way to halt deforestation or poaching by local people of public ecotourism reservations could be giving them some of the rents.<sup>54</sup>

## Conclusions

Given the quick growth during the last decades of outdoor recreation together with the corresponding private markets and the increasing concern about the environment and the depletion of the natural resources, the aim of this article is to analyze the important economic aspects of the outdoor recreation which are resource intensive. The reason for such study is to understand the necessary conditions for efficient management of the outdoor recreation activities.

For an efficient management of the outdoor recreation, it is indispensable the understanding of their demand. The information about the demand is valuable as much for the private companies of the related market as for the public agencies.

Regarding the efficient level of visitation, such as in the park case, this does not result the same when the resource is managed by private sector instead of public one. So, when the objective of using the resource is satisfying the social efficiency, understanding the difference between the private and public management results important for the pricing policies. However, when presents congestion externality, the socially efficient level requires higher entrance fee and consequently less quantity of visitors. To limit the access, in addition to the application of positive entrance fee, there are also nonprice based options available for the managing agencies. Even though, recently, the consideration of new concerns is justifying more preference of the price based entrance. Beside the creation of revenue, the another justification of the entrance fees is to ration the use of scarce asset and to make sure that people who visit the parks are those who value them more.

Even the revenue maximizes when the elasticity of the demand is unitary, however the entrance fees which maximize the revenue not necessarily coincide with the social efficient fees. Because the social efficient fees are those which maximize the social net benefit. This

---

<sup>54</sup> For information about national parks, visitation, forecasts and impacts on local communities, see National Park Service, Public Use Statistics Office (<http://www.aqd.nps.gov/stats>). For information about ecotourism see (<http://www.ecotourism.org>). And about Ecotourism Management, see Lindberg, Kreg.

distinction is particularly important when the visits involves environmental degradation lead to a difference between the total revenue and the social net benefit.

To fix the recomendable entrance fees when there are different grupos of visitors with dfferent demands, the application of different prices is prefered to equal price when the marginal coste is different among the different demandas and also in such cases when certain demandas exceed the maximum visitation capacity of the correlated area.

When the ecotourism used by the countries to help the economic growth, it could increse the value of corresponding natural resourses and in this way can help to improve their conservation. Now, when the application of fees for ecotourism are seen as to increse the revenue or to improve the conservation of natural resurces, the information about their demand result important. The efficient conservation management, also has to take in consideration various affecting intititional aspects.

### References:

- Aldo Leopold, Wilderness Reearch Institute, "Societal Responce to Recreational Fees onPublic ands," paper given at a conference on May 27-31, 1998, University of Missouri-Columbia (available at [www.fs.fed.us/research/rvur/wilderness/recreation\\_fees.htm](http://www.fs.fed.us/research/rvur/wilderness/recreation_fees.htm)).
- Cameron Mitchell, Paul & Carson, Richard T., *Using Surveys to Value Public Goods: The Contingent Valuation Methods*, Washington, DC, Resources for the Future, 1989.
- Charles J. Cicchetti and V.Kerry Smith, "Congestion, Quaity Deterioration and Optimal Use: Wilderness Recreation in the Spanish Peaks Primitive Area," *Social Science Research*, Vol. 2, 1973, pp. 15-30.
- Daniel Wolf-Watz, et al (eds), "Environmentalism and Tourism Preferences: A Study of Outdoor Recreationists in Sweeden," *Scandinavian Journal of hospitality and Tourism*, 06/2011.
- Erlet Cater and Gwen Lowman (eds.), *Ecotourism;a Sustainable Option?* Wiley, New York, 1994.
- Field, Barry C. : *Economía Ambiental*, McGraw Hill, Madrid, 2003, p. 164.
- Fisher, Anthony C., and John V. Krutilla, "Determination of Optimal Capacity of Resource-Based Recreation Facility," *Natural Resource Journal*, Vol. 12, 1972, pp. 417-444.
- Gardner Brown, "Wildlife in Developing Countries," in Parha Dasgupta and Karl-Gören Mäler, *The Environment and Emerging Development Issues*, Vol. 2. Clarendon Press, Oxford, England, 1997, p.562.
- Hanley, Nick, W. Douglas Shaw, and Robert E. Wright (eds.), *The new Economics of Outdoor Recreation*, Edward Elgar, 2003.
- International Union for the Conservation of Nature (IUCN), "Categories, Objectives, and Criteria for Protected Area," in J.A. McNeedly and K. R. Miller (eds.), *National Parks, Conservation and Development*, Smithsonian Institution Press, Washington, DC, 1984.
- J. Mackinnon et al (eds.), *managing Protected Area in the Tropics*, IUCN, Gland, Switzerland, 1986.
- Jensen, Clayne R., and Steven P. Guthrie, *Outdoor Recreation in America*, 6th ed., Human Kinetics Publishers, Champaign, IL, 2006.
- Lindberg, Kreg, and Richard M. Huber, Jr., "Economic Issues in Ecotourism Management," in Kreg Lindberg and Donald E. Hawkins (eds.), *Ecotourism, A Guide forPlanners and Managers*, Ecotourism Society, North Bennington, VT, 1993, pp. 82-115.
- U.S. Department of the Interior, U.S. Department of Agriculture, *federal Lands Recreation Enhancement Act: First TriennialReport to Congress Fiscal Year 2006*, Washington, DC, May 2006.

# OUTLOOK OF CHINA'S STATE-OWNED ENTERPRISES TRANSFORMATION

*Yi Hu PhD*

Researcher of China Society for the History of Economic Thought

---

## Abstract

This paper created a framework for a dynamic institutional analysis. (1) Reduction of the conviction and motivation inside economic factors (We think that this is the inducing factors of system changes), (2) system changes will be ultimately beneficial to the efficiently allocation of resources, (3) the typical economic factors. This is from the old institutional analysis framework, Mr. Frank Knight's economic thought and historical materialism. Based on this analytical framework, we researched Transformation of China's state-owned enterprises, we come to conclusion that it is the time for the market forces play an basic role in the allocation of resources.

---

**Keywords:** dynamic institutional analysis, conviction, soft system

## Introduction

Transformation of China's state-owned enterprises(SOEs) have been lasted for over 30 years since the beginning of China's reform In 1978.SOEs makes great success accompanied by growth of China's economy. The mainstream view about SOEs is that most policymakers and scholars wish construct a socialist market system which embedded in public ownership. The system not only uses market to efficiently allocate resources but also uses macro-control to protect mass interest and avoid intensification of wealth. However, New Institutional Economist Eric Brousseau (2008) insists that because of high transaction cost 'Privatization was assigned top-priority within most reform packages for developing and transition economies'. My research proposal creates a new historical institutional analysis framework to analyze the problem.

## Description of research agenda

Transformation of China's SOEs can be defined as institution change without technology innovation, Hence the research agenda rises: when the structure of SOEs should be changed? What sequence should be followed about the priority of China's SOEs transformation within reform package? What factors contribute to evolvement of SOEs? transaction cost is a relative static concept,Foundation of evolutionary economic is thought that "novelty---replication---retention".Both of them is inappropriate to explain the transformation of China's SOEs .As far as logistical positivism is concerned,"such accounts usually rest on a model of causality that requires the assumption of unit homogeneity" Daniel Ziblatt(2010) Historian need deal with heterogeneous facts.

## Methodology foundation

The highlight of my proposal is creation of new historical institutional analysis framework .It is original without prior research. Stimulated by work of professor Maria Cristina Marcuzzo (2008) ,the most important of rational reconstructions consists in the reformulation of the arguments of past authors into a modern theoretical framework 'My research proposal is reconstruct thought of old Institutionalism , historical materialism , phenomenology and some soft system method to form a new framework. Gerald

Midgley(1997) pointed out creative design of methods is “synthesis which is generated that allows each individual research question to be addressed a part of whole system question” In my view ,Creative design of methods is reconstruction of assumption and law to explain and predict event.Based on soft system thinking,the root definition of China’s SOEs transformation is structure change which is compatible with China’s economy transformation process to more efficient economy system.

Engels(1890) said “according to the materialist conception of history ,the ultimately determining element of history is production and reproduction of real life” and “the economic situation is the basis but the various element of super structure ...also exercise their influence upon the course historical struggles and in many case preponderate in determining their form”. Edmund Husser.(1954) pointed out “the truth is established only in the self-evidence of critical over-all view which brings to light ,behind “the historical fact” of documented philosophical theories and their apparent opposition and parallels a meaningful final having” Peter Checkland (1999) thought ‘Social reality is the ever-changing outcome of the social process in which human beings ,the product of their genetic inheritance and previous experience, continually negotiate and re-negotiate with others their perceptions and interpretation of world outside themselves’. historical materialism , phenomenology and soft system methodology constitutes the philosophy basis of my new method. Hence the framework is comprised of three parts below.

(1)Reduction of conviction and motivation inside typical case which based on ‘Behavior Subject’ is deemed as inducing factors of system change. According to actor-system-dynamics theory ,”actor ,individual and collective agents---in their various positions embedded in complex structure”Tom R.Burns(2006) ‘Behavior subject’ is a new Multi-actor assumption. Michael C. Jakson (2003) also said that ‘We now have six elements that a root definition make reference,...W=’world view’ makes transformation meaningful’.

(2)System change will be ultimately beneficial to the efficiently allocation of resources. Concept of Adaptive Efficiency is reconstructed in micro and macro lever

(3)Typical case

### **Simple upholding to prove the rationality and contractibility of the framework**

There is a typical economic factor in China's economy that the amount of deposits over loans reached 13 trillion yuan, which is the source of liquidity. According to the analysis of Keynes, the motivation of deposits is due to the prudent motive and investment motive. The factor shows our social security system is not good enough to meet people’s requirement, people lack investment channels. It results in a large number of deposits.We have to reduce state-owned shares to enrich the social security fund, give more investment opportunities to private capital.Now we have come to conclusion that changing economic growth mode must rely on independent innovation. According to thought of Joseph Schumpeter, entrepreneurs is the main organizer of economic development, which is a new combinational factors of production and innovation.Innovation of entrepreneurs also has motives of obtaining ownership, In order to stimulate innovation ,We have to reduce some state-owned shares to entrepreneurs .Based on our concept of successful reform ----two-track system, the core thought of two-track system is that let new market factor gradually play the role meanwhile maintaing the operation of the old scheme until new market factor ultimately replaced the old scheme. Our successful reform of price is a good example .Our state-owned enterprise reform should be similar to price reform, From the protection of private property into the Constitution to support of non-public-owned enterprises development, we have gradually play the role of non-public enterprises. That means non-public-owned enterprises would replace state-owned enterprise.

Time that non-public-owned enterprises replace state-owned enterprises.is decided by whether it is beneficial to the efficiently allocation of resources.(1) Chinese state-owned

enterprises Transformation will minimize the negative effects of the asset bubble ,’ Reducing state-owned share not only benefits social security system to stimulate demand but also absorbs invest demand in real estate market.’Yi Hu.(2011). (2) To maintain sustainable development , It is not rational that economic growth relies on investment because of the investment rate reaching 50%. Due to Eur debt crisis ,it is not reasonable to depend heavily on exports to boost economic growth , we have to speed up the building of the social security system to stimulate consumption growth, and promote innovation to achieve sustainable growth. (3) Grossman and Hart(1986) make a distinction between specific and residual rights of control when contracts are incomplete,and argue that allocation of residual rights of control have critically important incentive.Using the theory of property rights and the firm,Yingyi Qian(1996)pointed out reform of SOEs in China should aim at reducing both political and agency costs ,which can be done through depoliticization,effective corporate governance,and resocialization. . (4) Because of the good quality of state-owned enterprise assets, Someone still reject reform of state-owned enterprises, we have to point out that many state-owned enterprises rely on the scale effect and its monopoly position to maintain their own dominance, In fact,in some competitive field of advanced productive forces private enterprises have made great progress and obtain dominance. such as Huawei and Sina, however state-owned enterprises disappeared .Yanbing Wu (2008) analyzed the relationship between property right and innovation in China’s manufacture,He found distinctive property right had obvious positive incentive effect on innovation.Shaodong zhou(2008) researched the influence of administrative entry and exit Barry on innovation of China’s industrial enterprise,he conclude that the Barry has significate negative effect on innovation.(5) Mr. Deng Xiaoping pointed out that "Let market play basic role in resource allocation " .To accelerate the reform of state-owned enterprises ,we must implement this ideology

### Conclusion

Prevaricating SOE is unavoidable but priority is not the top. Efficient allocation of resources is the ultimate goal of economy system. My research is helpful for transformation of economy system which is in planned economy, It also enhance undemanding the evolvement of economy system.

### Reference:

- Edmund Husser.(1954) Crisis of European Sciences and Transcendental Phenomenology:Northwestern University Press.
- Eric Brousseau and Jean-Michel Glachat(2008). New Institutional Economics a Guidebook :Cambridge University Press.
- Gerald Midgley .(1997) .Developing the Methodology of TSI: from the Obligue use of Methods to Creative Design. System Practice ,Vol.10 NO.3.
- Giovanni Capoccia and Daniel Ziblatt .(2010).The historical Turn in Democratization Studies: A New Research Agenda for Europe and Beyond. Comparative Political Studies , 43-931.
- Michael C. Jackson (2003) Systems Thinking: Creative Holism for managers:John Wiley & Son Ltd.
- Maria Cristina Marcuzzo (2008) Is History of Economic Thought a "serious" subject? Journal for Philosophy and Economics,Volume 1, Issue 1,Autumn 2008, pp. XX-XX.
- Peter Checkland (1999).Soft System Methodology a 30-year retrospective:John Wiiley & SONS LTD.
- TOM R.BURNS. (2006). THE SOCIOLOGY OF COMPLEX SYSTEMS :AN OVERVIEW OF ACTOR-SYSTEM-DYNAMICS THEORY .World Future,62:411-440.
- Yanbing Wu.(2008).The dominate factor of innovation \_ positive study on China’s manufacture.World Economic Papers ,4.

Shaodong Zhou(2008) The relationship between technology innovation in China's enterprise and administrative entry and exit Barry.Inner Mongolia Social Science,4

Yingyi Qian(1996) Enterprise reform in China:agency problems and political control.Economics of Transition.Volume4(2),427-447.

Yi hu(2011).NALYSIS OF CHINA'S ECONOMY SYSTEM FAILURE

<http://journals.issn.org/index.php/proceedings55th/article/view/1609>,ISSN 1999 6918.

# HOW TO MEASURE ADEQUACY OF TECHNICAL PROVISIONS IN GENERAL INSURANCE – PRACTICAL PERSPECTIVE

*Peter Zsoldos*

Department of Mathematics and Actuarial Science,  
Faculty of Economic Informatics,  
University of Economics in Bratislava, Slovakia

---

## Abstract

The goal of this article is to outline possible applications of liability adequacy test (LAT) for non-life business applied by the insurance companies according to local accounting policy and IFRS. As LAT is very indicative tool to quantify adequacy of liabilities, therefore every non-life insurance company should apply certain method of LAT. In the first part, the article focused on the legislative framework and general descriptions of LAT according to IFRS 4. The general definitions and possible applied methodology are described in the next section. The final part is dedicated to calculations and illustrative examples of the topic.

---

**Keywords:** IFRS 4, liability adequacy test, RBNS, IBNR, run-off, UPR LAT

## Legislative framework

The basic principle of accounting applied in every country is the one by which financial statements should give a true and fair view of the financial position and results of an entity. This general principle allows harmonization of the rules in accounting. The result of this harmonization process has become International Financial Reporting Standards (IFRS), which are published since 2001 and the International Accounting Standards (IAS), which were published from 1973 to 2001. These standards are developed and published since 2001 by the International Accounting Standards (IASB). The objective of the IASB was to create clear standards for high-quality class financial reporting. Nevertheless, by adopting IFRS, a business can present its financial statements on the same basis as its foreign competitors, making comparisons easier. Furthermore, companies with subsidiaries in countries that require or permit IFRS may be able to use one accounting language company-wide. Companies may also benefit by using IFRS if they wish to raise capital abroad [6].

IFRS adaptation has an increasing trend on a global level. Currently more than 120 countries permit or require (fully or partially) reporting of the financial statements according to IFRS [4, 6].



Chart 1: Map of IFRS adoption. Source: Author's work by using [7]

IFRS in many countries have become a part of national legislation or common practice. Adoption of IFRS is recommended by the Bank of Cape Verde, however due to many constraints it is not allowed reporting according to IFRS in the country. Hopefully, many steps will be made towards the IFRS adoption taking into account the national specifics. In March 2004, the IASB issued IFRS 4 [1, 2], which is the first phase of the project of the international standards regarding to specific issues of insurance relations. As the second phase of IFRS 4 is still waiting for approval from the European Commission, as well as the introduction of risk-based Solvency II system is still delayed, insurance companies are required to prepare their financial statements (those parts of it) according to IFRS 4 which is engaged in insurance policies, especially their classification, accounting and reporting. Insurance companies have to take into account the definition of insurance contract as it is the core business of such an entity. Insurance contract described in the Annex A to IFRS 4 is defined as [1, p. 11]: „A contract under which one party (the insurer) accepts significant insurance risk from another party (the policyholder) by agreeing to compensate the policyholder if a specified uncertain future event (the insured event) adversely affects the policyholder.“ It means that insurance is the equitable transfer of the risk of a loss, from client to insurance company in exchange for payment. It is a form of risk management primarily used to hedge against the risk of a contingent, uncertain loss. The insurance company compensates the insured in the case of certain negative losses due to uncertain event which is defined in Annex B to IFRS 4 [1, p. 13]: „Uncertainty (or risk) is the essence of an insurance contract. Accordingly, at least one of the following is uncertain at the inception of an insurance contract: whether an insured event will occur; when it will occur; or how much the insurer will need to pay if it occurs.“

The main objective of IFRS 4 standard is to specify the financial reporting for insurance contracts. In particular IFRS 4 requires disclosure that identifies and explains the amounts in an insurer's financial statements arising from insurance contracts and helps users of those financial statements understand the amount, timing and uncertainty of future cash flows from insurance contracts.

Taken into account the disclosure requirements according to IFRS (4.36 to 4.37), insurers should separately disclose information explaining the amounts that are recognized in the financial statements and assumptions considered for quantifying these amounts, respectively. This information includes details about the particular risks (e.g. interest rate risk, market risk, insurance risk), which may have a significant impact on the figures reported in the financial statements.

Insurance companies are exposed to insurance risk and underwriting risk where the most important part of the described risks is the risk of lack of adequate technical provisions. Liability adequacy test is used to eliminate of that risk.

The precise description of principles of the liability adequacy test (LAT) is formulated in parts of IFRS 4.15 to 4.19. To perform the LAT is not possible to provide a general guide, therefore an actuary or a person who performs the LAT should consider all of the circumstances and propose the appropriate model and assumptions based on own best professional judgment.

Finally, based on the disclosure requirements of IFRS 4 (4.36 to 4.37), documentation of LAT should also include material about the segmentation of portfolios into groups, assumptions used and their derivation. In addition, documentation is not complete without a variance analysis, sensitivity analysis and back testing.

### **General methodology of liability adequacy test**

In accordance with the requirements of IFRS 4 (4.15 to 4.19) the insurance company should perform liability adequacy test (LAT) of technical provisions in non-life insurance at least once a year. However, in practice the insurance companies perform LAT at least once a

year as at 31.12. (or as at each reporting date). Implementation of LAT in practice consists of several steps.

The first step determines the best estimate (BE) of technical provisions, which takes into account all available information. The methodology used to estimate the BE should be in accordance with IFRS 4.

In the second step are adequately taken into account the different risks of estimation and application of risk margins (RM). Therefore, risk margins are added to the best estimate which represents certain level of prudence in the estimation process. Level of uncertainty in the estimate of technical provisions should be in each LAT quantified. Quantification includes indication whether there was an increase, decrease or stable level of prudence compared to the previous LAT. Based on IFRS 4.29 prudence is allowed in the estimation process, but if the technical provisions are already measured with sufficient prudence, it should not be added any additional prudence.

When calculating the best estimate with risk margins insurance companies can apply some aggregation of certain groups of insurance contracts of a similar nature. It means that the portfolios of insurance contracts can be divided into groups (e.g. by the nature of the products, by underwriting period). IFRS 4 does not specify which insurance contract should be in which group, therefore insurance companies can classify non-life insurance contracts according to own actuarial judgment. The main criterion should be that products with similar risks should be included within one group and managed together as a single portfolio. Separation can be done according to Solvency II directive (12 lines of business) or according to internal classification of insurance company. LAT of technical provisions should be assessed for each group separately. However, in practice is often applied simplified way where for the purpose of LAT particular groups are created (significant lines of business and others; short tail and long tail business).

In the last step is performed the LAT of technical provision by comparing best estimate with risk margins to the value of technical provisions in the financial statement. There are some basic types of LAT in non-life insurance:

- liability adequacy test of claim provisions,
- liability adequacy test of unearned premium reserve.

### **Liability adequacy test of claim provisions (Run-off for RBNS and IBNR)**

For LAT of claim provisions is used the result of claim settlements (run-off). This run-off test is used for checking of the proper amount of technical provision carried out for a certain term (usually one year). In case of negative result the reasons of the phenomenon are analyzed. Furthermore, the negative result has only informative character, but it also indicates some inconsistencies, therefore it is an indication for reviewing and analyzing of the methodology applied in the estimation process. LAT of technical provisions are linked to:

Provision for reported but not settled claims (RBNS). Components needed to perform the run-off are:

RBNS provision at the beginning of the period,

Claims paid from the beginning of the period to the end of the period which were reported until the beginning of the period, RBNS provision at the end of the period for claims reported until the beginning of the period.

Result of the run-off test for RBNS is then  $1) - 2) - 3)$ . If the result is less than 0, then the provision at the beginning of the period was not sufficient. Otherwise, the provision was sufficient.

Provision for incurred but not reported claims (IBNR). Components needed to perform the run-off are:

IBNR provision at the beginning of the period,

Claims paid from the beginning of the period to the end of the period for claims incurred until the beginning of the period but reported from the beginning of the period to the end of the period,

RBNS provision at the end of the period for claims incurred until the beginning of the period but reported from the beginning of the period to the end of the period,

IBNR provision at the end of the period for claims incurred until the beginning of the period.

Result of the run-off test for IBNR is then  $1) - 2) - 3) - 4)$ . If the result is less than 0, then the provision at the beginning of the period was not sufficient. Otherwise, the provision was sufficient.

### Illustrative example 1

The insurance company usually has a large portion of data about claims, current amounts of RBNS per policy basis, amount of IBNR per line of business. The records usually contain identification data, the date of the occurrence of claim, date of registration, date of payment, etc. Sufficiency of technical provisions should be assessed for each group separately as it is illustrated in the example below. Beginning of the period is January 1, 2013 and December 31, 2013 is the end of the period, therefore the run-off test is performed on annual basis. Suppose that the insurance company has prepared a dataset illustrated in the Table 1 from the available data (the data in the table below were generated and are for illustrative purpose):

Table 1: Data

Calendar year	2013	
Total paid claims – actual year (1.1.2013 – 31.12.2013)	17 976	A=B+C
of which reported in past years	9 761	B
reported in actual year	8 215	C=D+E
but incurred in past years	346	D
but incurred in actual year	7 869	E
RBNS at the beginning of the period (1.1.2013)	57 227	F
RBNS at the end of the period (31.12.2013)	54 902	G=H+I+J
of which claims reported in past years	46 822	H
claims reported in actual year, but incurred in past years	491	I
claims reported in actual year and incurred in actual year	7 589	J
IBNR at the beginning of the period (1.1.2013)	33 445	K
IBNR at the end of the period (31.12.2013)	31 100	L=M+N
of which claims incurred in past years	27 552	M
claims incurred in actual year	3 548	N

Source: Author's calculation

From the data illustrated above, it is simple to construct a run-off test for RBNS and IBNR. Based on the methodology of run-off test for RBNS the components needed for the run-off test are RBNS at the beginning of the period, total paid claims in actual year but reported in the past years and RBNS at the end of the period for claims reported in the past years. The result is presented in the following table. The number before the component description is a reference to the methodology described above. The last column indicates a link to input data from Table 1.

Table 2: Run-off for RBNS

1) RBNS at the beginning of the period	57 227	F
2) Total paid claims in actual year but reported in the past years	9 761	B
3) RBNS at the end of the period for claims reported in the past years	46 822	H
1)-2)-3) Run-off result	644	
Run-off result in %	1%	

*Source: Author's calculation*

Result of run-off test is positive, which means that the provision for RBNS was sufficient at the beginning of the period because the provision covers all paid claims reported in recent years. The positive result of 1% indicates that the provision was set appropriately. If the result is positive, and is very close to zero, then the determination of RBNS reflects appropriate estimate. In case that the result of run-off test is negative, it would be necessary to revise the methodology of RBNS provision. On the other hand, very high positive % is not appropriate, because it may indicate a deeply conservative approach and may cause excessive prudence, which is inconsistent with IFRS 4.29 (prudence in the estimation process).

Based on the methodology of run-off test for IBNR the components needed for the run-off test are IBNR at the beginning of the period, total paid claims in actual year reported in actual year but incurred in past years, RBNS at the end of the period for claims reported in actual year but incurred in past years, IBNR at the end of the period for claims incurred in past years. The result is presented in the following table. The number before the component description is a reference to the methodology described in the previous section. The last column indicates a link to input data from Table 1.

Table 3: Run-off for IBNR

1) IBNR at the beginning of the period	33 445	K
2) Total paid claims in actual year, reported in actual year, but incurred in past years	346	D
3) RBNS at the end of the period for claims reported in actual year but incurred in past years	491	I
4) IBNR at the end of the period for claims incurred in past years	27 552	M
1)-2)-3)-4) Run-off result	5 056	
Run-off result in %	15%	

*Source: Author's calculation*

Result of run-off test is positive (EUR 5 056 or 15%), which means that the IBNR provision was sufficient because the estimated provision covered all claims paid in the current year, reported in the current year, but occurred in the past years.

The positive result of 15% indicates that the provision was set appropriately. If the result is positive, and is very close to zero, then the determination of IBNR reflects appropriate estimate. Negative result is an indication for revision of IBNR methodology, because the provision should cover all the incurred but not reported claims. Very high positive % (usually more than 30-40%) is a sign of deeply conservative approach and may cause excessive prudence which is not allowed according to IFRS 4.29 (prudence in the estimation process).

### **Liability adequacy test of unearned premium reserve (LAT for UPR)**

This type of test is performed as a control of sufficient amount of UPR less the corresponding deferred acquisition costs. This value is then compared with the value of expected future cash flows from the insurance contracts. To create the expected future cash flows are used combined ratio, claim ratio and expense ratio. These values are determined by

the values of estimated future administrative costs, the amount of future commissions and expected claim ratio.

If the value of combined ratio is below 100%, UPR can be considered as adequate. On the other hand, if the value of combined ratio is above 100% it can be considered as a signal for inadequate premium. In case of deficiency of UPR the insurance company either amortizes deferred acquisition costs or creates provision for unexpired risks (Unexpired Risk Provision, URP). The following components are needed for the UPR LAT test.

Unearned Premium Reserve (UPR). Gross written premium (cost of insurance which is paid by the client) includes the total amount of payment of insurance contract during the period, regardless of the fact whether this amount relates fully or partially to future periods (unearned premiums). UPR is created for the premiums corresponding to the time period remaining on an insurance policy. Unearned premiums are proportionate to the unexpired portion of the risk, thus it is deemed to have not yet been earned by the insurer. It is usually calculated separately for each insurance contract by “pro rata” method. Alternatively it can be calculated as the gross written premium minus the change in the UPR.

Deferred acquisition costs (DAC). It is a term commonly used in the insurance business. It describes the practice of deferring the cost of acquiring a new client over the duration of the insurance contract. Insurance companies face large upfront costs incurred in issuing new business, such as commissions to sales agents, underwriting costs and other acquisition expenses. Insurance companies should spread out these expenses over the period in which revenues are earned. The DAC is treated as an asset and amortized over the life of the insurance contract.

Claim ratio. Claim ratio is used to illustrate the technical costs, which compares the amount of claims (total losses incurred in claims) to earned premiums. The lower the percentage, the greater part remains from the premium as profit.

Administrative ratio. It compares the amount of administrative costs (operating expenses related to insurance business) to earned premium. If the insurance company does not record these costs by lines of business then non-technical costs of non-life insurance can be allocated to each line of business according to the amount of earned premium.

Components in the general methodology of UPR LAT process can be described as follows:

- UPR at the end of the period,
- DAC at the end of the period,
- Combined ratio.

Result of the UPR LAT is then  $(1 - 2) - 3 * 1$ . If the result is below 0, then liabilities at the end of the period are insufficient to cover expected future liabilities, therefore it is necessary to reduce the DAC or to create a provision for unexpired risks (URP). Otherwise liabilities are sufficient to cover expected future liabilities.

### **Illustrative example 2**

The insurance company usually has a large portion of data about claims, current amounts of RBNS per policy basis, IBNR, earned premium, administrative expenses, etc. Sufficiency of UPR should be assessed for each group separately as it is illustrated in the example below. Beginning of the period is January 1, 2013 and December 31, 2013 is the end of the period. Suppose that the insurance company has prepared a dataset illustrated in the Table 4 from the available data (the data in the table below were generated and are for illustrative purpose):

Table 4: Data

Calendar year	2013	
Earned Premium at the end of the period (31.12.2013)	19 165	A
UPR at the end of the period (31.12.2013)	13 897	B
DAC at the end of the period (31.12.2013)	1 905	C
Claims paid in current year (1.1.2013 - 31.12.2013)	9 067	D
Change of RBNS (balance as at 31.12.2013 – balance as at 1.1.2013)	-438	E
Change of IBNR (balance as at 31.12.2013 – balance as at 1.1.2013)	254	F
Total claims paid in current year (1.1.2013 - 31.12.2013)	8 883	G=D+E+F
Administrative expenses in current year (1.1.2013 - 31.12.2013)	4 581	H

Source: Author's calculation

Based on the methodology of UPR LAT described above, all items are needed for the adequacy test purpose. The last column indicates a link to input data from Table 4.

Table 5: UPR LAT

Calendar year	2013	
Claim ratio	46%	I=G/A
Expense ratio	24%	J=H/A
Combined ratio	70%	K=I+J
Liabilities at the end of the period (31.12.2013)	11 992	L=B-C
Expected future liabilities at the end of the period (31.12.2013)	9 763	M=K*B
Result	2 229	N=L-M
Unexpired risk provision (URP)	0	

Source: Author's calculation

The result of the test is positive (EUR 2 229), which means that the UPR less DAC is sufficient to cover expected future liabilities. Therefore, the provision for unexpired risks is not needed. On the other hand, if the result is negative, the insurance company should create URP in amount of the final result.

## Conclusion

As performing LAT is required by IFRS 4, the insurance companies have to select and apply a certain method to quantify adequacy of liabilities. For this purpose is described above and illustrated the LAT of UPR which is the most common test applied by the insurance companies. It is simple and transparent method to measure adequacy of technical provisions in general insurance. Insurance companies have appropriate data to perform this LAT of UPR according to local and international accounting standards as the general methodology is introduced and illustrated through examples. Additionally run-off tests should be performed on regular basis to follow and monitor development of technical provisions carried out for a certain term. The results of run-off and impact on the LAT have to be analyzed.

## References:

- EIOPA: Technical Provisions - Lines of business on the basis of which (re)insurance obligations are to be segmented. 2009. [cited 11.12.2013]. Available on internet: [https://eiopa.europa.eu/fileadmin/tx\\_dam/files/consultations/consultationpapers/CP27/CEIOP\\_S-L2-Final-Advice-Technical-Provisions-Segmentation.pdf](https://eiopa.europa.eu/fileadmin/tx_dam/files/consultations/consultationpapers/CP27/CEIOP_S-L2-Final-Advice-Technical-Provisions-Segmentation.pdf)
- IAS Plus. 2014. [cited 08.01.2014]. Available on internet: <http://www.iasplus.com/en/standards/ifrs/ifrs4>
- IAS Plus. 2014. [cited 07.01.2014]. Available on internet:

<http://www.iasplus.com/en/news/2012/february/mandatory-transition-date-to-ifs-for-banks-in-ukraine>

IFRSsupportus. 2014. [cited 02.01.2014]. Available on internet:

<http://www.ifrssupportus.com/>

International Financial Reporting Standard 4 – Insurance Contracts. 2009. [cited 10.12.2013]. Available on internet:

[http://ec.europa.eu/internal\\_market/accounting/docs/consolidated/ifrs4\\_en.pdf](http://ec.europa.eu/internal_market/accounting/docs/consolidated/ifrs4_en.pdf)

International financial reporting standards. 2014. [cited 05.01.2014]. Available on internet:

[http://www.ifrs.com/updates/iasb/about\\_the\\_iasb.html](http://www.ifrs.com/updates/iasb/about_the_iasb.html)

PricewaterhouseCoopers: IFRS adoption by country. 2013. [cited 05.01.2014]. Available on internet:

[http://www.pwc.com/en\\_US/us/issues/ifrs-reporting/publications/assets/pwc-ifs-by-country-apr-2013.pdf](http://www.pwc.com/en_US/us/issues/ifrs-reporting/publications/assets/pwc-ifs-by-country-apr-2013.pdf)

# INSTITUTION OF MATRIMONIAL PROPERTY – DOWRY ON THE STAGE OF MODERN EUROPE

*Iveta Nikolajeva*, ( MA)  
Turība University, Latvia

---

## Abstract

The institution of matrimonial property – dowry still exists in the EU Council Directive of 24 June 1988 (88/361/EEC) referring to the principle of free movement of capital and is a link to the Latvian Civil Law and shows the existence of the institution of dowry in European law. The study shows the background and historically evolving nature of dowry institution and evaluates the need of it in the contemporary Civil Law of Latvia, tries to answer why such an archaic legal institution is still present in the modern law, analyses it through the gender equality framework and explain regulatory failure in this context, offers solutions for this problem from the theoretical and practical perspectives. In order to understand the topic's complexity, the article gives a short insight from the historical perspective examining the continuities and discontinuities in this social institution in different regions and eras – starting from ancient world to nowadays: from the time when the king of Babylon Hammurabi ruled up to the modern Southeast Region societies and in the Baltics. The issue has not been analyzed more widely before, there is no common understanding how it corresponds to provisions of the European Economic Community's gender equality law and what the opinion of general public in Latvia is on this subject.

---

**Keywords:** Dowry, Matrimonial property, Human rights,

## Introduction

Probably very few will question that the modern law practice in Latvia about dowry regulation is not something that is in high demand. The redemption and dowry are today's uncharacteristic relics from the past. In reality this family law institution of marriage practice from ancient times is not only a tradition remaining in our minds, but even as a separate institution fixed in the Civil Law of Latvia (hereafter CL). The legal meaning of word "dowry" in Internet resources shows no significant responses, suggesting that this archaic law institution in European legal space is either sunk or has disappeared. This raises the question about the dowry institution and its role and place in contemporary continental modern law. Clarity on this issue would also be required for practical reasons, because the alleged breach of gender equality issue may have significant implications for national interests.

### Short historical overview

In 1993 the CL from 1937 was restored in to force, including The Family Law Part<sup>55</sup>. Some parts of CL were substantially revised, however, left unchanged and retained were those

---

<sup>55</sup>Civillikums, <http://www.likumi.lv/doc.php?id=90223>, The Civil Law (www.vvc.gov.lv), Accessed: 2011-02-02 The Civil Law of Latvia CHAPTER 1, Marriage, SUB-CHAPTER 4, Property Rights of Spouses, Lawful Property Relations of the Spouses, has three articles for dowry: 111-113.

Article 111. A dowry, which, in the event of marriage, parents, kin or other persons have endowed to a woman, shall be the property of the wife even if it has been given to the husband.

Article 112. For a promise to give movable property of more than five hundred lats in value or immovable property as a dowry to be binding, it must be expressed in writing.

Fulfilment of a promise of dowry may be claimed by the wife herself or, on her behalf, by the husband; in addition, the right to bring an action for provision of the dowry is prescribed two years after the entering into of the marriage or the day specified for the provision of the dowry.

institutions which were traditional for Latvians, for example, engagement and dowry. As it happens more than 10 years before Latvia became an EU member state, it can't be notified that we have the rule, because the COUNCIL OF THE EUROPEAN COMMUNITIES DIRECTIVE of 24 June 1988 for the implementation of Article 67 of the Treaty (88/361/EEC), which was adopted to ensure European Economic Community the internal market area without internal frontiers, without prejudice to other provisions of the Treaty, providing the free movement of capital, Annex I, Article 1 (capital movements), Section XI - Personal capital movements - Part C, which includes a dowry, has.<sup>56</sup> So the Directive is a link to the CL and shows the probability of its existence in European law.

The dowry institution has an ancient origin and it has existed in many legal systems all over the world. Nevertheless currently de facto it exists mostly in Africa, America, South Asia. In Europe only among large immigrant communities from Asian, South-East Asian and Arabic countries.

The historical evidences of different nations and historical sources of information, including customs and habits, represents the various stages of institutions in their historical way of development, makes us understand the ancient society's way of life. This can also be said about dowry which in all times is seen as a special tool – an institution for women or wives, as less protected family members, as an instrument for their legal status regulation and support, of course, with some exceptions. In most cases, especially in patriarchal societies, the view is that a woman in the family must be protected and the dowry institution was for balance and to provide an environment for the new family to be economically independent and stable. The most common use for dowry were two functions: it served as a wife's contribution to the newly established family, as the wife's part for the families' property, which could be used by all family members,<sup>57</sup> and in a case of a divorce or husband's death, served as a wife's or widow's protection mechanism against the possible ill-treatment by husband or husband's family, and thereby provides a security for her future life, so it could be considered as a special instrument for wife's or widow's defence remedy.

The definitions on dowry institution are largely influenced by the system of the society, and the period in which it was formed.

In Latvian folk songs (in latvian-dainas) there are lot of evidences<sup>58</sup> showing the role of dowry and the decision from them is that if the dowry was prepared by women themselves, the women's virtue was assessed on a housewife's capabilities and usually it was checked at the wedding, when dowry was evaluated by the future husband's family representatives, and at this moment, in order to promote further relationship, the future wife donated some generous dowry to her future husband's relatives<sup>59</sup>. Not only Latvian folk songs contained

A dowry may not be claimed if the marriage has been entered into without the knowledge or assent of the person who has promised the dowry.

Article 113. Rights, which are based on the promise of a dowry may not be assigned to a third party; these rights may devolve, by way of inheritance, only to the children of that marriage for the entering into of which the promise of dowry was given, and to the husband who has been left with the children.

<sup>56</sup> Council Directive of 24 June 1988 for the implementation of Article 67 of the Treaty (88/361/EEC), [1988] OJ, L 178/5

<sup>57</sup> The Institution of Dowry in India: Why It Continues to Prevail Author(s): Sonia Dalmia and Pareena G. Lawrence Source: The Journal of Developing Areas, Vol. 38, No. 2 (Spring, 2005), pp. 71-93 Published by: College of Business, Tennessee State University Stable URL: <http://www.jstor.org/stable/41929>, Accessed: 2011-06-05

<sup>58</sup> Through in written form gathered dainas /what is a little part of them/there are 3597 dianas where dowry is mentioned:<http://www.dainuskapis.lv>, pūr, Accessed:2011-02-20; <http://www.maraslaks.lv/public/?id=32&ln=lv>, Agnija Saprovskā, Dainu Dievs - kā latviešu tautas garīguma ideāls, Accessed: 2011-09-11

<sup>59</sup> <http://www.liis.lv/folklorā/gimen/origin/ved.htm>, Accessed: 2011-16-02

confirmation of dowry. We can find the concept of dowry in the ancient Balts' Peasant Rights too: "Kurshi<sup>61</sup> (Curonian) Peasants' Law" (Latvian - Kuršu zemnieku tiesības) codified in the 13th century and later extended to Zemgale. <sup>62</sup>"Kurshi Peasants' Law" contains the rules that sons as heirs, "...must take care of their sisters' dowry" (Article 27b), they were obliged to give a part of their heritage to sisters when they married. At the same time it should be stressed that ancient Lithuanians were able to create their own state – Grand Duchy of Lithuania – and develop the civil law institutions on a relatively high level that included the dowry as part of matrimonial property. The dowry is widely described in it and implemented in a quite different way, not only as the traditional norms for medieval Lithuania, regulated by

rules of Lithuanian Statutes (Statutes of the Grand Duchy of Lithuania - 1<sup>st</sup> version – 1529; 2<sup>nd</sup> version – 1566 and 3<sup>rd</sup> version - 1588). Nonetheless, Paragraph 12 of the Polish Constitution<sup>63</sup> of 1588 under the title "On Dowry of Sisters" stated that brothers are obliged to provide their unmarried sisters with the dowry and determined that the amount would be at their own discretion and on their conscience; however, taking into account the opinion of and acceptance by two relatives on the father's side and two on the mother's side. At the same time the Lithuanian Statute of 1588 indicates that the brothers are obliged to give ¼ of the property of their father to unmarried sisters (Part V, Article 3)<sup>64</sup>.

In some nations the care of dowry must be taken by the future wife herself, in some - the bride's father, in others - the bride's family, or even the whole community. Jews, for example, had to give a certain minimum donation, which, if the father was unable to procure the woman, she was given from the whole Jewish community. The tradition of community to support newly married couples, a slightly altered form, has survived until the present day - a marriage ceremony, where guests from all those present at it (in terms of the local community) collect money for dowry - every guest has to put it into a hat and loudly announce the amount given. In the Middle East, a Jewish bride's legacy mainly was jewellery, which was given by both family sides. Jewellery served brides as a sort of insurance policy as we say nowadays for a rainy day - divorce, because the value of jewellery was truly remarkable. Wealthy women's wedding dresses sometimes were decorated with jewels literally from head to toe.<sup>65</sup>

Oregon State University's anthropological definition dictionary<sup>66</sup> states that dowry is the woman's shared part of her inheritance from the group at her birth, which is taken with her upon marriage.

<sup>60</sup> Endzelīns J., Baltu valodu skaņas un formas, Latvijas valsts izdevniecība, Rīgā, 1848., p.5.,7., see also: Čatverdži S.K., Balti un ārieši, Rīga, Zinātne, 1990., ievads, p.41.

<sup>61</sup> <http://www.vaidilute.com/books/gimbutas/gimbutas-07.html>, *the Cours (the Couronians) inhabitants of Kursa (Courland)-an ancient Latvian tribe, Chapter VII, The Balts before the Dawn of History*, see also: <http://www.historyfiles.co.uk/KingListsEurope/EasternLivoniaCourland.htm> Accessed: 2012-08-04

<sup>62</sup> <http://www.zemgale.lv/eng/>, <http://www.vietas.lv/?id=3&p=11>, Zemgales Reģions, Accessed: 2012-08-04

<sup>63</sup> Term "Constitution" in medieval Polish – Lithuanian Commonwealth was used in the meaning of body of laws adopted by Seim (Parliament of Commonwealth) session. It was not Constitution in the modern sense of this word.

<sup>64</sup> Ibid., c.45

<sup>65</sup> <http://ldolphin.org/risk/ult.shtml>, Accessed: 2010-08-08, <http://www.infoplease.com/spot/dowries1.html#ixzz1EWDWxMDNDowries>, Jewish Brides Wore Their Dowries, The joining of money and marriage by David Johnson, <http://connection.ebscohost.com/c/articles/11306269/division-dowry-death-daughter-instance-negotiation-laws-jew>, Accessed: 2011-08-02, [http://faculty.ksu.edu.sa/amer%20elzanaty/The%20Englis%20Books/Encyclopaedia/Encyclopaedias%20Miscellaneous/Encyclopedia\\_of\\_Modern\\_Jewish\\_Culture.pdf](http://faculty.ksu.edu.sa/amer%20elzanaty/The%20Englis%20Books/Encyclopaedia/Encyclopaedias%20Miscellaneous/Encyclopedia_of_Modern_Jewish_Culture.pdf), Encyclopedia of Modern Jewish Culture, Abramson Glenda, pp. 67, Accessed: 2012-09-01

<sup>66</sup> [oregonstate.edu/instruct/anth370/gloss.html](http://oregonstate.edu/instruct/anth370/gloss.html)

The most common for the definition is that dowry is money, goods or property which a woman gives to her husband when she entered for marriage. Noble family daughters' dowry can consist of money and valuables, sometimes – land. So, more often the traditional understanding of this is that dowry is money or property that the bride brings in for a new family.

In the book "Understanding the age: from the 5<sup>th</sup> to the 15<sup>th</sup> century", the historical period for the definition of terminology, it is marked that a dowry is a present given to a new husband by the bride upon marriage and it could take the form of land, goods or money<sup>67</sup>, sometimes jewellery, and - rarely - land that accompanies the bride and is provided by the wife-givers. The dowry was also the entrance fee, gift for the monastery, when the nun or monk joined it<sup>68</sup>.

A different viewpoint is at All-Russian classification of economic activities in the chapter "Marriage Redemption"<sup>69</sup> where it is stated that the marriage of redemption is compensation for the dowry what the bride took for her new residence to furnish new family social life. Here, even it is said that redemption and a dowry are about the equivalent value interchange format between families. At the same time it is not excluded that the dowry has appeared later as the ransom, and was established at the time started from Nuclear (according to the DNA test results it is confirmed that the oldest of them were formed before 4600 years)<sup>70</sup> small family, which split off from the former family, moved on and started a separate life within a certain area which also was a precondition for the incurrence of dowry.

The ancient civilizations of Egyptians, Mesopotamians, Hebrews, Aztecs, Incas all of them used the bride price. The Germanic tribes, who date from 2000 BC and ruled western Europe from the 600 to 1000 AD, required bride's price for a marriage to be legal.<sup>71</sup>

Vancouver British Columbia University assistant professor of economics in Canada Siwan Anderson, believes that today, however, it is no longer possible to determine exactly when the dowry or ransom institutes were established or which of them was the first one, even though they are ethnographically recorded both at the beginning of our era, at the Bronze and Iron ages, when people had food from hunting, fishing and plant collection, and when the hunters' plant collectors and the community switched over to an independent, local life.<sup>72</sup>

However, it is true that the bride's redemption and the dowry at ancient times in all communities has an important role and its rational basis: parents were given some compensation for the loss of working hands, it served as a form of subsidiary for bringing up and educating the child, as well promoted the strengths of relationship between two new families<sup>73</sup>. For the ancient Latvians the bride's family sometimes also made payments for the other family, as a compensation for the loss of a family member. Redemption and dowry are

<sup>67</sup> <http://www.legal-explanations.com/definitions/dowry.htm>, Legal Resources in plain English, Legal-Ezplanations.com Home > Legal Definitions, Dowry, Accessed: 2010-12-09

<sup>68</sup> [essenes.net/index.php](http://www.essenes.net/index.php), Accessed: 2011-06-05

<sup>69</sup> [http://linai.lt/index.php?option=com\\_content&task=view&id=101&Itemid=50](http://linai.lt/index.php?option=com_content&task=view&id=101&Itemid=50), Общероссийский классификатор видов экономической деятельности ОК 029-2001 (КДЕС Ред.1) введен в действие постановлением Госстандарта РФ от 6 ноября 2001 г. N 454-ст Дата введения 2003-01-01, part "Брачный выкуп", Accessed: 2011-07-02

<sup>70</sup> <http://www.thefreelibrary.com/World's+earliest+nuclear+family+found+in+4,600-yr-old+grave.-a0199285736>, Accessed: 2011-18-02

<sup>71</sup> <http://www.econ.ubc.ca/asiwan/siwan-jep.pdf>, Anderson S., Journal of Economic Perspectives—Volume 21, Number 4—Fall 2007—Pages 151–174, Accessed: 2011-06-05

<sup>72</sup> [http://wn.com/bride\\_price](http://wn.com/bride_price), World news, Bride price, Accessed: 2011-06-05,

<http://www.econ.ubc.ca/asiwan/siwan-jep.pdf>, Journal of Economic Perspectives—Volume 21, Number 4—Fall 2007—Pages 151–174, Accessed: 2011-03-02

<sup>73</sup> <http://hubpages.com/hub/LoveForSale>, Love for Sale: Dowries and Bride Prices, The Bride Price Is A Turn About For The Groom, Accessed: 2010-08-04

referred in various ancient sources, such as the Bible - the Old Testament<sup>74</sup>, the Code of Hammurabi<sup>75</sup>, or the oldest monument of Greek fiction - Homer's epic "Odyssey", where Penelope insists on the marriage with redemption in accordance with the old tradition, while the groom's guests request to enter the marriage with a dowry after a new tradition, by Andrew Lang in a book "Homer and his Age", the 11 chapter "Notes of Change in the" Odyssey "" it is evaluated as the legal position - judicial instability of Penelope giving the bright description of the woman's place and role in the society and pointing out that it consists only as the fact that they could be used for physical needs and men's well-being.<sup>76</sup>

The dowry institute most of all flourished at medieval Europe when it became almost mandatory or a part of a marriage. In fact, at that time that meant that a woman without a dowry didn't even have a hope to get married. Therefore, one of the ways to punish a disobedient daughter was to take away the dowry. This tradition is described in W. Shakespeare's tragedy "King Lear" when after Cornelia's famous monologue: "You have begot me, bred me, loved me: I Return those duties back as are right fit, Obey you, love you and most honour you...Why have my sisters husbands if they say They love you all? ...Sure I shall never marry like my sisters to love my father all", she was deprived of the dowry.<sup>77</sup> Reduction of the role of the dowry, even tripled, in England, in the period when an aristocratic English woman faced increasing competition with women of different origin - namely noblewomen. Some similarities to this process were also observed in Renaissance Venice, where reductions of the role of dowry were caused because of increasing competition among senior noble clans, who due to the modernization and influences from economic development opportunities rapidly became wealthy and created new, competing

segments of society.<sup>78</sup> It is considered that in the 18<sup>th</sup> century Great Britain gradually became freer, and at the marriage negotiations the role of dowry decreased (with the exception of

higher order aristocracy). The proceses at the 18<sup>th</sup> century in France were similar, when

competition between new bourgeoisie and the old nobility emerged. In the 17<sup>th</sup> century there were similar trends in northern Italy. Moreover, there may be other reasons, which played a role for the disappearance of dowry in continental European countries.<sup>79</sup> Siwan Anderson believes that the further explanation in reducing the dowry, was that it became obvious for parents giving dowry to daughters because they faced the fact that the sons who, as it was

<sup>74</sup> Mozus 22:28-29,24: 61, 34:12, Exodus 22:16-17, T.B.S. 217KINGSTON ROAD, LONDON, SW 19 3NN ENGLAND, pp.214

<sup>75</sup> Blūzma V., Zemītis G., Osipova S., Ārvalstu tiesību vēstures avoti. Rīga, "Biznesa augstskola Turība" SIA, 2007., pp. 6-3

<sup>76</sup> <http://ebooks.adelaide.edu.au/l/lang/andrew/homer/chapter11.html>, D.O. Hughes, From brideprice to dowry in Mediterranean Europe, in: M. Kaplan (Ed.), The Marriage Bargain: Women and Dowries in European History, Havorth Press, New York, 1985, pp.13-58, Accessed: 2011-16-02

<sup>77</sup> Shakespear W. The Tragedy of King Lear, R.Ābeltiņa, Dz.Fleija, Ā.Misāne, English and American Literature, Zvaigzne Publishing House Riga, 1978, pp.29

<sup>78</sup> Kaplan, Marion A. The Marriage bargain : women and dowries in European history New York : Harrington Park Press, 1985, pp. 17

<sup>79</sup> Kaplan, Marion A. The Marriage bargain : women and dowries in European history New York : Harrington Park Press, 1985, pp.5, <http://www2.kenyon.edu/projects/margin/beguine1.htm>, Sisters Between Gender and the Medieval Beguines by Abby Stoner, Accessed: 2011-09-  
<http://www.arcaini.com/ITALY/ItalyHistory/Italy12th17th/Italy12thto17th.htm>01, Italy 12th to 13th Century, Source:Microsoft® Encarta® Encyclopedia 2000, Encyclopedia Britannica

<http://faculty.arts.ubc.ca/asiwan/documents/dowry-jpe.pdf>, Anderson S, Why Dowry Payments Declined with Modernization in Europe but Are Rising in India, The Journal of Political Economy, Vol. 111, No. 2 (2003), pp. 269-310, Published by: The University of Chicago Press, Stable URL: <http://www.jstor.org/stable/3555204>, Accessed: 2010-16-11

adopted in patriarchal societies, after marriage have to stay and live together with parents, no longer saw the sense of building family wealth and became quite lazy.

At the same time daughters joined their husband's household and received a dowry. To tackle this huge issue, society had to reduce the dowry payment and review the tradition that the sons have to work and live with their parents after marriage.<sup>80</sup> It is worth mentioning the role of dowry in America's first president's George Washington's life - when a 26-year-old young man married a wife, the widow Martha Dandridge Custis (Washington). The new rich widow's dower - 6 thousand hectares of land and 150 slaves inherited from her brother's property, helped George Washington to become the richest person in Virginia and to build his political career on his way to the first U.S. presidential post.<sup>81</sup> Mostly in the Western world, the late 19<sup>th</sup> century, early 20<sup>th</sup> century, is the time when the role of dowry faded. The only places where institution of dowry remains in the national law in Europe it seems to be in Latvia<sup>82</sup> and till 2006 – in France<sup>83</sup>. Not so long ago it was in Austrian<sup>84</sup> and Catalonian civil codes. Until 2005 in the United States the dowry or “Marriage Portion” was included in Articles 2317- 2359 (VI Title, II Division) and regulated by the Louisiana's Civil Code (1870).<sup>85</sup> Louisiana's Civil Code from 2005 includes modifications, which speak of gifts that can be donated by a third party in relation to newlyweds. Today's “Marital Portion” is mentioned as the surviving spouse's share if the surviving spouse is in need. In this case the share may make a one-fourth of the inheritance. However, it cannot be considered as a dowry, but rather as a widow's share (see: Articles 2432 - 2437 of the Louisiana Civil Code<sup>87</sup>). In other states of USA the dowry had not been mentioned at all.

### The dowry nowadays

Living in Europe today is no longer imaginable without migration, which in turn has an impact on the integrity of society and brings up the diversity of modern Europe, including traditions of nations each immigrant group brings there. Thus, modern European marriages

<sup>80</sup> <http://www.scribd.com/doc/29970365/Women-of-the-Renaissance>, Women of the Renaissance, Margaret L. King, The University of Chicago Press, Chicago 1991, pg.50; <http://homes.chass.utoronto.ca/~siow/papers/dowry.pdf>, Why Dowries? Maristella Botticini and Aloysius Siow, February 2002, pg.3; <http://arno.uvt.nl/show.cgi?fid=4191>, Anderson S., Why Dowry Payments Declined with Modernization in Europe but Are Rising in India, University of British Columbia, EBSCO Publishing, 2003, Accessed: 2011-20-03

<sup>81</sup> <http://www.whitehouse.gov/about/presidents/georgewashington>, [http://findarticles.com/p/articles/mi\\_m0JIW/is\\_3\\_58/ai\\_n14932706/](http://findarticles.com/p/articles/mi_m0JIW/is_3_58/ai_n14932706/), Accessed: 2010-12-12, <http://www.firstladies.org/biographies/firstladies.aspx?biography=1> [http://ru.wikipedia.org/wiki/Джордж\\_Вашингтон](http://ru.wikipedia.org/wiki/Джордж_Вашингтон), Accessed: 2010-10-10 <http://www.history.org/almanack/people/bios/biomwash.cfm>, Martha Dandridge Custis Washington, <http://marthawashington.us/exhibits/show/martha-washington--a-life/early-life/page-3>, Early Life, Courtship of Daniel Parke Custis and Martha Dandridge, Accessed: 2014-02-13

<sup>82</sup> Civillikums, <http://www.likumi.lv/doc.php?id=90223>, The Civil Law (www.vvc.gov.lv), Accessed: 2011-02-02

<sup>83</sup> [http://www.legifrance.gouv.fr/html/codes\\_traduits/code\\_civil\\_textA.htm](http://www.legifrance.gouv.fr/html/codes_traduits/code_civil_textA.htm), Accessed: 2010-10-26

<sup>84</sup> <http://www.ceflonline.net/Reports/pdf3/Austria.pdf>, Accessed: 2010-08-27

<sup>85</sup> <http://www.ceflonline.net/Reports/pdf3/Catalonia.pdf>, Accessed: 2010-08-27

<sup>86</sup> <http://www.archive.org/stream/civilcodeofstate00loui#page/312/mode/2up/search/313>, Civil code of the state of Louisiana, Accessed: 2012-05-05, see also: <http://www.law.lsu.edu/index.cfm?geaux=lcco.home&v=en&u=062#062>, <http://legal-dictionary.thefreedictionary.com/dowry>, West's Encyclopaedia of American Law, edition 2. Copyright 2008 The Gale Group, Inc.; Accessed: 2011-02-02

<sup>87</sup> <http://www.law.lsu.edu/index.cfm?geaux=lcco.home&v=en&u=062#062>, Accessed: 2012-05-05

sometimes demonstrate that in order to help young women to procure the necessary items for the new life, dowry and the ransom are not forgotten despite the fact that in South East Asia today the dowry institution causes family tragedies. Many countries including India, China, Southeast Asia,<sup>88</sup> on the African continent countries like - South Africa, Tanzania, Ghana, Senegal, Rwanda, Kenya, Uganda<sup>89</sup>, Nigeria<sup>90</sup>, it is still not possible to get married without dowry or ransom<sup>91</sup>. The enormous impact of the role of dowry in public life today for individuals was shown by the Pakistani women interview in Euro news that were given in relation to the August 2010 summer floods and 6.3-point earthquake in Pakistan, India and

th  
Afghanistan on the 17<sup>th</sup> of September 2010 when in the context of disasters women were mostly worried about the loss of dowry and not for the fact that the earthquake killed their relatives, destroyed their shelter, any documents or other important common life things<sup>92</sup>. In some places the bride has to be bought by the groom from their parents, so it is in China, India, Thailand<sup>93</sup>, Burma, Indonesia<sup>94</sup>, Central Asia - Kazakhstan, Kyrgyz Stan, Uzbekistan, on the American continent for Peru indigenous people – Urarina<sup>95</sup>, the institution exists for the indigenous people of Amazon and Australian aborigines<sup>96</sup>, too. A contemporary Thai bride's ransom could reach as high as \$ 300,000 if the bride is beautiful, educated and from a considerable family. Thai bride's ransom usually consists of cash, gold and diamond rings, and is given to the bride's family to show the bride's parents, that the groom is wealthy enough to feed a young family, sometimes it is given as a wedding gift.

During the first half of January 2014, in Latvian public space appeared the message : " The tendency in England : immigrants make abortions expected to be girls."<sup>97</sup> The article gives an overview of the "Anglo Baltic News" published information that some ethnic groups in the UK are widely practicing illegal - selective abortion in order to avoid girls' birth, as a result, in those communities there are huge amount of "lost" girls. This is confirmed in England and Wales, and the number of these "lost" girls is between 1400 and 4700, with a reference to the articles from "The Independent". The Independent "publishes articles one after another, expert opinions and discussions<sup>98</sup> on this issue, stating that 2013 government's

<sup>88</sup> <http://factsanddetails.com/china.php?itemid=109&catid=4&subcatid=20#13>, WEDDINGS, CUSTOMS, CEREMONIES AND GIFTS IN CHINA, Accessed: 2011-08-02

<sup>89</sup> [http://ipsnews.net/africa/interna.asp?idnews=22462,CULTURE-UGANDA: A Price Above Rubies](http://ipsnews.net/africa/interna.asp?idnews=22462,CULTURE-UGANDA:A%20Price%20Above%20Rubies) Rachel Rinaldo, Accessed: 2011-08-02

<sup>90</sup> <http://www.enotes.com/bride-price>; The Bride Price | Introduction, Accessed: 2011-08-02

<sup>91</sup> <http://hubpages.com/hub/LoveForSale>, Love for Sale: Dowries and Bride Prices. Origin Of The Bridal Shower, Accessed: 2011-12-02

<sup>92</sup> <http://www.euronews.net/tag/natural-disasters>, Accessed: 2010.09.10

<sup>93</sup> [http://wn.com/bride\\_price](http://wn.com/bride_price), World news, Bride price, Accessed: 2011-10-02

<sup>94</sup> <http://www.econ.ubc.ca/asiwan/siwan-jep.pdf>; The Economics of Dowry and Brideprice. Siwan Anderson, Accessed:2011-12-02

<sup>95</sup> <http://www.let.leidenuniv.nl/pdf/lucl/lwpl/2..2/olwaky.pdf>, Knut J. Olawsky, Urarina – Evidence for OVS Constituent Order, p.43, Accessed: 2011-08-07; <http://www.encyclo.co.uk/define/Urarina>, Accessed: 2011-07-02; <http://www.encyclo.co.uk/define/Urarina>, Accessed: 2011-07-02

<sup>96</sup> <http://saiic.nativeweb.org/ayn/urarina.html>, New and Old Disease Threats in the Peruvian Amazon: The Case of the Urarina, Accessed: 2011-08-07

<sup>97</sup> <http://www.anglobalticnews.co.uk/lv/da%C5%BEas-lielbrit%C4%81nijas-etnisko-minorit%C4%81%C5%A1u-grupas-pla%C5%A1i-piekopj-neleg%C4%81los-abortus,Da%C5%BEas-Lielbrit%C4%81nijas-etnisko-minorit%C4%81%C5%A1u-grupas-pla%C5%A1i-piekopj-neleg%C4%81los-abortus>, Accessed: 2014-01-16

<sup>98</sup> <http://www.independent.co.uk/news/uk/crime/the-lost-girls-department-of-health-to-act-on-reports-of-illegal-abortions-by-gender-9062460.html?origin=internalSearch>, The lost girls: Department of Health to launch investigation into reports of illegal abortions, Cahal Milmo, Steve Connor, Thursday 16 January 2014;

<http://www.independent.co.uk/news/science/the-lost-girls-thousands-of-missing-girls-revealed-by-analysis-of-uks-2011-census-results-9059905.html>, The lost girls: Thousands of 'missing' girls revealed by analysis of UK's 2011 census results, Steve Connor, Tuesday 14 January 2014;

investigation has not revealed evidences that women living in the UK, but born abroad, make abortion in cases when the expected baby is a girl, and refers to the "The Independent" journalists search analyzing the same data from Office for National Statistics, which shows that among immigrant families the child sex ratios problem, however, exists. British Columbia University in Canada associate professor Siwan Anderson and Debraj Ray professor of New York City university in 2013 published the study<sup>99</sup> which also indicated that during 90 – 92 in India there were "lost" about 25-50 million women, but over the past 20 years, made more than 10 million female selective abortions and pointed out that the reason for this problem lies in the declared topic here: matrimonial property - dowry de facto existence and gender discrimination in those communities. The similar problems caused by the existence of a dowry in both - China and India, are faced in "The Economist"<sup>100</sup> article "The worldwide war on baby girls". The article highlights that due to the fact that in China there is a one-child state policy and due to the fact that many families still are keeping the tradition to give the daughters dowry, millions of young couples after examining the expected child is a daughter, choose to kill them. The same is happening in India. Despite the fact that the Indian government has taken a series of measures to limit the use of prenatal diagnosis and prohibit the use of this method for the determination of the sex, selective abortion on sex is widely used. Still, both in China and northern India, despite the government's efforts, for every 100 girls born there are more than 120 boys born. At a substantial total population amount in these countries, this results in a number of problems because of the enormous amounts of unmarried, young men: an adult crime, human trafficking, sexual abuse, suicide rates which have a tendency of increasing. According to 2001 population census data of India for every 1,000 males there were 933 women, but in 2004 only 882 girls per 1,000 boys were born. India now announced that in such proportions each year they are missing 930,000 girls<sup>101</sup>. This fact is a tragedy and a danger which is confirmed in data published in the 2005 at India's National Crime Records Bureau: :  
 every 3 minutes in India are committed one crime against a woman ,  
 every 9 minutes is fixed cruel behavior against women,  
 every 15 minutes, there is sexual molestation of women ,  
 every 20 minutes - female rape,

---

<http://www.independent.co.uk/news/science/the-lost-girls-it-seems-that-the-global-war-on-girls-has-arrived-in-britain-9059610.html>, The lost girls: It seems that the global war on girls has arrived in Britain, Steve Connor, Tuesday 14 January 2014;

<http://www.independent.co.uk/news/science/the-lost-girls-if-you-have-a-girl-you-feel-youve-let-your-husband-down-9059570.html>, The lost girls: 'If you have a girl, you feel you've let your husband down', Cahal Milmo, Tuesday 14 January 2014;

<http://www.independent.co.uk/news/science/the-lost-girls-why-it-has-been-so-difficult-to-prosecute-doctors-offering-terminations-where-gender-has-been-an-issue-9059590.html>, The lost girls: Why it has been so difficult to prosecute doctors offering terminations where gender has been an issue, Steve Connor, Tuesday 14 January 2014;

<http://www.independent.co.uk/news/science/the-lost-girls-girls-are-still-aborted-in-states-with-more-educated-women-by-amartya-sen-9059544.html>, The lost girls: Girls are still aborted in states with more educated women, by Amartya Sen, Tuesday 14 January 2014;

<http://www.independent.co.uk/news/science/the-lost-girls-main-conclusions-of-the-independents-study-9059716.html>, The lost girls: Main conclusions of The Independent's study, Steve Connor, Saturday 18 January 2014.

<sup>99</sup> <http://ideasforindia.in/profile.aspx?id=41>, India's missing women by age and state, Siwan Anderson, Debraj Ray, 11 Jan 2013, <http://www.econ.nyu.edu/user/debraj/Papers/AndersonRay.pdf>, Review of Economic Studies (2010) Missing Women: Age and Disease, SIWAN ANDERSON University of British Columbia, DEBRAJ RAY, New York University, First version received July 2008; final version accepted December 2009, Accessed: 2014-02-04

<sup>100</sup> The Economist, The worldwide war on baby girls, March 4th 2010, Accessed: 2010-08-11

<sup>101</sup> <http://www.parliament.uk/documents/commons/lib/research/rp2007/rp07-041.pdf>; RESEARCH PAPER 07/41 2 MAY 2007 A political introduction to India, Accessed: 2011-05-01

every 23 minutes - the abduction of women ,  
 every 53 minutes, a woman suffers sexual harassment and  
 every 77 minutes, occurs a woman's death due to dowry <sup>102</sup>.

Despite the fact that in modern continental European countries, the dowry institute has almost vanished, the impact of Roman law on civil law system with some exceptions, such as UK, and the fact that Europe is home to a large number of immigrants, including a large Arab and Muslim community migrants, in which a dowry functioning is a traditional in their countries of origin, the role and impact of it, is even more important than it might be seen.

The other problem lies in a different reason also linked with dowry: the German Zentral Institute of Islamic Archive ( dt. Zentral -Institut Islam - Archiv - Deutschland) gives data that in modern Europe there are more than 53.7 million Muslims, 16 million of whom live in the European Union<sup>103</sup>. Thus, if we take into account the EU's total estimated population of 497 million on the first January 2007<sup>104</sup> and compared it with the number of Muslims in the EU, we can conclude that the EU is a large enough number of people living in the EU, wanting domestic legislation to be introduced at Sharia traditions, including divorce in which the wife must be provided with a dowry. In the interview, published at "Financial Times" article "First Person : Dr. Suhaib Hasan".<sup>105</sup> Dr . Suhaib Hasan (according to Islamic law he is the Islamic Sharia Council judge in London from 1982) helps UK British Muslim community with issues related to Islam such as divorce. Only Criminal cases they agree to be let to the jurisdiction of the British courts. The Islamic Sharia Council wants to ensure that British law regarding the status of the Sharia Council would be changed and the Muslim community on legal grounds must be given responsibility for this area. This result cannot be left unattended because it has continuation in another publication in "The Economist "<sup>106</sup>. The article shows that 40 % of British Muslim origin would liked the idea of the application of Sharia in the UK. Respondents indicated that, contrary to some hysterical speeches, no one advised Islamic justice system in any of the Western democracies, that's why there is no reason to be afraid of it. Nobody has objections if two citizens deal with commercial disputes in the normal manner. However, as in the English-speaking part of the world, there has long been a special arbitration solving commercial disagreements, and their services are required, this only demonstrates the objection of the possibility and necessity in the Muslim practical life for Sharia law. British society has a reasonable concern that Muslim women will be turned to arbitration not of their own free will, so using an Islamic divorce procedures they may be less favorable, as in the national legislation where their rights would be better protected.

In March 2012, the German court have a case where a Turk 's father put a dispute in to the court calling for his sons divorced wife to return the gold jewelry € 12,000 (twelve thousand euros) value, which the woman was given as a dowry, because in two months after the wedding, she got divorced. The judge ruled that a woman can keep the jewelry as dowry because dowry lets the woman be financially independent after divorce, and there is no matter how long the marriage would have lasted. The judge noted that their decision was based on the Turkish court ruling knowledge for such cases decided under Sharia law, which

<sup>102</sup> [http://www.crowdvoice.org/sexual-assault-in-india?gclid=CKeB6dvXwLoCFYdf3god\\_RIAAA](http://www.crowdvoice.org/sexual-assault-in-india?gclid=CKeB6dvXwLoCFYdf3god_RIAAA), Sexual Assault in India, crime clock, Accessed: 2013-12-10

<sup>103</sup> <http://islamineurope.blogspot.com/2007/05/number-of-muslims-in-europe.html>, Accessed: 2010.05.08

<sup>104</sup> <http://islamineurope.blogspot.com/2007/05/number-of-muslims-in-europe.html>, Accessed: 2010.05.08  
[http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-SF-08-081/EN/KS-SF-08-081-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-SF-08-081/EN/KS-SF-08-081-EN.PDF), Accessed: 2010.05.08

<sup>105</sup> <http://www.ft.com/cms/s/2/9064931e-a0f6-11de-a88d-00144feabdc0.html>, Financial Times Limited , 2009. gada 19. septembrī, Accessed: 2010-09-10

<sup>106</sup> The Economist, Islamic law and democracy, Sense about sharia, October 14th 2010, Accessed: 2010-09-10

determines to maintain divorced wife's dowry, thus shielding her from poverty. As an additional reason, which the rule stated, was that it fully complies with the requirements of the German constitution and eliminates poverty. Commenting on this outcome of the case, the lawyer does not exclude that a different decision would be expected if a similar dispute occurred not with the Turks, but among the Germans<sup>107</sup>. Another case from Sweden: every year the Swedish authorities receive hundreds of requests for the registration of marriages between persons who are still within the meaning of Swedish law - children: "It's about people who have arrived to Sweden, either on arrival or later, one of them already is a Swedish citizen, and the other a foreigner, and they ask to register them as spouses. According to the Swedish National Youth Council report, in Sweden at least 8,500 of children exposed to the risk of early marriages, often with close relatives and even before reaching the age of 12, which indicates the increasing role of the Sharia here, and like the above situations in the UK, also it is seen increasing pressure and efforts to affect the existing legal order of Sweden. Thus, any Arab citizen, in accordance with Sharia law in Hebron (the occupied Arab city in Israel) got married to a girl, who at the time of marriage hadn't reached the age of maturity. Returning to Sweden this Arab citizen, wanted that his marriage would be recognized in Sweden. The Swedish Tax Agency (Skatteverket) requested from the person's marriage certificate, that the marriage was at the time when the girl was not 18 years old. Sweden Court decided that a 17-year – old once married under the Sharia, in Sweden cannot be recognized as valid. The Swedish Supreme Administrative Court (Högsta förvaltningsdomstolen ) set aside the lower court's ruling, stating that the case of Sweden cannot recognize the marriage to be entered into force, as to foreign marriages registered in Sweden must be clear and follow the Swedish marriage law conditions, refusing girls marriage registration in Sweden. Yet this is a clear signal that the Swedish legislation, in comparison with Sharia law, is in preference.<sup>108</sup>

### Bottom of Form

European integration has been and is the legal integration. One must be able to see a causal link and be able to predict the life-changing potential and its impact on society in future. Both Germany and Sweden in recent years has doubled the number of Muslims, who have an impact on society as a whole, as these migrant groups are not isolated from the rest of society.

<sup>107</sup> <http://www.familysecuritymatters.org/publications/detail/turks-in-germany-are-a-time-bomb>, Family Security Matters, *Turks in Germany are a Time Bomb*, by DR. SAMI ALRABAA, March 22, 2013.

<http://www.destentor.nl/2.2545/buitenland/duitse-rechter-past-sharia-toe-1.239909>, Duitse rechter past sharia toe, de Stentor, 26 maart 2012

<http://www.internationalfamilylawfirm.com/2012/10/law-panel-wants-anti-dowry-law-toned.html>, Jeremy D., International Family Law, Thursday, Law Panel Wants Anti-Dowry Law Toned Down, October 04, 2012

<http://www.emirates247.com/news/region/girl-wins-dowry-case-against-her-father-2011-10-06-1.422195>, Girl wins 'dowry' case against her father, Emirates, 24/7, October 06, 2011

<http://www.indiankanoon.org/docfragment/1698806/?formInput=cases%20on%20dowry>, cases on dowry, Sunil Kumar Sharma vs State (Cbi) on 30 March, 2007, JUDGMENT,

Venkatesan J., Casual, wholesale reference to in-laws won't justify dowry case: Supreme Court, The Hindu, New Delhi, October 22, 2012,

Patnaik I., Women are misusing Dowry Act, rules court, The Indian Express, Wed Feb 03 2010, Patnaik I., Nisha Sharma dowry case: Court acquits all accused, The Indian Express, New Delhi, Thu Mar 01 2012,

<http://www.indiankanoon.org/docfragment/698149/?formInput=cases%20on%20dowr%20fromdate:1-2010%20todate:31-12-2010>, cases on dowry, Shahid Riza @ Raju vs State on 30 September, 2010

[http://post.jagran.com/dont-implicate-family-members-in-dowry-case-merely-on-fir-sc-1351245209](http://post.jagran.com/dont-implicate-family-members-in-dowry-case-merely-on-fir-sc), Don't implicate family members in dowry case merely on FIR:SC, Jagran Post, Latest News from India News Desk 26 Oct 2012, Accessed: 2013-05-25

<sup>108</sup> <http://www.sydsvenskan.se/sverige/tvangsaktenskap-ska-utredas/>, Tvångsaktenskap ska utredas, 21 maj 2012, Accessed: 2012-05-25

The above mentioned examples show that society and their respective systems of law, whatever they might be, represent and confirm existing arrangements, and are expressed in the order of their life. In any case, it should be kept in mind that for the development of democratic society, in accordance with the rules and the principles of law, it is possible to reach this only when the rules are adopted as the concept of democracy requested in an appropriate way and they are essentially fair.

Considering the institution of dowry at various historical stages of its development, it seems obvious that at all times, it was *a priori* the Institute for Women, as the less important, poorer, incapable, weaker element of the society requiring support, and thus indicates the public's attitude and awareness of the equality issues, even to this present day, on the one hand, but on the other hand - it should make men feel uncomfortable and discriminated.

### The Dowry and Human Rights

Noting as well that the UN General Declaration of Human Rights (1948)<sup>109</sup> affirms the principle of the inadmissibility of discrimination and proclaims that all human beings are born free and equal in dignity and rights and that everyone is entitled to all the fundamental rights and freedoms set forth therein, without distinction of any kind, including distinction based on sex (Article 1).<sup>110</sup> Although most of societies at some point in their history have been

characterized by marriage payments, in the 21<sup>st</sup> century we can no longer live in a society where sex is seen as a sign of one of the reasons to legitimise different rights and even restrictions - both formally and informally. In a case of dowry, even for the reason of fairness, it should be understood and assessed how and why people behave differently. Theoretically, dowry, as a pre-mortem inheritance, was set up to protect women through the property given as dowry; however, nowadays this institution, on the one hand, seems to have vanished, while on the other - it has transformed and become distorted and degraded, thus losing its original meaning. This requires a deeper analysis beyond national legislation to ensure the legal principles for the mandatory basic human rights are followed, as well as to establish solutions that include legal remedies and much more, because only through exploring and comprehending the development of processes it is possible to achieve true democracy where the human rights principles are respected. Only understanding, which is based on knowledge, opens up the next window - *to respect, to protect, to fulfil*<sup>111</sup> human rights in order to minimize the existing contradictions and differences between various groups or communities and possibly at times even to slumber destructive potential thereof, while considering how to safeguard inherent characteristics of the identity of these groups and ensure tolerance to everyday social life in order to get along in a diverse cultural, and religious environment of one or other group having different characteristics on the common grounds of humanity and equal treatment of all, regardless of gender, ethnic, racial origin or religious affiliation, without going into the conflict of interest on some bases or other. Inadmissibility of discrimination is and must be an essential element of any national law. The definition and characteristics of it vary in different countries and in national and international legal instruments. If human rights are meant to be implemented without any discrimination of any

<sup>109</sup> <http://www.ohchr.org/EN/UDHR/Pages/introduction.aspx>, the Declaration proclaimed by the United Nations General Assembly in Paris on 10 December 1948 [General Assembly resolution 217 A \(III\)](#), Accessed: : 2012-05-06, see also: <http://www.britannica.com/EBchecked/topic/618067/Universal-Declaration-of-Human-Rights-UDHR>>, Universal Declaration of Human Rights (UDHR), *Encyclopædia Britannica. Encyclopædia Britannica Online*. Encyclopædia Britannica Inc., Accessed: : 2012-05-06

<sup>110</sup> <http://www.un.org/womenwatch/daw/cedaw/text/econvention.htm#article1>, Accessed: 2011-07-08

<sup>111</sup> *Indivīda tiesības vs sabiedrības drošība - kāds ir demokrātisks balanss?*, *Sabiedriskās politikas forums "Brīvība v. drošība: kā demokrātiski atbildēt draudiem?"*, 11th August 2005, E.Levits Publisher: <http://www.Politika.lv> 23rd August 2005, Accessed: 2005-11-08

kind, then what is the actual role of the institution of the dowry in Latvian CL for today? As seen, in the past, it had a function of supporting a woman as a vulnerable member of the family; in some cases it had a protective function of marriage. Currently, the preservation of the institution of dowry in continental Europe's legal system looks a rather archaic phenomenon, not complementing the fundamental human rights.

### **Conclusion**

Today dowry is mostly transformed as a gift given in connection with marriage. Therefore, Latvia would have to consider this direction in order to achieve the real implementation of human rights in daily life and make changes in Civil Law to comply with Constitution of Latvia.

On the one hand it seems not so much a legal as a political question, therefore, it must be considered whether the current EU member states of the various target groups and communities are fundamentally incompatible and inconsistent, or not. On the other hand, there always existed issues of national and community legislation in the various rolling processes by the interaction between them.

In this context, we must agree to the Russian professor, J. Tihomirova who said in the book "Upravlenie na osnove prava"<sup>112</sup> that the findings of the legal nature of public affairs management rules, values and other changes during the period, where the author writes that the law itself is an internal change of time.

There is no doubt that European integration has been and is the integration of the right which changes with the time, but it should be based on shared values and understanding, including history. On the one hand at the European context, now there is more or less

---

<sup>112</sup> Тихомиров Ю., "Управление на основе права", Москва, 2007, pg.64

common understanding of the institution of marriage, spouses' legal or contractual property rights, as well as marital property or legal separation of property, with some country-specific rules. On the other hand there occurs a very legitimate question, why dowry still, if granted, is only for women.

Historical understanding and analysis is also a common and sustainable growth, sustainable development issue for the European space. Therefore, there is a the need for a common European awareness and identity formation, a common approach to certain problems in the search of our joint European home.

### References:

- Тихомиров Ю. Управление на основе права, Москва, 2007.
- Shakespear W. The Tragedy of King Lear, R.Ābeltiņa, Dz.Fleija, Ā.Misāne, English and American Literature, Zvaigzne Publishing House Riga, 1978.
- Endzelīns J. Baltu valodu skaņas un formas, Latvijas valsts izdevniecība, Rīgā, 1848, see also: Čatverdži S.K., Balti un ārieši, Rīga, Zinātne, 1990.
- Mozus 22:28-29,24: 61, 34:12, Exodus 22:16-17, T.B.S. 217KINGSTON ROAD, LONDON, SW 19 3NN ENGLAND.
- Kaplan Marion A.The Marriage bargain : women and dowries in European history New York : Harrington Park Press, 1985.
- Blūzma V., Zemītis G., Osipova S., Ārvalstu tiesību vēstures avoti. Rīga, “Biznesa augstskola Turība” SIA, 2004.
- The Economist,The worldwide war on baby girls, March 4th 2010.
- The Economist, Islamic law and democracy,Sense about sharia, October 14th 2010.
- <http://ebooks.adelaide.edu.au/l/lang/andrew/homer/chapter11.html>, D.O. Hughes, From brideprice to dowry in Mediterranean Europe, in: M. Kaplan (Ed.), The Marriage Bargain:Women and Dowries in European History, Havorth Press, NewYork, 1985.
- <http://www2.kenyon.edu/projects/margin/beguine1.htm>, Sisters Between Gender and the Medieval Beguines by Abby Stoner,
- <http://www.arcaini.com/ITALY/ItalyHistory/Italy12th17th/Italy12thto17th.htm01>, Italy 12th to 13th Century, Source:Microsoft® Encarta® Encyclopedia 2000, Encyclopedia Britannica.
- <http://faculty.arts.ubc.ca/asiwan/documents/dowry-jpe.pdf>, Anderson S,Why Dowry Payments Declined with Modernization in Europe but Are Rising in India, The Journal of Political Economy, Vol. 111, No. 2, 2003. Published by: The University of Chicago Press, Stable URL: <http://www.jstor.org/stable/3555204>.
- <http://www.likumi.lv/doc.php?id=90223>, The Civil Law (www.vvc.gov.lv).
- <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31988L0361:EN:HTML>,Council Directive of 24 June 1988 for the implementation of Article 67 of the Treaty (88/361/EEC), [1988] OJ, L 178/5
- <http://www.jstor.org/stable/41929>The Institution of Dowry in India: Why It Continues to Prevail Author(s): Sonia Dalmia and Pareena G. Lawrence Source: The Journal of Developing Areas, Vol. 38, No. 2, Spring, 2005. Published by: College of Business, Tennessee State University Stable URL.
- <http://www.dainuskapis.lv>, pūr.
- <http://www.marasloks.lv/public/?id=32&ln=lv>, Agnija Saprovska, Dainu Dievs - kā latviešu tautas garīguma ideāls.
- <http://www.liis.lv/folkloragimena/origin/ved.htm>.
- <http://www.vaidilute.com/books/gimbutas/gimbutas-07.html>, the Cours (the Couronians) inhabitants of Kursā(Courland)-an ancient Latvian tribe, Chapter VII,The Balts before the Dawn of History.
- <http://www.historyfiles.co.uk/KingListsEurope/EasternLivoniaCourland.htm>.

<http://www.zemgale.lv/eng/> , <http://www.vietas.lv/?id=3&p=11>, Zemgales Reģions.  
<http://ldolphin.org/risk/ult.shtml>.  
<http://www.infoplease.com/spot/dowries1.html#ixzz1EWDWxMDND>Dowries, Jewish Brides Wore Their Dowries, The joining of money and marriage by David Johnson.  
<http://connection.ebscohost.com/c/articles/11306269/division-dowry-death-daughter-instance-negotiation-laws-jew>.  
[http://faculty.ksu.edu.sa/amer%20elzanaty/The%20Englis%20Books/Encyclopaedia/Encyclop aedias%20Miscellaneous/Encyclopedia\\_of\\_Modern\\_Jewish\\_Culture.pdf](http://faculty.ksu.edu.sa/amer%20elzanaty/The%20Englis%20Books/Encyclopaedia/Encyclop aedias%20Miscellaneous/Encyclopedia_of_Modern_Jewish_Culture.pdf), Encyclopedia of Modern Jewish Culture, Abramson Glenda.  
[oregonstate.edu/instruct/anth370/gloss.html](http://oregonstate.edu/instruct/anth370/gloss.html).  
<http://www.scribd.com/doc/29970365/Women-of-the-Renaissance>, Women of the Renaissance, Margaret L. King, The University of Chicago Press, Chicago 1991.  
<http://homes.chass.utoronto.ca/~siow/papers/dowry.pdf>, Why Dowries? Maristella Botticini and Aloysius Siow, February 2002.  
<http://www.whitehouse.gov/about/presidents/georgewashington>.  
[http://findarticles.com/p/articles/mi\\_m0JIW/is\\_3\\_58/ai\\_n14932706/](http://findarticles.com/p/articles/mi_m0JIW/is_3_58/ai_n14932706/).  
<http://www.firstladies.org/biographies/firstladies.aspx?biography=1>.  
[http://ru.wikipedia.org/wiki/Джордж\\_Вашингтон](http://ru.wikipedia.org/wiki/Джордж_Вашингтон).  
<http://www.history.org/almanack/people/bios/biomwash.cfm>, Martha Dandridge Custis Washington.  
<http://marthawashington.us/exhibits/show/martha-washington--a-life/early-life/page-3>, Early Life, Courtship of Daniel Parke Custis and Martha Dandridge.  
 Civillikums, <http://www.likumi.lv/doc.php?id=90223>, The Civil Law (www.vvc.gov.lv).  
[http://www.legifrance.gouv.fr/html/codes/traduits/code\\_civil\\_textA.htm](http://www.legifrance.gouv.fr/html/codes/traduits/code_civil_textA.htm).  
<http://www.ceflonline.net/Reports/pdf3/Catalonia.pdf>.  
<http://www.archive.org/stream/civilcodeofstate00loui#page/312/mode/2up/search/313>, Civil code of the state of Louisiana.  
<http://www.law.lsu.edu/index.cfm?geaux=lcco.home&v=en&u=062#062>.  
<http://legal-dictionary.thefreedictionary.com/dowry>, West's Encyclopaedia of American Law, edition 2. Copyright 2008 The Gale Group, Inc.  
<http://www.law.lsu.edu/index.cfm?geaux=lcco.home&v=en&u=062#062>.  
<http://factsanddetails.com/china.php?itemid=109&catid=4&subcatid=20#13>, WEDDINGS, CUSTOMS, CEREMONIES AND GIFTS IN CHINA.  
<http://ipsnews.net/africa/interna.asp?idnews=22462>, CULTURE-UGANDA: A Price Above Rubies Rachel Rinaldo.  
<http://www.enotes.com/bride-price>; The Bride Price | Introduction, Accessed: 2011-08-02  
<http://hubpages.com/hub/LoveForSale>, Love for Sale: Dowries and Bride Prices. Origin Of The Bridal Shower.  
<http://www.euronews.net/tag/natural-disasters>.  
[http://wn.com/bride\\_price](http://wn.com/bride_price), World news, Bride price.  
<http://www.econ.ubc.ca/asiwan/siwan-jep.pdf>; The Economics of Dowry and Brideprice. Siwan Anderson.  
<http://www.let.leidenuniv.nl/pdf/lucl/lwpl/2..2/olwaky.pdf>, Knut J. Olawsky, Urarina – Evidence for OVS Constituent Order.  
<http://www.encyclo.co.uk/define/Urarina>.  
<http://saiic.nativeweb.org/ayn/urarina.html>, New and Old Disease Threats in the Peruvian Amazon: The Case of the Urarina.  
<http://www.anglobalticnews.co.uk/lv/da%C5%BEas-lielbrit%C4%81nijas-etnisko-minorit%C4%81%C5%A1u-grupas-pla%C5%A1i-piekopj-neleg%C4%81los-abortus,Dažas-Lielbritānijas-etnisko-minoritāšu-grupas-plaši-piekopj-nelegālos-abortus>.

<http://www.independent.co.uk/news/uk/crime/the-lost-girls-department-of-health-to-act-on-reports-of-illegal-abortions-by-gender-9062460.html?origin=internalSearch>, The lost girls: Department of Health to launch investigation into reports of illegal abortions, Cahal Milmo, Steve Connor, Thursday 16 January 2014.

<http://www.independent.co.uk/news/science/the-lost-girls-thousands-of-missing-girls-revealed-by-analysis-of-uks-2011-census-results-9059905.html>, The lost girls: Thousands of 'missing' girls revealed by analysis of UK's 2011 census results, Steve Connor, Tuesday 14 January 2014.

<http://www.independent.co.uk/news/science/the-lost-girls-it-seems-that-the-global-war-on-girls-has-arrived-in-britain-9059610.html>, The lost girls: It seems that the global war on girls has arrived in Britain, Steve Connor, Tuesday 14 January 2014.

<http://www.independent.co.uk/news/science/the-lost-girls-if-you-have-a-girl-you-feel-youve-let-your-husband-down-9059570.html>, The lost girls: 'If you have a girl, you feel you've let your husband down', Cahal Milmo, Tuesday 14 January 2014.

<http://www.independent.co.uk/news/science/the-lost-girls-why-it-has-been-so-difficult-to-prosecute-doctors-offering-terminations-where-gender-has-been-an-issue-9059590.html>, The lost girls: Why it has been so difficult to prosecute doctors offering terminations where gender has been an issue, Steve Connor, Tuesday 14 January 2014.

<http://www.independent.co.uk/news/science/the-lost-girls-girls-are-still-aborted-in-states-with-more-educated-women-by-amartya-sen-9059544.html>, The lost girls: Girls are still aborted in states with more educated women, by Amartya Sen, Tuesday 14 January 2014.

<http://www.independent.co.uk/news/science/the-lost-girls-main-conclusions-of-the-independents-study-9059716.html>, The lost girls: Main conclusions of The Independent's study, Steve Connor, Saturday 18 January 2014.

<http://ideasforindia.in/profile.aspx?id=41>, India's missing women by age and state, Siwan Anderson, Debraj Ray, 11 Jan 2013.

<http://www.econ.nyu.edu/user/debraj/Papers/AndersonRay.pdf>, Review of Economic Studies (2010) Missing Women: Age and Disease, SIWAN ANDERSON University of British Columbia, DEBRAJ RAY, New York University, First version received July 2008; final version accepted December 2009.

<http://www.parliament.uk/documents/commons/lib/research/rp2007/rp07-041.pdf>; RESEARCH PAPER 07/41 2 MAY 2007 A political introduction to India.

[http://www.crowdvoice.org/sexual-assault-in-india?gclid=CKeB6dvXwLoCFYdf3god\\_RIAAA](http://www.crowdvoice.org/sexual-assault-in-india?gclid=CKeB6dvXwLoCFYdf3god_RIAAA), Sexual Assault in India, crime clock.

<http://islamineurope.blogspot.com/2007/05/number-of-muslims-in-europe.html>.

[http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-SF-08-081/EN/KS-SF-08-081-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-SF-08-081/EN/KS-SF-08-081-EN.PDF).

<http://www.ft.com/cms/s/2/9064931e-a0f6-11de-a88d-00144feabdc0.html>, Financial Times Limited, 17.09. 2009.

<http://www.familysecuritymatters.org/publications/detail/turks-in-germany-are-a-time-bomb>, Family Security Matters, Turks in Germany are a Time Bomb, by DR. SAMI ALRABAA, March 22, 2013.

<http://www.destentor.nl/2.2545/buitenland/duitse-rechter-past-sharia-toe-1.239909>, Duitse rechter past sharia toe, de Stentor, 26 maart 2012.

<http://www.internationalfamilylawfirm.com/2012/10/law-panel-wants-anti-dowry-law-toned.html>, Jeremy D., International Family Law, Thursday, Law Panel Wants Anti-Dowry Law Toned Down, October 04, 2012.

<http://www.emirates247.com/news/region/girl-wins-dowry-case-against-her-father-2011-10-06-1.422195>, Girl wins 'dowry' case against her father, Emirates, 24/7, October 06, 2011.

<http://www.indiankanoon.org/docfragment/1698806/?formInput=cases%20on%20dowry>, cases on dowry, Sunil Kumar Sharma vs State (Cbi) on 30 March, 2007,

JUDGMENT.Venkatesan J., Casual, wholesale reference to in-laws won't justify dowry case: Supreme Court, The Hindu, New Delhi, October 22, 2012.

Patnaik I., Women are misusing Dowry Act, rules court, The Indian Express, Wed Feb 03 2010, Patnaik I., Nisha Sharma dowry case: Court acquits all accused, The Indian Express, New Delhi, Thu Mar 01 2012,

<http://www.indiankanoon.org/docfragment/698149/?formInput=cases%20on%20dowry%20fromdate:11-2010%20todate:31-12-2010>, cases on dowry, Shahid Riza @ Raju vs State on 30 September, 2010

<http://post.jagran.com/dont-implicate-family-members-in-dowry-case-merely-on-firc-1351245209>, Don't implicate family members in dowry case merely on FIR:SC,Jagran Post, Latest News from India News Desk 26 Oct 2012.

<http://www.sydsvenskan.se/sverige/tvangsaktenskap-ska-utredas/>, Tvångsaktenskap ska utredas, 21 maj 2012.

<http://www.ohchr.org/EN/UDHR/Pages/introduction.aspx>, the Declaration proclaimed by the United Nations General Assembly in Paris on 10 December 1948 General Assembly resolution 217 A (III).

<http://www.britannica.com/EBchecked/topic/618067/Universal-Declaration-of-Human-Rights-UDHR>>,Universal Declaration of Human Rights (UDHR), Encyclopædia Britannica. Encyclopædia Britannica Online.Encyclopædia Britannica Inc.

<http://www.un.org/womenwatch/daw/cedaw/text/econvention.htm#article1>.

<http://www.Politika.lv>, Individā tiesības vs sabiedrības drošība - kāds ir demokrātisks balanss?, Sabiedriskās politikas forums "Brīvība v. drošība: kā demokrātiski atbildēt draudiem?", 11th August 2005, Levits E.Published: 23rd August 2005.

# THE CASE FOR A BALANCED BUDGET CONSTITUTIONAL PROVISION IN GHANA

*Nicholas Amponsah*

Political Science Senior Lecturer, University of Ghana, Legon

---

## Abstract

Fiscal indiscipline has been a major tussle of most African nations and a disturbing problem. How African governments and the people can subscribe to the basic principles and canons of institutional restraint and accountability which are hallmarks of good governance and subscribe to the basic principles and canons of institutional restraint and accountability which are hallmarks of good governance, has continued to challenge us. The paper attempts to provide some reasons for the menace and some mechanisms for resolution.

---

## Introduction

There is no doubt that fiscal prudence is a virtue of good governance and democracy. It is indicative of how a government and the people of a nation subscribe to the basic principles and canons of institutional restraint and accountability which are hallmarks of good governance. Indeed, of all the major causes of poor governance and its associated problems of poverty, indebtedness, instability and underdevelopment, the absence of institutional restraints, especially, in the area of national finances, has been noted as the single major factor accounting for mass poverty in developing countries. In Ghana, it is a well known fact that the greatest source of interparty and governmental castigations, and disappointments that emerge after governmental change-over has been due to the incidence of huge indebtedness left by outgoing administrations. The scourge of national indebtedness emanating from unrestrained governmental spending is such that it has become a major source of the loss of confidence on the part of the people of Ghana in their government, irrespective of whichever party comes to power. This has been an especially recurrent challenge that has faced Ghana throughout its post-independence history. Not only have our governments acted without restraints, they have also, in the absence of institutional restraints wantonly violated the rules of democratic game. Indeed, governments of poor nations such as Ghana have been able to act with impunity because they are not limited in any way in the extent to which they can spend, even if it is clear they do not have the resources available.

Fiscal deficits bequeathed by outgoing governments have always been decried by incoming governments. In its 2010 budgetary statement to parliament, the government lamented about the crumbling economy. The Minister of Finance and Economic Planning presenting the government's budget statement noted that "The truth that must be told is that, the Government inherited a distressed economy characterised by huge twin deficits," (Republic of Ghana, 2009: 3). The Minister noted that "the fiscal deficit alone stood at GH¢2.6 billion at the end of 2008 when the NPP left office compared with GH¢260 million registered at end of 2000 when the NDC left office" (ibid). He lamented that "in addition, by end September, arrears and unpaid bills amounted to GH¢1.7 billion in 2008, amounting to almost 22% of GDP," and that "never in the history of our country have we faced such a huge fiscal deficit in proportion to GDP." What was worse, the Minister noted that this huge indebtedness had occurred despite "the significant increases in Government resources between 2005 and 2008." The conclusion thus, was that "the huge deficit showed a serious

failure of expenditure control”, and that, as a nation, “we were living beyond our means in a manner that we could not sustain” *ibid*).

### **The Scourge of Fiscal Indiscipline**

The devastating impact of fiscal indiscipline on Ghana’s long term prosperity, dignity and national pride cannot be gainsaid. It was the urgent need to mitigate the perennial economic devastation and the strain that huge indebtedness put on the country’s efforts at economic development that the country had to travel the painful and degrading journey of a *Highly Indebted and Poor Country (HIPC)*. While mindful of what the humiliation effects that such a declaration meant for the country, including international ridicule, and the possible closure to access to international capital, the country nonetheless accepted to take the painful road or the bitter pill. It was obvious that as a nation we had realized the devastating consequences of unsustainable fiscal deficits. And it was to curb the cancer of fiscal indiscipline the entire country yielded to the option of swallowing the bitter pill through the HIPC status. Having gone thus far in our effort to initiate renaissance in our spending habit, one would have thought our governments had their bitter lesson and would not want to witness such a humiliation in the future. But that was not the case, because in the absence of a culture of moral probity, not constrained the leaders to turn a new leaf to become fiscally responsible. The reason is quite obvious. In the absence of clearly and rigidly provided institutional restraints to serve as warning signals and self control, and in a society whose politics is colored in neopatrimonial politics, our governments will be unwilling or unable to rationalize their spending behavior.

Thus, the preamble that highlighted fiscal imbalance was replayed in the 2011 budgetary statement. Thus the Minister noted sadly that though there is some significant improvement “the fiscal deficit reduced significantly from the double digit of 14.5 percent on cash basis at the end of 2008 to 9.7 percent in 2009.” To be sure the scourge of deficit budgetary situation continues to haunt us as a nation. There is the urgent need to find a way to mitigate this undoubtedly catastrophic economic situation if we are to achieve our goal of a better Ghana. It will be recalled that the same lamentation about wanton fiscal indiscipline, ravaged the entire country in 2001 when the then Minister of Finance referring to this same unbridled budgetary deficit used the terminology of “trillion” in quoting the national debt. Thus, the problem of unrestrained fiscal indiscipline has not only become a noticeable anathema in our politics, but it is increasingly becoming unacceptable by the entire nation and the key political players in our political game.

### **The presentation is premised on the arguments that**

The entire nation is becoming weary about the perpetual game of budgetary indiscipline and unbridled indebtedness of governments.

There is the need take decisive decision by way of constitutional restraints on the problem of budgetary indiscipline.

The only way to halt the accusations and counter accusations of our various governments over the problem of macroeconomic uncertainty is to craft constitutional rules or norms that rationalize the financial behavior our governments, including their revenue mobilization and spending behavior

Our governments would be able to exhibit the capacity for effective and efficient planning and also be able to make reasonable predictions about our overall future financial stability and sound economy and development if we consciously indicate a cap on permissible governmental spending.

Several examples or evidence exist from best practices elsewhere in the Highly Performing Asian Economies (HPAEs), as well as the Advanced Industrialized Countries, that point to the imperative that a balanced budget principle is not only desirable, but a

fundamental governance principle that should guide the Poorly Performing African Countries (PPACs) including Ghana in their desire to ensure economic growth and prosperity for their peoples. It is also one of the major indicators of the level of institutional restraint required for both political and economic stability, while curbing arbitrariness, and capricious governance.

Liberal democracy does not imply the simple act of election of leaders. While this is a necessary aspect of democratic governance, the really important part of democratic governance is to have governments and leaders that actually deliver and act according to the norms of economic and political rationality. More important, such a society, under normal circumstances, must be seen as not dependent on the charity of other nations (a situation which is highly unpredictable and not dignifying, in any case). Democracies thrive on good governance. Nonetheless, they persist only under sound macroeconomic regimes, which in itself is a further indicator of the prevalence of a culture of moral probity and accountability.

### **The Rationale of Balanced Budget Principle**

The purpose of a *balanced budget* is to ensure that governments are disciplined and spend within their means.

Just as in conventional individual behavior budgetary discipline requires a convergence of revenues and expenditures, a balanced budget sets a convention that unrestrained leakages of public funds is intolerable and that state resources must as far as practicable be utilized for their sole intended purposes.

The balanced budget convention has the potential of cautioning government that society takes mapping or tracking of all possible routes for corruption seriously.

It is also a major indicator of a self-restraining state which is a fundamental principle of democracy (Schedler Andreas, Larry Diamond and Marc F. Plattner 1999). Simply put, governments must act responsibly in terms of spending, and when the urge for spending becomes necessary, it must be in tandem with the capacity to raise revenue.

In fact, the principle serves as a great motivation for government to be enthusiastic in the area of firm, fair and rational revenue mobilization.

The great founders of the American Democracy recognized this nearly a century ago. Thomas Jefferson is on record as noting that fiscal deficits and wanton debts left by previous governments and generations were not only morally unacceptable, they are also unauthorized. As he intimated, the principle of a Balanced Budget “is of such importance as to place it among the fundamental principles of government”, and warning that current governments and generations “should consider ourselves “*unauthorized*,” (emphasis mine) to saddle posterity with our debts” to which the future generation did not contribute to its accumulation ([Http://cwx.prenhall.com/bookbind.....](http://cwx.prenhall.com/bookbind.....) last visited November, 2010).

Indeed, the scare of unbridled indebtedness and the need to ensure fiscal prudence on the part of our governments appears to be such indubitable that one may not be wrong to argue that it is the shared position of all our governments when they take over the reign of government from their predecessor. Thus, one can argue convincingly that all the stakeholders, governments and the entire population alike share this position to warrant making a provision on this issue a critical aspect of the constitution review exercise. The need to be prudent in one’s management of resources and in particular fiscal matters warrants much of our attention as it deserves. There is no need to talk of poverty reduction in the face of unbridled and wasteful spending. Reckless spending is tantamount to disregard for future unfortunate and unanticipated events that may need scarce resources. To reduce poverty warrants being able to have a revolving fund one can fall on the rainy day. As Ayine and Opoku-Afriye (2008) rightly observed, one of the best strategies to confront or mitigate poverty is to be mindful of “the need to have a dual strategy of raising incomes”

The idea of a balanced budget could be institutionalized through several ways, one of which might be to establish an estimated per capita limitation on the national debt permissible

for incumbent governments. Another would be to place an estimated projection on the level of deficit governmental spending that may be tolerable in view of future urgent demands and the extend that unsustainable deficits would hamper the future plans of current generations. In fact, a major overarching conclusion arrived at in the US Congressional discussions on the importance of a balanced budget rule are based on the understanding that *persistent deficits threaten the nation's long-term prosperity*. Accordingly, congressional debate conclusion on fiscal prudence is that since the search for popular and painless ways to limit deficit spending is difficult to come by, a balanced budget constitutional provision may be the only way to provide the fiscal discipline the nation desperately needs (ibid: 3).

### **Lessons from Best Practice Cases**

Recent findings by reputable research think tanks clearly suggest that part of the explanation for the Asian economic miracle growth lies in the area of fiscal restraints (Campos and Root: 1996). According to these findings, regime commitment to fiscal discipline is one of the surest ways of ensuring institutional credibility necessary for economic growth and development. It is thus reasonable to argue, from these abundance information available on best practices from the High Performing Asian Economies (HPAEs) that budgetary discipline played no mean role in the economic success in those countries. Among the key instruments that accounts for the rapid economic growth and development of virtually all the HPAEs. Campos and Root (1996: 127) provide abundant data that clearly points to the role of budgetary controls. While noting the depth of the commitment and reliance of regime leaders in these countries on technocratic policy advice, they attributed so much of the success on the advice that technocrats provided with special emphasis on fiscal discipline. The major argument can be summed up in the extent budgetary discipline provided grounds for sound macroeconomic management.

According to Campos and Root (1996) a major hallmark of the technocrats' policies which ensured responsible macroeconomic management was stringent controls on their budgets among others. They argued that the regime of Soeharto, for instance committed itself to growth by following the advice of the technocrats lock, stock and barrel. As they put it, in the bid of the Soeharto regime to demonstrate commitment to provide a sound macroeconomic environment, *"he had a balanced budget requirement inserted into the constitution in 1967"* (Campos and Root ibid: 140). That was so many years ago and during the twentieth century when the advanced nations such as US had also initiated debate on the importance of balanced budget for macroeconomic stability and overall development. This should thus tell how significant the issue of budgetary discipline has taken center stage in discussions on development, good governance and institutional restraint among rich and developing countries alike.

The record is thus replete and clear on the potential economic and political benefits to be derived from the application of a balanced budget principle as a foundation for overall good governance and development especially in the Poorly Performing African Economies such as Ghana. In the *key to the Asian Miracle* Campos and Root (1996) provide compelling arguments on the need for considering the balanced budget principle as an institutional foundation not only for stable development, but also for sustained economic growth, lessons worth noting as we in Ghana make strenuous efforts at establishing a constitutional framework that will not only ensure stable economic growth but peaceful democratic development as well. Campos and Root note emphatically that the HPAEs, Thailand, Indonesia as well as Japan have been the strongest adherents to hard budgetary rules, which implies predictability for a nation's economic transactions.

### **What are the benefits to be derived from a balanced budget constitutional provision?**

While the positive benefits need not be overemphasized, a few concrete social, economic and political benefits can be summed up here. Campos and Root (1996: 155-161) provides several time tested beneficial outcomes including the following:

**Credible and predictable macroeconomic environment:** The first is that a credible and predictable macroeconomic environment that emerges definitely will provide foundation for curbing the chaotic economic environment that often characterizes Third World economies and the constant search for leverage from outside agencies with concomitant economic uncertainty.

**Autonomy and Adherence to Economic and Bureaucratic Advice:** Adoption of credible budgetary constraints via the aegis of a *balanced budget principle* is a sure way of giving the economic bureaucracy the desired autonomy over macroeconomic policy making.

**Mapping and Tracking Macroeconomic Management:** Well established and institutionalized budgetary rules that are entrenched in a constitution also provide efficient and low cost means of monitoring macroeconomic policy. The well known adage of North (1990) that when it is costly to transact, institutions matters is very true under this circumstance. Institutionalized budgetary constraints, provides the surest way and strongest way of constraining the influence of the political elite and their comprador private parties over government expenditure, because it will take away capricious and arbitrary economic decision making from the momentary whimsical pursuits of politicians.

**Curbing Wanton Corruption:** Pervasive corruption in the Less Developed Countries always results from the capture of the state in patronage and neopatrimonial politics and policy making practices that involve the dispensing of favours rather than promoting the broader public good. The surest way to combat or limit this to institute institutional mechanisms that ensure that state resources are prevented from being employed directly and indirectly for political advantage with impunity.

**Curtailement of Uncontrollable Inflationary Spiral:** In more concrete terms, because budgetary constraints will ensure certainty and predictability of the macroeconomic regime, it will curb uncontrollable inflationary spiral, a condition that is antithetical to private economic initiative.

**Motivation for Private Investment:** The stable macroeconomic environment, devoid of uncontrolled inflation, and the disciplinary economic framework in itself is beneficial for overall economic growth as this will motivate and invigorate private economic actors to initiate investment projects for the overall national economic health, especially in the area of employment and increased productivity.

**Incentive for Revenue Mobilization:** There is no better signal for private business activity than a sound, stable and predictable macroeconomic environment. At the same time an invigorated economic environment would provide huge benefits in terms of government revenue mobilization capacity.

**Checking Overreliance on Foreign Loans and Donor Conditionality:** Finally, strict adherence to fiscal discipline through the adoption of a constitutional provision on a cap on the national budget would be one of the surest ways, that Ghana can avoid overreliance on unpredictable and debilitating foreign loans. For as Deyo (1992) notes, one of the major reasons why the East Asian New Industrialized Countries (NICs) have ensure sustained growth and development is their ability to avoid overreliance on foreign loans

## **Conclusion**

The urgent need for a much more concrete harmonized legal and regulatory provision in the area of fiscal restraint and discipline cannot be overemphasized. In sum, a balanced budget constitutional stipulation would help reduce unbridled financial leakages by serving as a constant caution of societal desire for fiscal discipline. This will also go a long way in corruption reduction in our governments by highlighting national consensus on the anti-

corruption drive. In our desire for promoting economic growth and development for our people, especially through the aegis of the private sector which has become universally recognized as the engine of growth, there can be no better idea or approach than that provided by the adoption of hard and budgetary discipline, which brings economic certainty and predictability in overall national development. The urgent need for the provision of a cap on our budgetary framework so as to ensure sound macroeconomic environment, good governance and development cannot therefore be delayed any further.

### References:

- Ayimusah Ayine Emmanuel and Kwame James Opoku-Afriye, "Incidence Analysis of Poverty Reduction Programs In Ghana: A Case Study of The Bolgatanga Municipality." Ghana Policy Journal, Vol 2, June, 2008, p2-33.
- Campos, Jose Edgardo. and Hilton L. Root 1996. *The Key to the Asian Miracle Making Shared Growth Credible*. Washington, D. C.: The Brookings Institution.
- Deyo, Fredric C. 1992. *The Political Economy of the New Asian Industrialization*. London: Cornell University Press.
- Michael Bratton & Nicolas Van de Walle 1997. *Democratic Experiments in Africa, (Especially, Chapter Two on Neopatrimonial Rule in Africa)*. Michigan: Cambridge University Press.
- Schedler Andreas, Larry Diamond and Marc F. Plattner 1999. *The Self Restraining State: Power and Accountability in New Democracies*. Boulder: Lynne Rienner.
- Republic of Ghana. 2009. *Budget Statement and Economic Policy of the Government of Ghana for the 2010 Fiscal Year*. Presented to Parliament on Wednesday, 18th November, 2009 By: Dr. Kwabena Duffuor Minister of Finance and Economic Planning.
- Republic of Ghana. 2010. *Budget Statement and Economic Policy of the Government of Ghana for the 2010 Fiscal Year*. Presented to Parliament, November, 2010 By: Dr. Kwabena Duffuor Minister of Finance and Economic Planning.
- Prentice Hall Documents Library: Balanced Budget Constitutional Amendment (1995) [Http://cwx.prenhall.com/bookbind.....](http://cwx.prenhall.com/bookbind.....) last visited November, 2010.
- North, Douglas C.1990. *Institutions, Institutional Change and Economic Performance* (Cambridge: Cambridge University Press, 1990).

# INTERNATIONAL LAW ENFORCEMENT COOPERATION

***Korontzis Tryfon*** Dr.

Professor in the Hellenic National School of Local Government (ESTA)  
Nikaia, Piraeus, Hellas

---

## Abstract

Modern states have created a society based on freedom, security and justice, respecting relevant international legal texts drawn up for this purpose, such as the European Convention on the Protection of Human Rights and on Fundamental Freedoms. The current-modern society is characterized by an elation of criminal activities and particularly of organized crime as also and of terrorism which international character, proves that for illegal activities there are no borders.

Modern criminals' businessmen trivialize and corrupt legitimate economies, societies and the state law through transnational criminal markets and by forming international illegal trade alliances.

It is responsibility of all governments for their citizens' benefit, to undertake effective measures in order to combat crime and its causes, with full respect on individuals' fundamental rights, including personal data protection. Recognizing the important role that effective information exchange and close cooperation between the law enforcement agencies play in order to prevent and combat all forms of crime and serious crime, including terrorism, has been promoted the international law enforcement cooperation with the establishment of International and European organizations.

---

**Keywords:** Interpol, europol, eurojust, epcf, frontex, selek, law enforcement agencies (leas), international organized crime, terrorism, European Union (EU).

## Introduction

Combating of organized crime and terrorism, occupies modern societies with particular intensity in recent years. The latter make hard efforts especially after the terrorist attacks that have taken place in the U.S. in 2001 and in Europe (Madrid 2004, London 2005) in order to enhance at the utmost their internal security.

Organized crime (Korontzis T. 2012 'c'), (Korontzis T. 2012 'd') (Korontzis T. 2012 'g'), (Korontzis T. 2012 'f'), (Korontzis T. 2012 'h'), today given the fact of the financial economic globalization and the increased transnational flows has taken international dimensions.

The increase in international contacts, due to the fact that the distances because of the technology have been reduced, has led to the internationalization of criminal activities which are highly profitable. This led among other initiatives to the signed of the Palermo Convention in December 2000 by approximately of 120 countries. The above convention is referred against transnational organized crime.

The development of international police cooperation is one of the ways that international community uses in order to deal systematically and methodically with organized crime and terrorism. International police cooperation is developing in three fields:

- With the establishment of international organizations by the States, which are used as instruments of effective and immediate cooperation in judicial and police cooperation,
- With the development of common legislative frameworks and security policies and
- with the development of bilateral cooperation between States in order to combat more effectively the international border crime.

Particularly European Union (EU), was the place where were grown - implemented, the major policies related to international police cooperation. European organizations were established with main task the effectively prosecution of international organized crime and terrorism at judicial and police cooperation level. This followed the establishment of Interpol, which marked the start of international police cooperation.

Particularly EU develops police cooperation involving all the competent authorities from the Member States (MS), including police, customs, coast guard, border police etc (Law Enforcement Agencies–LEAs), agencies that are specialist in the prevention or detection of the criminal activities as also on their investigation.

For these purposes, European Parliament and the Council, acting in accordance with the ordinary legislative procedure, may establish measures concerning:

- (a) Collection, storage, processing, analysis and exchange of relevant information;
- (b) Support for staff training as also the cooperation on the personnel exchange, equipment, and forensic search and
- (c) Common investigative techniques in relation to the detection of serious organized crime forms [Article 87 TREATY ON THE FUNCTIONING OF THE EUROPEAN UNION, C 83/473, 30-03-2010, p. 83].

The purpose of this summary study is to present the main international and European organizations involved in combating organized crime and terrorism, and more specifically the presentation of the competencies and duties that have been assigned to them. Through this presentation will be determined and the added value they bring to international police cooperation, preventing and combating international criminal activity, especially with their contribution by providing information, analysis and training to national LEAs and their staff. The paper will be completed by citing the conclusions resulting from its development.

### **International Criminal Police Organization (Interpol)**

Interpol is the largest international police organization, within 187 countries cooperate. INTERPOL's Constitution is the main legal document guiding the Organization through the decades of its existence.

The Constitution of the Organization was adopted at the 25th session of the General Assembly (June 1956, Vienna) and came into force on 13 June 1956. Prior to this, a series of less uniform statutes had served as the legal basis of the Organization since its foundation in 1923.

The Constitution outlines INTERPOL's aims and objectives, it establishes the mandate of the Organization and guides the way for effective international police cooperation.

The Constitution is divided into 11 parts that outline the key points of the Organization's aims, activities and structure. The part of "General Provisions" represents the core foundations of the Organization, and gives it a particularly broad mandate.

The aims of the Organization are outlined in Article 2. They are, first, to ensure the widest possible cooperation between all criminal police authorities and, second, to establish and develop institutions in order to suppress ordinary law crimes. The mandate given to the Organization is thus rather general and the scope makes it possible to enlarge the Organization's ways of operating according to the needs of different times and situations.

Article 2 further specifies that the international police cooperation is to be conducted within the "spirit of the Universal Declaration of Human Rights", thus laying out the foundation for the Organization's obligation to respect fundamental rights and freedoms of individuals in the course of its actions.

This is complemented by Article 3 of the Constitution, which is sometimes referred to as "the neutrality clause". This Article states that in order to ensure the widest possible cooperation between the police authorities of its member States, it is strictly forbidden for

organization to undertake any intervention or activities of a political, military, religious or racial character.

In particular, Article 3 is most commonly used to ensure the legitimate everyday application of the Constitution.

This provides a legal personality to the Agency by providing it the right to enter into cooperation with other organizations or to decide its own budget, and thus makes possible to facilitate cooperation without external intervention.

Interpol provides support to National Central Offices in the areas of drugs, illegal immigration, organized crime, human trafficking, financial crime, terrorism and high technology.

Interpol structure as defined in article 5 of the Constitution is as follows:

General Assembly;

Executive Committee;

General Secretariat;

National Central Bureaus;

Advisers;

Commission for the Control of Files

National Central Bureaus exist in all states and are manned by officers of the competent national enforcement authorities. The National Central Bureaus support nationwide law enforcement authorities with:

-Ensuring direct communication with the competent authorities.

-Databases operation.

-Searches support of relevant law enforcement authorities.

-Staff training of LEAs.

National Central Offices are connected to the Interpol network I-24/7 Interpol [I = Information, 24 = 24 hours a day, 7 = 7 days a week], which operates on a 24 hour basis in order to register information or to search information facilitating investigations of criminal activities that have taken place (Interpol, 2012).

### **European Police Office (Europol)**

European Police Office (Europol) establishment was agreed in the Treaty of the European Union (February 7, 1992) while the relative arrangements were contained in the Convention of establishing the European Police Office ("Europol Convention") [EU 316/27-11 -1995] Article K.3 of the Treaty for the European Union.

By the Council Decision issued on 6 April 2009 [EU L 121/15-05-2009] which came into force from 01.01.2010, the provisions of the convention which were mentioned above were replaced and Europol under this Decision shall be deemed as the successor of Europol as was established by the Europol Convention.

Objective of Europol according to article 3 of the above mentioned decision is: «to support and strengthen action by the competent authorities of the Member States and their mutual cooperation in preventing and combating organised crime, terrorism and other forms of serious crime affecting two or more Member States».

EUROPOL which has legal personality is based in The Hague, Netherlands. It has a staff of approximately 700 officers who hail from 28 MS of the EU. Europol staff is recruited from different LEAs, including police, customs, border police, coast guard and security services. Also Europol is connected with the national units (article 8 of EU decision).

Within Europol's mandate is organized criminal group according to article 4 of the decision (document with No 6204/2/97 ENFOPOL 35 REV 2 issued by EU decision), terrorism and other serious crime as described in the annex of the decision like drugs trafficking, illegal immigration, human trafficking, money-laundering, crimes related to motor vehicles, swindling, maritime piracy (Korontzis T. 2012 'b') which affect two or more MS,

in a way that requires a joint approach by the MS, given the scope, significance and consequences of criminal acts.

At EUROPOL premises are also posted liaison officers from the 28 MS/EU as well as the liaison officers from other countries or organizations with which Europol has signed cooperation agreements (agreements divided into strategic and operational). Their number is about 145 and are entrusted by the national unit to represent its interests within Europol in accordance with national law of the MS which has separated them and the provisions which are applicable to the administration of Europol (articles 9 and 35 of EC decision).

It should be noted that in order to be simplified the exchange of information and intelligence between the LEAs of EU, the Decision - Frame 2006/960/JHA issued on 18 December 2006 has been adopted [EU L 386/29.12.2006].

With this decision MS ensure that the procedures allow them to respond within 8 hours, in urgent requests for information and data relating to the offenses of paragraph 2 of Article 2 of Decision - 2002/584 Framework / JHA [EU L 190, 18-07-2002], where the requested information and data are held in a database directly accessible to LEAs.

In order EUROPOLs work to be supported, at EUROPOL National Units and at the offices of the liaisons officers exists a secure telecommunications infrastructure along with systems on information elaboration - Chapter II of Council Decision - and in Chapter III the rules on information processing are set out. A high protection in the database under an institutional framework that clearly defines the procedures on keeping, sharing and deleting data, ensure that the information managed by EUROPOL and especially all the procedures followed are in line with the provisions of personal data protection.

The main activity of EUROPOL is the supporting of MS in the collection, analysis and distribution of information relating to crime and to coordinate operations. For this purpose, EUROPOL has over 100 information analysts.

MS which are facing a specific criminal phenomenon that affects two or more EU states may request from EUROPOL to open a focal point (FP) in order to support searches in this field. EUROPOL provides assistance for current operations through two Analytical Work Files [(Serious Organized crime (SOC) – Counter terrorism (CT)] in 23 themes (FP) for illegal activities that are included within the circle of its competencies (Korontzis T. 2012 'i').

Important areas of Europol's staff activity comprise the participation with a support capacity character in Joint Investigation Teams (JIT) (Korontzis T. 2012 'a') with a scope to provide assistance for all activities and exchanging information with all JIT members without participating in coercive measures.

From the above is clear that EUROPOL is a supported European service offering through specific processes expertise to LEAs without actively participating in operational processes but only to analyze operational information.

The supervisory Authority for Europol as is clear from Council decision is the EU Council. This selects the Director and approves together with the European Parliament its budget.

With under a new legal regime governing the responsibilities, tasks and organization, aimed at assisting the forces of law enforcement by member states to combat specific types of crime.

According to article 5 of the EU decision its tasks are:

1. Europol shall have the following principal tasks:

- (a) To collect, store, process, analyze and exchange information and intelligence;
- (b) To notify the competent authorities of the Member States without delay via the national unit referred to in Article 8 of information concerning them and of any connections identified between criminal offences;

(c) To aid investigations in the Member States, in particular by forwarding all relevant information to the national units;

(d) To ask the competent authorities of the Member States concerned to initiate, conduct or coordinate investigations and to suggest the setting up of joint investigation teams in specific cases;

(e) To provide intelligence and analytical support to Member States in connection with major international events;

(f) To prepare threat assessments, strategic analyses and general situation reports relating to its objective, including organized crime threat assessments.

2. The tasks referred to in paragraph 1 shall include providing support to Member States in their tasks of gathering and analyzing information from the Internet in order to assist in the identification of criminal activities facilitated by or committed using the Internet.

3. Europol shall have the following additional tasks:

(a) To develop specialist knowledge of the investigative procedures of the competent authorities of the Member States and to provide advice on investigations;

(b) To provide strategic intelligence to assist and promote the efficient and effective use of the resources available at national and Union level for operational activities and the support of such activities.

4. Additionally, in the context of its objective under Article 3, Europol may, in accordance with the staffing and budgetary resources at its disposal and within the limits set by the Management Board, assist Member States through support, advice and research in the following areas:

(a) The training of members of their competent authorities, where appropriate in cooperation with the European Police College;

(b) The organization and equipment of those authorities by facilitating the provision of technical support between the Member States;

(c) crime prevention methods;

(d) Technical and forensic methods and analysis, and investigative procedures.

.....  
5. Europol shall also act as the Central Office for combating euro counterfeiting in accordance with Council Decision 2005/511/JHA of 12 July 2005 on protecting the euro against counterfeiting, by designating Europol as the Central Office for combating euro counterfeiting (1). Europol may also encourage the coordination of measures carried out in order to fight euro counterfeiting by the competent authorities of the Member States or in the context of joint investigation teams, where appropriate in liaison with Union entities and third States' bodies. Upon request, Europol may financially support investigations of euro counterfeiting.

### **European Union Justice Cooperation Unit (Eurojust)**

Eurojust was established by the Council Decision of 28 February 2002 regarding establishing Eurojust with a view to reinforcing the fight against serious crime [2002/187/JHA, L 63/27].

The objectives of Eurojust according to article 3 of EU decision are:

1. In the context of investigations and prosecutions, concerning two or more Member States, of criminal behavior referred to in Article 4 in relation to serious crime, particularly when it is organized, the objectives of Eurojust shall be:

(a) to stimulate and improve the coordination, between the competent authorities of the Member States, of investigations and prosecutions in the Member States, taking into account any request emanating from a competent authority of a Member State and any information provided by anybody competent by virtue of provisions adopted within the framework of the Treaties;

(b) to improve cooperation between the competent authorities of the Member States, in particular by facilitating the execution of international mutual legal assistance and the implementation of extradition requests;

(c) to support otherwise the competent authorities of the Member States in order to render their investigations and prosecutions more effective.

2. In accordance with the rules laid down by this Decision and at the request of a Member State's competent authority, Eurojust may also assist investigations and prosecutions concerning only that Member State and a non-Member State where an agreement establishing cooperation pursuant to Article 27(3) has been concluded with the said State or where in a specific case there is an essential interest in providing such assistance.

3. In accordance with the rules laid down by this Decision and at the request either of a Member State's competent authority or of the Commission, Eurojust may also assist investigations and prosecutions concerning only that Member State and the Community.

Its competences according to article 4 of the above mentioned decision are:

1. The general competence of Eurojust shall cover:

(a) The types of crime and the offences in respect of which Europol is at all times competent to act pursuant to Article 2 of the Europol Convention of 26 July 1995;

(b) The following types of crime:

- Computer crime.  
- Fraud and corruption and any criminal offence affecting the European Community's financial interests.

- The laundering of the proceeds of crime.

- Environmental crime.

- Participation in a criminal organization within the meaning of Council Joint Action 98/733/JHA of 21 December 1998 on making it a criminal offence to participate in a criminal organization in the Member States of the European Union (1);

(c) Other offences committed together with the types of crime and the offences referred to in points (a) and (b).

2. For types of offences other than those referred to in paragraph 1, Eurojust may in addition, in accordance with its objectives, assist in investigations and prosecutions at the request of a competent authority of a Member State.

In order to accomplish its objectives, Eurojust shall fulfil its tasks according to article 5:

(a) Through one or more of the national members concerned in accordance with Article 6, or (b) as a College in accordance with Article 7:

(i) When so requested by one or more of the national members concerned by a case dealt with by Eurojust, or

(ii) When the case involves investigations or prosecutions which have repercussions at Union level or which might affect Member States other than those directly concerned, or

(iii) When a general question relating to the achievement of its objectives is involved, or

(iv) When otherwise provided for in this Decision.

Also when Eurojust fulfills its tasks, Eurojust shall indicate whether is acting through one or more of the national members within the meaning of Article 6 or as a College within the meaning of Article 7.

Also may request the establishment of a JIT (Korontzis T. 2012 ''a''), as well as its members to enroll in the JIT. Its role in the establishment and successful activation of JIT is crucial. In this case is provided to Eurojust the capability as reveals from its institutional framework but also from its function to call the national competent authorities to establish JIT when something like that is judged as necessary. In the last Eurojust provides administrative support and co-ordination meetings held at its premises in The Hague, Netherlands.

MS are able to define its national representative to participate in the JIT and in such a case would not represent the Eurojust but the Member State from which it originates. Eurojust has the opportunity to participate as a collective body in JIT defining in this case the member that will represent its interests something provided in Article 9 & 3 2002/187/JHA of 28 February 2002.

Notable as far as concerns JIT is the fact that Eurojust after signing the memorandum of cooperation with the European Anti-Fraud Office (OLAF) for fraud or other crimes affecting the financial interests of the EU, when one of the two organizations involved in JIT for such offenses shall inform the other institution and suggests to the Member State which established JIT to invite respectively and the other organization (Eurojust 2013, 'a'). Relations between Eurojust and Europol are regulated under the Memorandum of Cooperation signed between them (Eurojust 2013, 'b').

### **European Police Chiefs Task Force (EPCTF)**

The establishment of the Police Chiefs Task Force of the EU known as «Police Chiefs Task Force» was the result of the Tampere Council held on 15-16/10/1999 in order to fill gaps and strengthen the overall structure and functional mechanisms of EU internal security. More specifically in paragraph 44 of Tampere Council foreseen: «The European Council calls for the establishment of a European Police Chiefs operational Task Force to exchange , in co-operation with Europol , experience, best practices and information on current trends in cross-border crime and contribute to the planning of operative actions» and aims primarily in improving operational cooperation in combating cross-border crime between police forces of the MS through sharing experience and guidance of their leaders and in close cooperation with Europol.

This new structure in the area of EU internal security is informal, namely has been integrated into the existing overall structure of the EU Council, having as result its decisions not to bind MS, but remains in their sole discretion to implement the decisions taken on the basis of national law.

However is noted that the unanimous decisions in matters of operational nature items, provide a distinctive and dynamic impetus to the work of European LEAs to combat organized crime. But different laws and police practices of MS create difficulties in the unanimous decision and the implementation of common measures and actions (Bunyan T. 2006).

### **European Anti-fraud Office (OLAF)**

The European Anti-Fraud Office established by Commission Decision of 28 April 1999 (OLAF), (notified under document number SEC (1999) 802, (1999/352/EC, ECSC, Euratom).

The tasks of OLAF mentioned Office according to article 2 of the above EU decision are:

1. The Office shall exercise the Commission's powers to carry out external administrative investigations for the purpose of strengthening the fight against fraud, corruption and any other illegal activity adversely affecting the Community's financial interests, as well as any other act or activity by operators in breach of Community provisions.

The Office shall be responsible for carrying out internal administrative investigations intended:

(a) to combat fraud, corruption and any other illegal activity adversely affecting the Community's financial interests, (b) to investigate serious facts linked to the performance of professional activities which may constitute a breach of obligations by officials and servants of the Communities likely to lead to disciplinary and, in appropriate cases, criminal proceedings or an analogous breach of obligations by Members of the institutions and bodies,

heads of the bodies or members of staff of the institutions and bodies not subject to the Staff Regulations of Officials of the European Communities and the Conditions of Employment of Other Servants of the Communities.

The Office shall exercise the Commission's powers as they are defined in the provisions established in the framework of the Treaties, and subject to the limits and conditions laid down therein.

The Office may be entrusted with investigations in other areas by the Commission or by the other institutions or bodies.

2. The Office shall be responsible for providing the Commission's support in cooperating with the Member States in the area of the fight against fraud.

3. The Office shall be responsible for the activity of developing a concept for the fight against fraud as referred to in paragraph 1.

4. The Office shall be responsible for the preparation of legislative and regulatory initiatives of the Commission with the objective of fraud prevention as referred to in paragraph 1.

5. The Office shall be responsible for any other operational activity of the Commission in relation to the fight against fraud as referred to in paragraph 1, and in particular:

- (a) Developing the necessary infrastructure;
- (b) Ensuring the collection and analysis of information;
- (c) Giving technical support, in particular in the area of training, to the other institutions or bodies as well as to the competent national authorities.

6. The Office shall be in direct contact with the police and judicial authorities.

7. The Office represent the Commission, at service level, in relative forums in fields covered by this Article [See also Regulations 1073/1999 (25/5/1999), 1074/1999 (25/5/1999), 2988/1995 (18/12/1995), 2185/1996 (11/11/1996)].

### **European agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union (FRONTEX)**

Community policy in the field of the EU external borders aims at an integrated management ensuring a uniform and high level of control and surveillance, which is a necessary corollary to the free movement of persons within the European Union and a fundamental component of an area of freedom, security and justice. To this end, the establishment of common rules on standards and procedures for the control of external borders is foreseen (Korontzis T. 2013) (Korontzis T. 2011 'e').

Taking into account the experiences of the External Borders Practitioners' Common Unit, acting within the Council, a specialized expert body tasked with improving the coordination of operational cooperation between Member States in the field of external border management should therefore be established in the shape of a European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union (hereinafter referred to as the Agency) [Regulation (EC) No 2007/2004 of 26 October 2004].

For the purpose of fulfilling its mission and to the extent required for the accomplishment of its tasks, the Agency may cooperate with Europol, the competent authorities of third countries and the international organizations competent in matters covered by this Regulation in the framework of working arrangements concluded in accordance with the relevant provisions of the Treaty.

The Agency should facilitate the operational cooperation between MS and third countries in the framework of the external relations policy of the European Union.

It is based in Warsaw (Poland) [Council Decision 2005/358 (26/4/2005)], and its main task which are operationally defined in Regulation (EC) 2007/2004 of 26 October 2004,

Regulation (EC) 863/2007 of 11 July 2007 and Regulation (EC) No 1168/2011 of European Parliament and of Council of 25 October 2011].

It should be noted that the RABITs groups' executives may carry weapons, make arrests, etc. presence of local/s law enforcement officials in contrast to Europol staff who do not have any executive responsibility.

Specifically in Article 5 paragraph 6 of Regulation (EC) 863/2007 states that: «While performing their tasks and exercising their powers, members of the teams shall be authorized to use force, including service weapons, ammunition and equipment, with the consent of the home Member State and the host Member State, in the presence of border guards of the host Member State and in accordance with the national law of the host Member State».

The Agency shall perform the following tasks:

(a) Coordinate operational cooperation between Member States in the field of management of external borders;

(b) Assist Member States on training of national border guards, including the establishment of common training standards;

(c) Carry out risk analyses;

(d) Follow up on the development of research relevant for the control and surveillance of external borders;

(e) Assist Member States in circumstances requiring increased technical and operational assistance at external borders;

(f) Provide Member States with the necessary support in organizing joint return operations.

g) Providing rapid operational assistance for a limited period to a requesting Member [Rapid

Border Intervention Team (RABIT)] in relation to Regulation (EC) 863/2007, Regulation (EU) 1168/2011 (Korontzis, T. 2013), (Korontzis T. 2012 'g').

It should be noted that from its establishment till today the organization has undertaken a number of important actions and initiatives such as:

- Realization of joint European activities in the sea borders.
- Establishment of a European Patrol Network.
- The creation of a central registry regarding the available equipment.
- Development of the Rapid Intervention at the borders.
- Training of border guards - preservation of common training standards.

EUROPOL and FRONTEX have signed an agreement to strengthen cooperation among them in particular through the exchange of strategic and technical information, which does not allow data transfer to identify individuals.

### **European Police College (CEPOL)**

The European Police College was established according to the Council Decision 2005/681/JHA of 20 September 2005 establishing the European Police College (CEPOL) and repealing Decision 2000/820/JHA [L256/63, 1-10-2005].

CEPOL contributes in the training of EU MS senior police officers, particularly as regards the knowledge of the national police systems and structures of other MS, Europol and of the cross-border police cooperation in the EU [Decision 2005/681].

Its tasks according to article 7 of the EU decision are:

(a) Provide training sessions, based on common standards, for senior police officers;

(b) Contribute to the preparation of harmonized programmes for the training of middle-ranking police officers, middle ranking police officers in the field and police officers in the field with regard to cross-border cooperation between police forces in Europe, and help set up appropriate advanced training programmes as well as develop and provide training for trainers;

- (c) Provide specialist training for police officers playing a key role in combating cross-border crime, with a particular focus on organized crime;
- (d) Disseminate best practice and research findings;
- (e) Develop and provide training to prepare police forces of the European Union for participation in non-military crisis management;
- (f) Develop and provide training for police authorities from the candidate countries, including training for police officers with a key role;
- (g) Facilitate relevant exchanges and secondments of police officers in the context of training;
- (h) Develop an electronic network to provide back-up for CEPOL in the performance of its duties, ensuring that the necessary security measures are put in place;
- (i) Enable the senior police officers of the Member States to acquire relevant language skills.

Duties of the said College could be exercised by Europol. Thereby is saving valuable human and financial resources and training work can be outsourced to a European agency that has the appropriate experience, expertise and personnel for the implementation of such activities.

Additionally Europol with concentration of the main police activities and activities can become the main and the only police organization concerning European police cooperation. An entity that can be example concerning European political and administrative unification of police activities under one administration with political oversight.

### **Southeast European Law Enforcement Center (SELEC)**

In Bucharest on 26 May 1999 was signed the "Agreement concerning cooperation in preventing and combating cross-border crime" with the attached annex "Charter organization and operation of the Regional Center of the Southeast European Cooperative Initiative (Center SECI) to combat cross-border crime".

MS to these agreement, participating States in SECI center, recognizing the value and progress of cooperation, structures and procedures which have been established and developed between police and customs authorities of the countries in the fight against cross-border crime and desiring strengthen this cooperation, on the one hand between them, on the other hand with other international organizations with further view the safety of their citizens, agreed to transform the «SECI Center» in regional international organizations in Southeastern Europe, with name «Center for Law Enforcement in Southeast Europe (SELEK)».

In the context of this cooperative implementation spirit implementation moves and the new Convention «Convention of the Southeast European Law Enforcement Center», signed on 9 December 2009 in Bucharest, with full respect on individuals fundamental rights, including personal data protection and considering EU acquis as and other international agreements in the field of law enforcement.

The establishment of an international organization in the sensitive region of Southeast Europe undoubtedly has special significance because provides the possibility of enhancing cooperation on the one hand, between the Parties through the exchange of information between LEAs (police and customs) on the prevention and combat of all crime forms and serious crime, including terrorism, on the other hand with the European Police Office (Europol).

The purpose of SELEC, in the context of cooperation between the competent authorities, is to provide support to the MS and to improve coordination in preventing and combating crime, including serious and organized crime, where the crime involves or appears to involve an element of cross-border activity.

The new convention foresees the following tasks for SELEK according to article 3:

(a) To support investigations and crime prevention activity in Member States and in accordance with this Convention.

(b) To facilitate the exchange of information and criminal intelligence and requests for operational assistance.

(c) To notify and inform the National Focal points of Member States of connections between suspects, criminals or crimes related to the SELEC mandate.

(d) To collect, collate, analyze, process and disseminate information and criminal intelligence.

(e) To provide strategic analysis and to produce threat assessments related to the SELEK objective.

(f) To establish, operate and maintain a computerized information system.

(g) To act as a depository of good practice in law enforcement method and techniques and to promote the same through multi – national training and conferences for the benefit of the Member States.

(h) To undertake other tasks consistent with the objective of this Convention, following a decision by the Council.

SELEC aspires to continue to be the guardian of good practice in law enforcement and provision of information through multinational meetings and conferences with the participation of MS representatives as also and its partners.

On 7 October 2011 SECI Center become SELEC center, while operational and strategic capacities maintained and transferred to the new SELEC. SELEC inherited operational activities, joint searches, meetings and strategic analysis covering the most sensitive border criminal areas in Southeastern Europe.

During this period, the intensive exchange of information through liaison officers and the communication channels of the Center successfully argued the efforts of MS LEAs.

From operational perspective, SELEC retains flexibility and operational efficiencies, with parallel enhancing of analytical capacity with a wider information system and an adequate level of personal data protection in accordance with European standards. The new agreement replaced SECI provides an international legal personality at the Centre and also establishes and maintain cooperation with other relevant international LEAs.

Member States of SELEC are Albania, Bosnia - Herzegovina, Bulgaria, Croatia, FYROM, Hellas, Hungary, Moldova, Serbia, Slovenia and Turkey.

## Conclusion

Interpol is the only international police organization that promotes police cooperation worldwide and exists for decades. It is the communication bridge between 187 states, which represent different police cultures, practices, laws. It is accepted by dozens of states and helps the utmost efforts of the law enforcement authorities in combating organized crime and in dealing with everyday crime.

Europol is a recent European organization contributes to the promotion of European police cooperation. Its purpose is to support and strengthen action by the MS competent authorities and their mutual cooperation in preventing and combating organized crime, terrorism and other forms of serious crime affecting two or more MS. From 01-01-2010 was improved and was simplified the legal framework governing Europol as an EU agency, in order to respond more effectively to the tasks and to the various modern crimes forms.

Europol has not any executive competence. Despite the important steps taken by the Treaty of Maastricht and beyond in the field of internal security at EU level, MS reserves the right to apply national and constitutional framework in this field. For this reason, tasks and activities of Europol have basic coordination - supporting character.

Eurojust is the European organization for judicial cooperation, aimed at better coordination of MS LEAs in investigations and prosecutions carried out by them. Also

promotes closer judicial cooperation by MS. It must be noted that the differences in EU legal cultures are many and strong and Eurojust with its presence and its institutional framework defines its function, contribute to the maximum extent possible grade to coordinate investigations and prosecutions for various forms of organized crime and other forms of crime occupying MS.

An important tool in this case constitute JIT which are composed of magistrates and police officials of different States, aim at coordinating investigations into two or more States for serious crimes. These teams represent a decisive step in the consolidation of police and judicial bodies' activities to combat and to prosecute serious crime.

EPCTF has an informal character in EU internal security system and its decisions are not binding. In any case enables to the MS Police Chiefs the opportunity to exchange views and experiences in major crime and to transfer them within their states. Alongside this team could provide advice to EU institutions on police matters and on international general public interest.

Frontex is the most recent European organization. Although surveillance of external borders is competence of MS, Frontex as a body of the EU facilitate and render more effective the application of existing and future measures regarding the management of external borders and in particular on Schengen Code. This is taking place by MS coordinating activities during the implementation of these measures, thereby contributing to an efficient, high and uniform level of control on persons and surveillance of MS external borders.

Also develops border guards from the European Border Guard Teams in MS for joint operations, pilot projects and rapid interventions and provide the necessary assistance for the development and operation of a European border surveillance system and depending the needs to develop a common information sharing environment, including interoperability system. Further strengthen of organization role is congruous with the Union's objective to develop a policy for the gradual introduction of integrated border management concept.

Also is foreseen cooperation of this organization with other EU institutions and especially with Europol with which has signed an agreement for closer cooperation. Its role is crucial to the internal security system as illegal immigration has momentum growing with great pressure on social, economic and political fabric of States.

The European Anti-Fraud Office is an internal organ of EU, in order to strengthen the fight against fraud, corruption and any other illegal activity affecting the financial interests. A needed service especially now that organized crime is transnational.

Competences of the European Police College obviously can be exercised by Europol through its Services.

SELEC promotes effective cooperation in the prosecution of organized crime across Balkans borders. Region located between two continents and is one of the main routes used by modern international crime. Consequently, the establishment and operation is essential for strengthening the cooperation of competent bodies in this region.

International police cooperation is the most basic institution to combat crime globally. The international development of organized crime has led to new forms of cooperation through legal texts at multilateral and bilateral level. Combat of organized crime constitutes a priority for all states while it undermines democracy, civil and social rights and freedoms. In this context, the establishment of international, European and peripheral institutions in order to combat transnational organized crime is the only way to protect people and societies.

### References:

Eurojust 2013, "a". [Online] Available [http://eurojust.europa.eu/doclibrary/Eurojust-framework/agreements/Agreement%20between%20Eurojust%20and%20Europol%20\(2010\)/Eurojust-Europol-2010-01-01-EN.pdf](http://eurojust.europa.eu/doclibrary/Eurojust-framework/agreements/Agreement%20between%20Eurojust%20and%20Europol%20(2010)/Eurojust-Europol-2010-01-01-EN.pdf) (July 18, 2013).

Eurojust 2013, "b". Since mid-January 2011, the JITs Network has had a secretariat of its own to promote the activities of the Network and to support the National Experts in their work which is hosted at Eurojust. More information available on the website <http://www.eurojust.europa.eu/Practitioners/networks-and-fora/Pages/jits-network.aspx> (August 19, 2013).

Interpol 2012. [Online] Available <http://www.interpol.int/> (September 22, 2013).

Korontzis T. Surveillance of the Hellenic sea borders and smuggling of illegal immigrants. European policy, Frontex and the stationary role of the Hellenic Coast Guard. Athens: Dioikitiki Enimerosi (quarterly journal of administrative inspection), issue 63, 2013, p.p.4-30 (in Hellenic).

Korontzis T. "a". European Union criminal policy and Joint Investigation Teams. The case of Hellas. International Journal of Asian Social Science, Vol. 2, issue 12, December 2012, p.p. 2237-2250.

Korontzis T. "b". Maritime piracy in the international and in the Hellenic legal order. Review of European Studies, Vol. 4, No. 5, December 2012, p.p. 75-93 (doi:10.5539/res.v4n5p75).

Korontzis T. "c". The prosecution of economic crime in Hellas. Piraeus: Limenika Chronika", issue 91, 2012, p.p. 5-6 (in Hellenic).

Korontzis T. "d". The meaning of organized crime in the Hellenic and in the International legal order. Piraeus: Limeniki Rota, issue 10, 2012, p.p. 27-29 (in Hellenic).

Korontzis T. "e". The European policies for illegal immigration via EUROPOL and FRONTEX in Hellas. Announcement which took place in the Scientific International Conference titled «Comparing and contrasting "Europeanization": concepts and experiences» which was held on 14-16 May 2012 in Athens, by the Institute of International Economic Relations (IIER/IDOS)], is posted on the website <http://www.idec.gr/iier/new/Europeanization%20Papers%20PDF/KORONTZIS%20MAY%202012.pdf> (September 18, 2013).

Korontzis T. "f". The role of the Hellenic Coast Guard in the Hellenic internal security and in combating the phenomenon of organized crime. International Review of Social Sciences and Humanities, Vol. 3, issue 1, 2012, p.p. 210-227.

Korontzis T. "g". The prosecution of economic crime in Hellas. International Journal of Humanities and Social Science, Vol. 2, No. 5, 2012, p.p. 221-227.

Korontzis T. "h". The establishment of judicial police as an administrative reform. An evaluative approach. Administrative Scientific Journal, No 17, p.p.103-116, Athens-Komotini: Ant. Sakkoulas, 2011 (in Hellenic).

Korontzis T. "i". The contribution of EUROPOL and FRONTEX in combating the phenomenon of illegal immigration in Hellas. Review of European Studies, Vol. 4, issue 1, March 2012, p.p. 188-202, (doi:10.5539/res.v4n1p188).

Korontzis T. "a". The establishment of judicial police as an administrative reform. An evaluative approach. Athens:Dioikitiki Enimerosi (quarterly journal of administrative inspection), issue 57, 2012, p.p.76-93 (in Hellenic).

Korontzis T. "b". European Police Office: EUROPOL. Athens: Ethnikes Epalxeis, issue 97, 2011, p.p. 50-51 (in Hellenic).

Korontzis T. "c". Maritime borders surveillance – New European Perspectives. Summary of the aforementioned Atomic Thesis which was elaborated in the Hellenic National Defense College (SETHA) in the academic year 2009-2010, posted on the website of the above mentioned College <http://www.setha.mil.gr/main.php?action=diatribes> on 28/04/2010 (in Hellenic).

## **EMBEDDING HEALTH RESEARCH FINDINGS INTO POLICY MAKING: POLICYMAKERS AND ACADEMICIANS PERSPECTIVE, PALESTINE, 2013**

*Yousef Ibrahim Aljeesh* Dr.

Associate Prof. in Public Health-The Islamic University of Gaza (IUG)

*Mohammed Shoukri Al-Khaldi* Mr.

Master Health Management- Ministry of Health (MOH), The Islamic University of Gaza (IUG), and Pal-think for Strategic Studies Gaza Strip, Palestine

---

### **Abstract**

**Background:** There is growing interest in understanding how to effectively bridge the gap between the production of knowledge and its embedding in health decision-making. Health research supports health systems in the delivery of better, fairer and more equitable health care to people. It does so by identifying challenges and providing best solutions in emerging and embedding these research findings into policies in order to improved approaches to public health. So, the research findings are extremely important to inform policy and decision-making in health to tackle threats and diseases, to address priorities and focus on the most important health issues. Ultimately, the concept of evidence-based practice or policy-based evidence aims to improve health system performance and attain sustainable development. However, policy-makers, particularly in Palestine may not recognize the contribution which research can make. There is a huge gap between the scope of research and the scope of policy-making. The stereotype of the researcher in ivory tower still prevails. In fact, health officials and policy-makers may be doing research without knowing it, and researches that conducted by universities are not adopt and not invest of it. This study aims to understand and assess the research findings embeddedness into decisions and policies in Palestine from policymakers and academicians perspective.

**Design and methodology:** The study design was a qualitative approach by using in-depth interviews for gathering and elaborating data about the phenomenon. The study participants included seven in-depth interviews; three of them with graduate faculty' members at the universities, two policy makers from Ministry of Health (MOH), one expert from Non-Governmental Organizations (NGOs) and International NGOs (INGOs), and the last one parliamentary from Palestinian Legislative Council (PLC) who engage in this field.

**Findings:** through the thematic analysis, the study main findings revealed that the degree of embeddedness is remarkably faint across the MOH in particular and moderately respectable in the academic, NGO, and INGOs institution, the overall impression about evidence-based practice in the health sector is very weak due to many obstacles that were identified. Most importantly, there is a significant weakness in research culture in the health institutions as well as mal-practice and poor experience, and no clear national health research priorities, strategy. There are various obstacles hindering evidence embeddedness into policies which are: systems issues such centralization and lack of incentives and capacity building programs as staff and fund insufficiency, poor information infrastructure and logistical and technological capacities also absence of knowledge transfer "dissemination". Moreover, communication, networking, and coordination across institutions and researchers and policy makers were fragile. Also, the majority stated that the evidence-based practice is not appropriately use and mostly personally-driven and actually not institutionalized, since the

researchers' role is mainly minor as well as the relationships among institutions is not well-established.

Recommendations: the researcher emphasizes on the necessity of taking the research evidences into consideration. Urge MOH, Universities, NGOs, INGOs, and institutes, and to its members to build effective relationship to play a complementarily role and work as a team to find solutions to research-relevant policy obstacles and to enforce the research utilization and institutionalization by active communication and coordination. Also, allocate sufficient financing and logistics and qualified human resources through capacity building, presence of supportive culture and system such leadership, incentives, find research units. Also, more concern in applied research quality and credibility to use appropriately. The necessity for embracing agreed research-policy and priorities integration strategy to support the research system primarily and to empower the Palestinian health care system based on national health goals and needs to attain sustainable health development.

---

**Keywords:** health policy and education, health research, embeddedness research into policy, Palestine

### Introduction

Health research supports health systems in the delivery of better, fairer and more equitable health care to people. So, the health research is extremely important to gear the policy maker's practices and inform them in health systems to tackle threats, address priorities and focus on the most important health issues and determinants. Ultimately, health research aims at improving health system performance and attaining sustainable development. As health systems have become more complex and public demands. The current international emphasis on evaluating performance has positioned health systems research as an important vehicle for promoting evidence-based policy making. This emphasis has also encouraged health systems research to become relevant to policy making.

So, the divide between research and policy is substantial in many low and middle-income countries (LMIC). Both supply and demand factors are responsible for this. On the supply side, the limited local pool of human and financial resources has constrained the production of quality research. The result is that many LMICs are characterized by limited institutional capacity to generate research to aid policy making. On the other hand, avenues for research to influence policy are severely limited. One reason for this is the bureaucratization of policy making, in which, researchers and research institutions have only a minor role. Other common obstacles in this regard are centralized decision making and a policy making culture that gives little importance to evidence-based research (WHO, 2012).

However, health research is not a luxury to be conducted by countries with scarcity resources only. Jawahar Lal Nehru said: "Because we are a poor country, we cannot afford not to do research" (Salam, 1989). However, health policy-makers, particularly in developing countries, may not recognize the contribution which research can make. There is a big gap between the scope of research and the scope of policy-making. The stereotype of the researcher in ivory tower still prevails. In fact, health managers and policy-makers may be doing research without knowing it. Health researches support institutions by developing competitive grant and fellowship schemes, supporting the institutional infrastructure, management and technical services, strategic development planning, and promoting networks and partnership between institutions (Tanner et al, 1994). On the other hand, Nchinda (2003) calls for greater involvement by policy makers in developing countries in the entire capacity building process and they should set highly focused research priorities. Strong national health research systems must address in particular leadership, career structure, infrastructure, and establish effective information access and interfaces between research producers and users. The greater national and global investment in capacity building in developing countries has the greatest potential for securing dynamic knowledge systems that can helps health officials

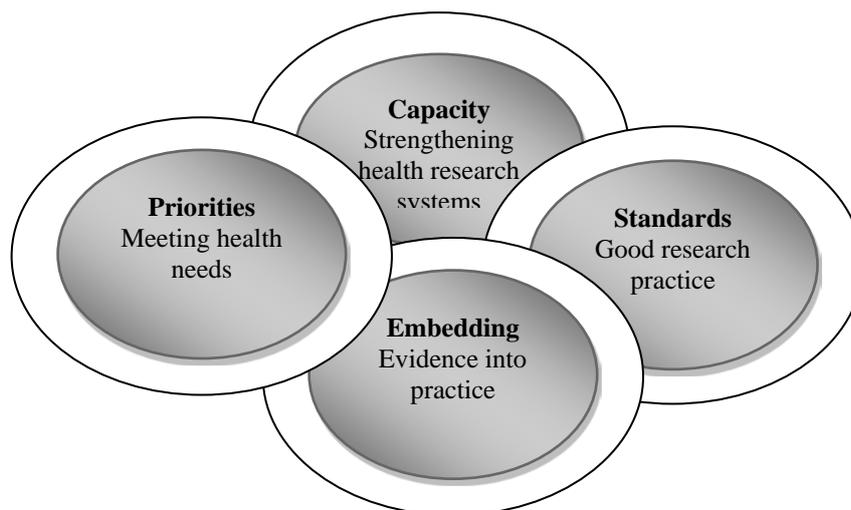
to rely entirely on the research evidences on their policies formulation in order to deliver better health and equity, now and in the future (Lansang and Dennis, 2004).

There are several problems that face the health sector especially in the developing countries as well as Palestine like shifting epidemiological trends in disease patterns, rapid increase in populations, political instability, unemployment and poverty, inadequacy in research and development capacities, new emerging health problems, increasing commercial interests of the private health sector and shrinking financial resources. All mentioned problems contribute to the local, regional and global inequity in health care. These problems must motivate the all relevant stakeholders to concern more on the quality research then to conclude effective evidences to exploit them efficiently in the health policy making scheme. Therefore, WHO (2010) called for a strategy research for health based on five main goals. The first and important is greater sharing of research evidence; second is research capacity building, setting research priorities which meet health needs, the third is creating and supportive culture and environment

The UNESCO statistics (2012) confirm that the global entirely expenditure on research forming 1.4% of the Gross Domestic Product (GDP) and all Arab countries combined allocated equals 0.3% of the GDP. Regionally, "Israel" expenditures on the scientific research (other than the military) reached around 4.7% of the GDP. The per capita spending on research is less than \$15 in Arab countries combined, while in "Israel" more than \$1200. Moreover, the number of researchers and scientists per million populations is less than 500 in Arabic countries, but around 4000 in North America. Locally, the gross expenditure of Research and Development R&D in Palestine is terrible 0.2% and the number of the Palestinian researchers reached 2348. The total expenditures on the research and development were 35 million US dollars. In other words, this signifies that the R&D in the Arab world particularly in Palestine remained sluggish and needs collective attempts locally and internationally to entrench and empower health R&D foundations.

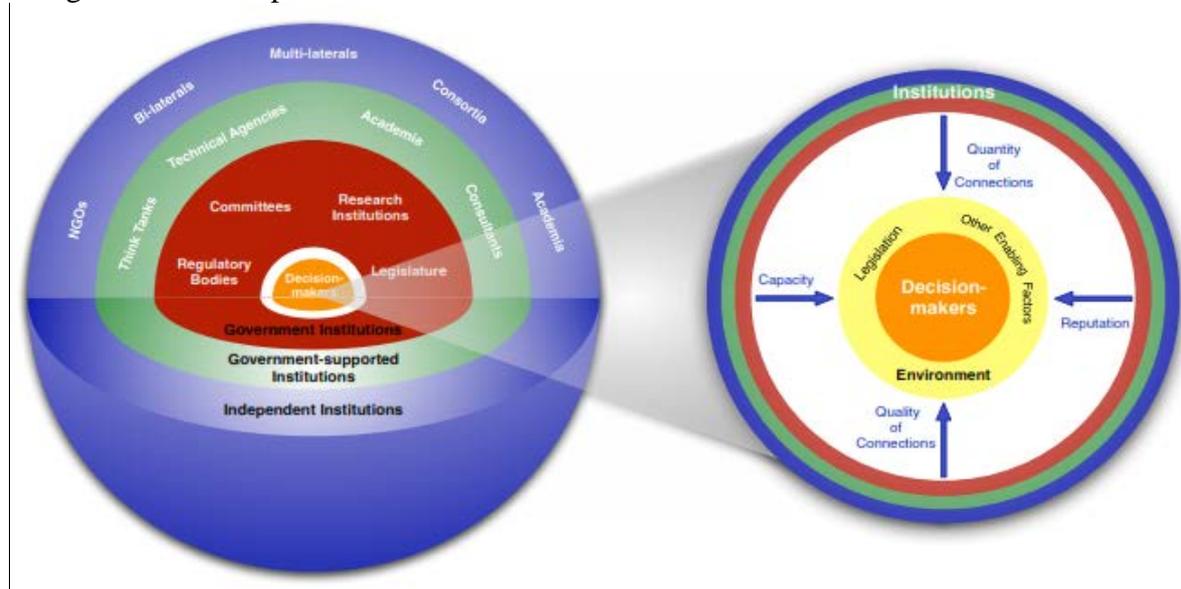
Obviously, the health R&D in the Palestinian condition is a real investment that has great impact over the policy makers' decisions and practices that are still ignoring the evidences to formulate the right decisions, to promote the health status through effective health planning and management, diseases control and prevention and through providing high quality health services. So, this topic gained interest since the Palestinian National Authority was established when the Palestinian health system was shaped. Unfortunately, several efforts were made to create health research system but these efforts collided with external effects that include the political situation as well the internal effects. Those effects are related with the health system majorly the absence of vision and culture by the policy making, the limited resources and the difficulty to agree on a unified strategy and priorities to be foundation, lack of coordination and cooperation between research producers and users. Additionally, strategic vision for the PNA in adopting research and providing the required fund is weak. Also the Universities, research institutions and NGOs work separately. In other words, health research is practiced and used in the mentioned bodies according to its own policies and not according to the national priorities and agendas.

Figure 2.1: A strategy of effective health research system adopted by WHO, 2012



As regards of (WHO, 2012), as depicted in figure (2.1) which illustrates the WHO strategy in adopting the optimal, which explains the important elements to create effective and efficient health research system of the world countries, the strategy has five interrelated goals, organization (strengthening of the research culture), priorities, Standardized research, translation. In the same context, Koon et al. (2012) stated that the WHO through Alliance for Health Policy and Systems Research in light in embedding research into decision-making processes is constructs a conceptual framework for institutional embeddness of research in the health sector. As depicted in figure (2.2) below.

Figure 2.2: Conceptual framework for institutional embeddness of research in the health.

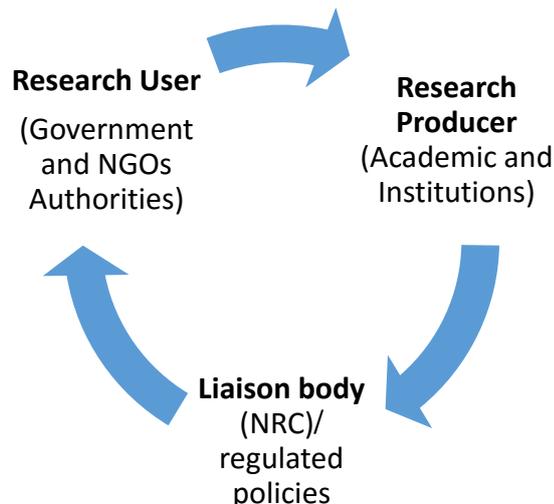


Source: Koon, A., Nambiar, D., and Rao, K. (2012).

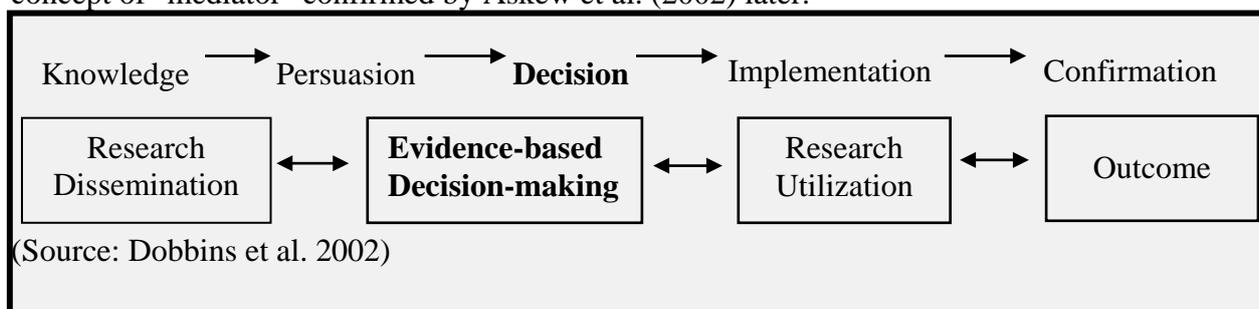
From the figure (2.2), this study adopted this framework is useful map and practical circles for any organizations under the health care system umbrella. So the deepest ring consists of government organizations such as special committees, research units, and regulatory bodies. Then the next circle consists of government-supported research institutions such as institutes, universities, think-tanks centres and individuals who are funded by government but not directly part of it. The outer most circle consist of independent research institutions which are privately funded and managed like those belonging to multi-lateral and bi-lateral agencies, private universities, NGOs, and research conglomerates.

Regarding to research and policy-making bodies relationship and alignment, figure (2.3) develops by study researchers that demonstrate a relationship nature and stream between the two institutions of health research maker and policy and decision maker. It's crucial to find liaison body as a mediator like National Research Council NRC or established national regulated policies. This body and policies tasks are action coordination, evidences transfer and communication, disseminate information, knowledge mutuality in order to achieve the alignment and integration, interaction, and harmonization. Therefore, facilitate the embedding of research findings reflection into policy making practices and processes in the health field.

Figure 2.3: Research and Policy-making Bodies Relationship and Alignment (Developed by study researchers).



Respecting to the dissemination of research findings for policies and decisions purposes, numerous global studies emphasized on the importance of findings dissemination to accomplish "embeddedness". Dobbins et al. (2002) and McBride et al. (2008) addressed the research dissemination flow, diffusion of innovations, and evidence based to construct a comprehensive theoretical and empirical structure of research utilization to be useful for both health policy and clinical decision-making bodies. This model helps to outlines the various stages of research flowing process within decision making practice, to identify possible areas for research. In addition to facilitate health researchers and policy makers understanding of the complexities of research dissemination and utilization process to develop new future dissemination strategies. It illustrated that the process of research evidence in health care field is influenced by numerous intervening variables like organization, environment and individual, which produced the complexity of transferring research findings into practice. See below Dobbins structure for research findings dissemination in the policy practices. The concept of "mediator" confirmed by Askew et al. (2002) later.



Abu Hamad (2013) clarified that the status of research in health sector in Palestine is not different than other sectors, as most research studies are descriptive with less focus on operation and health services research, usually academic in nature, rarely reflecting the national needs and priorities and most importantly the use of research in decision making is not institutionalized within the organizational culture of health institutions. The infrastructure for health research is weak and the brain drainage phenomenon is common among the Palestinian researchers in general including health researchers. Mostly, research studies in health are externally initiated and donors dependent. Abu Hamad sees areas that require focus include identifying the national prevalence and incidence of communicable and non-communicable diseases common in the Palestinian culture such as mental health, cancer, cardiovascular diseases, prematurity and pregnancy risk factors. Furthermore, there is a dearth

of research on the effectiveness of therapeutic interventions and management. Studying the risk factors and reasons for the commonly prominent diseases occupying the top of the leading causes of death among the Palestinian population is essential. Health care providers' commitment, morale, administrative and managerial barriers to effective delivery of health services constitute a top priority. Because of the widely perceived in-efficiency of the health system, economic studies in health services like cost effectiveness, marginal analysis, costing services and marginal utility analysis are important areas for investigation. In particular, drug shortage, rational prescribing and treatment.

Despite the high expending on health in Palestine (9-12% of the GDP), still the community perspectives about the health services is not as expected, so views and perceptions of beneficiaries is critical. Quality of health, medical errors and reporting practices are also very important areas for research. Abu Hamad recommended creating a culture that values scientific research as a basis for health development including supporting infrastructure, allocate certain budget (2-5% of health budget), setting national health research priorities, developing human resources capacities in conducting and utilizing studies. Lastly, institutionalizing the use of research into decision making is crucial through national policies, teaming up among researchers and policy makers and promoting the relationships between them. Generally, the health sector in Palestine case experience many obstacles related to create effective research scheme and to embed its findings in policy making procedures. These obstacles such as unsupportive culture, poor infrastructure, fund insufficiency, lack of leadership, resources and personnel, absence of agreed national strategy, inefficient information system and uncoordinated relevant actors activities mainly the government and academic institutions. If these difficulties can be identified, it will be then easy to develop a long-term strategy that will serve the research and policy making pattern in Palestine. Due to this case, sooner or later, we should find mechanisms and develop research integration into health management practices to be strongly found.

### **Research Aim**

This study is concerned with health research and policy making to assess the real status of embedding and translating the health research evidence into policy making from policy makers and academicians perspectives in Palestine. In order to identify effective and efficient ways that accomplish the integration between them, thus providing suggestions about the appropriate utilization of research outcomes in policy making process.

### **Specific Objectives**

To examine the health researches and policy making integration and mutuality impact, reality, obstacles, opportunities, strengths and weaknesses and factors affecting that.

2- To develop relevant, flexible, effective, efficient, accessible, sustainable strategy and mechanisms that manage the relationship between research producers and policy makers in Palestine.

3- To present a conceptual understanding of institutional embeddeness and apply it to the context of research in policy making in health.

4- To recognize the stakeholder's roles in supporting health research and its implications on policy making practice levels.

5- To provide recommendations for better utilization of health research findings into policies in light of supporting the health system components.

### **Methodology**

In this study, literature from various disciplines was sourced to develop the idea of embeddedness. We conducted a thorough review of the literature pertaining to the decision making process in health policy, and processes of knowledge translation. The study used

qualitative approach by conducting in-depth interviews with academicians, experts and policy makers for gathering data about the phenomenon. The seventh interviews conducted in February 2013, the first two interviews commenced at the Palestinian Ministry of Health MOH with two Chief Executive Officers CEOs and the third one with expert from Palestinian Legislative Council PLC. For the fourth interview held with expert from Non-Governmental Organization NGO, and the fifth, Sixth and seventh interviews carried with three academicians from Al-Quds University, Al-azhar University, and The Islamic University of Gaza.

The study was used Non-probability convenience and purposive selection, and the Interview questions were developed initially based on a conceptual model of institutional embeddedness that drew from an extensive review of the literature and experts consultations. One interview was piloted with academic professor to arrive at a revised instrument focusing on ten major questions. In content comparative analysis, data were systematically analyzed within steps. Raw data that provided by the participants were carefully read, word by word and line by line. Codes were developed through a process of open coding. Coding in qualitative research is a word or string of words used as a name for category generated during analysis process, coding is the first step in moving beyond concrete statements in the data in order to make analytical interpretations.

### **Discussion and analysis**

First, the term “embeddedness” has a long history in the social sciences. The origins of the concept can be traced to the work of Karl Polanyi, who, in 1957, wrote that “the human economy...is embedded and enmeshed in institutions, economic and non-economic. As it is often referred to, represents an organization’s/individual’s connection, relationship, and/or embed position, within a social network (Koon et al, 2012).

One of the experts pointed to that there are efforts in applying the health research into policy making and till this moment there is a weak attitude from the policy makers to use the research evidences within their policy practices in the Palestinian health organizations. There was consensus from the respondents that the health policies must be constructed on evidence-based decisions since these policies and decisions should be derived from scientific bases. While another expert said that the researches have scientific and practical value and it is supposed to be implemented. The expert also added that researches have clear aims in evaluating the health services and activities or presenting ideas and approaches that contributed improvement in the health field. The other aim from researches is adding what is new and developed on the contrary of the reality where its results are applicable in the field to enhance the health providers' performance. In the same context, according to one of the experts researches are the mirror that evaluates the current situation and the desired horizons for the future. Most of world countries depend on the research to develop its capacities and allocate budgets related to research that could reach around 5% of the general budget of the government.

Locally, the majority of the respondent said that there is severe shortage in the funds that are directed to research. The Palestinian government budgets and plans did not allocate fund for research in general and health research specifically. On the NGOs and INGOs levels there is concern with research to some extent due to the programs' and projects' nature of such organizations. It is merely found in such organizations research units or departments and this what was confirmed by an experts who works in an INGOs where he indicated that most decisions and policies are built on scientific evidences. On the other hand, another group of experts clarified that the aim of research that are made about the Palestinian institutions are personally-oriented and not priority or scientific-oriented. The experts added that researchers make researches to develop his professional and functional position besides the financial aspect.

With regards of the experts' satisfaction about the situation of embedding and utilization of research findings into decision and policy making in the health field they agreed that there is no full satisfaction and the embeddedness state did not reach the required level. Some experts asserted that few researches and studies were accomplished and its results were applied by some decision-makers. This situation is referred to that the approach of research and development is recent and newly-established in the health system in Palestine. There are hundreds of researches results that are not used for the right decision as a result of various circumstances across the health services providers like system, qualified experts, lack of knowledge and miscommunication. One of the experts justified his dissatisfaction about policy-based evidence because all results are applicable especially for the Palestinian organizations case due to the existence of some obstacles like: capacities, financial and human resources and unsupportive environment. From another point of view, an expert argued that he is displeased about that because researches that are made only reflect the aims, visions and priorities of the researchers and their organizations either universities, NGOs or institutes and not according to the objectives and needs of decision makers. This problem originates from individual interests and not from national or institution needs.

Through the in-depth interviews questions were presented about cons and pros of health research impact on the decisions and policies formulation. Regarding the cons, there is major consensus that the researches results should be credible and with high quality evidences and basically rely on diagnosing health problems. It also should present constructive solutions that contribute in improving health services and health system performance and if this takes place it will produce right policy making and vice versa. The researcher believes that the following elements could negatively affect the evidences translation into policy making. These factors are: lack of logistic resources and the capacities. There is weakness in determining the research priorities that authorities and decision makers are concerned with, decision makers make up decisions without scientific evidence. Health research is personally-driven because it reflects the researcher's desires and not the priorities of the national context and many researches that are externally funded "donors" address topics that serve donor purposes and not the national purposes. Furthermore, the centralized system of health organizations doesn't provide sufficient fund to the departments and the weakness in developing the capacities of the staff in addition to the miscommunication between research producer and policy makers.

On the other hand, the positive aspects for embedding research findings in the decision and policy making practices were from the respondents' point of views agreement. The respondents agreed on the necessity to apply it in the health sector that is characterized by its complexities which should be met with feasible facts. It was mentioned that health studies fill the gaps in the health system and produces true health decisions since some research focus on cost effectiveness of health services, some examine the beneficiaries' satisfaction about the health services. One of the experts added that one of the pros of research embeddedness into policy helps policy makers in setting the health development plans since it provides real information to be reflected in the form policies which helps to reach better health situation. Moreover, it increases the policy makers' abilities in evaluating the reality. For more clarification, one of the respondents provided an example of research that was scientifically conducted and it addresses thalassemia disease, this research concluded findings that contributed in creating strategic plan including policies that control the disease.

The fourth question is related to the concept of policies-based evidences contributions to fulfilling health needs and indicators, and health system performance. An expert said that health indicators are usually related to two methods that are: research which measures and assesses the trends and in general the obtained results are more specific and accurate, while the other method is gathering the routine data and this often inadequate for several reasons like the reporting system and the gathering rout. Consequently, it is insured that the health

research and its results in the policy making process assists in finding precise indicators that reflect the health needs to compare the health situation geographically between areas within one country and with other countries and timely over time stages. In other words, the health indicators are based on the research findings which main aim is evaluating and validating these indicators for example: surveillance-based evidences.

Another expert perspective strongly believes that there is close relationship between utilization of research evidences in policies and fulfilling health needs. This explained by that when health providers determine the population health needs, deliberately they use research as a suitable tool like needs assessment to achieve the sounded needs. From another point of view, if health research is scientifically conducted and correctly directed according to the health system priorities it will reach findings and recommendations that will effectively contribute in improving health system performance and will fulfill the gaps this is called "decision-based evidence". Additional opinion stated that the researches are real mirror for the current situation and as a result it reflects the health needs and could enhance the health situation depending on quality, design, methods, impact and purpose of these researches.

It is obvious from the perceptions that embedding the studies' policy-based results into policy making in Palestine is almost ignored and mal-practiced and huge interventions are needed to achieve it. The researches that are derived from priorities, address urgent problems in the health system, investigate the population's needs and are with high quality conducted, scientifically-oriented, collaboratively supported and teaming-driven, can greatly contribute in improving the indicators, meeting the needs and developing the health system performance. This could be more valuable if it is done with coordination and cooperation with the policy makers. About the perceptions of expert interviewees about research findings appropriate utilization in decision making in the health field there were two different points of views. Some views indicated that it is appropriately used specially in the NGOs because there is concern and supportive culture and resources either from the NGO management or from the donor to conduct researches that are related to the nature of the projects. Moreover, presence of human resources that have the knowledge, skills and experience in the scientific research which gave them the power to practice it, additionally, the current condition of health research in NGOs is well. In contrast, some of the experts argued that the research and its findings were not translated properly into the process of decision making process and witness severe weakness because it believed that most researches that are produced are not for scientific or policy purposes but they are merely for personal purposes if that financially or professionally as was mentioned earlier.

There is no doubt that there are few researches that are directed for strategic purposes. The rest of experts argued that it is not thought at all that researches facts are used correctly by the decision makers from one side, and from the other side the researches do not depend on comprehensive and actual information which makes it hard to be efficiently exploited. Overall, the difficulties hinder research use into policies in proper manner mainly represents in issues of procedures, personal, environmental, absence or miscommunications, and priorities contradiction, also organizational aspects such as bureaucratization.

For the research findings appropriately application into policy making in the health in Palestine, It is questionable issue; because the research units within the Palestinian health institutions are almost not-existence or inactive. Supposedly, it should be taken into account good quantity and quality of connections to decision makers. However, because of poor reputation for research products, it might have low embeddedness overall. On the other hand, an NGO that operates on the Palestine as an independent body and energetic role in line for high quality products, honestly policy-relevant evidence and has numerous and good quality connections with their policy makers could be said to exhibit a high degree of embeddedness. This is applies in the academic institutions. Nevertheless, researcher and policy maker's

closeness, the presence of legislation, body, and regulated policies is essential in the health sector.

In relevance with above, through asking the experts about their perceptions on the role of health researchers in decision and policy making in the MOH and health NGOs in Palestine, the is compromise among experts that the health researchers role is a very minor and mainly marginalized and does not reach to the required level which researchers must be normally occupied in this process. Where four of the experts attributed the faint role of health researchers due to own reasons such as rewards and promotions, and the bulk of the research idea is not a national health priority and stems from individual motives, this does not deny the existence of active and initiative researchers in health research. Another stated that the health researchers have a central and vital role to a large extent in the decision-making process within NGOs sector, as a result of the characteristics that distinguished these organizations from others. In Palestine case, it seems that the role of researchers and decision makers in the process of policies-based evidence is a scattered due to of separation between them, as well as barriers related to lack of communication, relationships, consultations, mutual understanding and cooperation at the academic institutions, government authorities and NGOs. If there is a strong relationship there will be a vital role, and vice versa. Importantly, establishing National Health Research Council (NHRC) may strengthen the relation among research producers and users, and reinforce more and more the researchers' role and contributions.

Therefore, the relationship nature between the research institutions and MOH or NGOs is fragile and not profound based on a real strategic partnership and cooperation in health researches. This was confirmed by five experts who clarified that this weak relationship as a most barrier between them only for administrative arrangements for researcher likes administrative approval or consent from the authorities, with existence of certain links but seasonal between specific institutions such as consultations services, workshops conferences and tutorial sessions addressing health issues and problems.

Virtually, the study presented through the interview questions which examining the experts' experiences and attempts by giving example from their organizations of a recent major health policy implemented in the last 2-3 years grounded on research findings and recommendations. In addition to sub questions like who was involved and consulted in this policy, the processes of deliberation, the type of decisions, availability of link between the decisions and research with explanation from experts' perspectives. One of experts from the Palestinian Legislative Council (PLC) declared firmly that the most of health policies are formulated after make deep investigations conclude evidences, this take place by involving and networking with all relevant stakeholders. Moreover, some of the academician experts provided examples according to the nature of their work in using the curriculum/courses evaluation and assessment to set correct policies on teaching process. In turn, one expert from INGOs stated that the entire his organization operations and decisions are centered on facts and studies, the expert gave an example of anemia, it was conducting research on this topic for different age groups, then it concluded to findings and decisions that are importance of awareness and preventive measures, and all stakeholders inside and outside the organization have been involved. At the government level, one expert also confirmed clearly that MOH administration occasionally adopts the evidence-informed policy for example: hospitality services in MOH hospitals.

Noticeably from the experts' perspectives, there is significantly weakness by health government institutions in adopting the concept of evidence embeddedness into policy and that it is critical for them institutionalizing this concept to become the culture research-oriented. This urge us to the need to more efforts and interventions to promote this concept by developing policy makers capacities, strengthen networking and communication, support research units within organization, plenty resources, more involvement and consultation, regulated health research-policy strategy, and supportive management.

Finally, all key informants acknowledged the need for evidence to inform decision making and that the overall trend seems unsatisfactory, weak, and blurred status and the need for serious corrective strategies and greater actions to be taken to create a culture of health research production, utilization and translation with our health organizations. Therefore, there is a consistent perspective among experts in underpinning the research findings utilization in the health actions and policies as a considerable part of health system components. They have recommended several important suggestions concerning in founding agreed national health research priorities, formulating regulated body for research, sufficient and planned fund, encouraging the networking, coordination, consultations and partnership agreements as well as Activating the complementarity role among all relevant institutions and stakeholders at local and international levels, creating incentive systems and implementing capacity building programs, and teaming among researchers and policy makers is essential.

About the information aspects, developing effective information and surveillance system and expanding the research and publications accessibility and dissemination were recommended. Moreover, focusing in research issues such as quality, design, priority and purpose, redundancy, .ect. More importantly, one of experts focuses on making a comprehensive review of all critical health researches and studies in order to utilize from them. However, another perception stressed that the significance role donors and their organizations in supporting the health research and its implications on the health sectors in Palestine.

## **Conclusion and Recommendations**

### **Conclusion**

The importance of health research utilization on policies in the developing countries as a whole and for Palestine specifically, as health systems have become more complex and public demands. So, this study represents a nascent attempt to understand and assess the issue of health research embeddedness in policy making. The study findings suggest that the degree of embeddedness is remarkably faint across the MOH in particular and moderately respectable in the academic, NGO, and INGOs institutions. The overall impression about evidence-based practice in Palestine health sector is very weak due to many obstacles that were identifies. Importantly, there is a significant weakness in research culture across the Palestinian health institutions as well as evidence-based mal-practice and poor experience, no clear national research priorities and strategy. May obstacles are identified such: centralized system, absence of incentives and capacity building programs as qualified human resources and fund insufficiency, poor information infrastructure and logistical and technological capacities also absence of knowledge transfer. Moreover, communication and coordination across institutions and health researchers and policy makers were fragile. The evidence-based practice is not appropriately use, actually not institutionalized and mostly personally-driven. The researchers' role is being minor as well as the relationship among stakeholders is not well-established. In conclusion, the necessity of taking the research results into consideration to MHO, Universities, NGOs, INGOs, and institutes, and to its members in particular researchers and policy makers to find solutions to the obstacles of the research-relevant policy and to strive hard in evidences utilization. Also, adopting clear and agreed policies and strategies to support the research system primarily and to empower the health system based on Palestinians needs and national goals in order to attain sustainable health development.

### **Recommendations**

1. Important of existing body as a mediator such as national committee or council and adopting WHO research strategy. Also, need to disseminate the researches clearly, effectively, and efficiently to all concern audiences with focusing on improving the policy makers'

potentials and experience in research and urging the universities and colleges in concerning more in research methodology course.

More involvement and the importance to establish national research policy based on priorities through teamwork (team-driven) with the need to build active partnership and cooperation across universities, research institutes, government and NGOs and INGOs. Also, encouraging the operations, applied, evaluation and assessment researches

Urging the government and universities in promoting research culture and working on support research infrastructure, commit to fixed budget for research, upgrading dynamic information and technological, as communication and coordination measures.

Call to institutionalize the research by finding and supporting research and development units within the health institutions linked directly with front management "directors", and encourage researchers and professionals through incentives system.

Call for making a comprehensive review of all critical health researches and studies in order to utilize from them. Moreover, urge the donors and their organizations to play important role in supporting the health research and its implications on the health sectors in Palestine.

### References:

- Abu Hamad, B. (2013). Health Research in Palestine: Gaps and Challenges. Research paper submitted to the *Conference of Scientific Research Priorities in Palestine*, 25-26 March, The Islamic University of Gaza IUG. Palestine.
- Askew, I, Matthews, Z., & Partridge, R. (2002). Going beyond research: A key issues paper raising discussion points related to dissemination, utilisation and impact of reproductive and sexual health research. [<http://www.socstats.soton.ac.uk/choices=Workshop>].
- Dobbins, M., Ciliska, D., Cockerill, R., Barnsley, J. and DiCenso, A. (2002). A Framework for the Dissemination and Utilization of Research for Health-Care Policy and Practice, *Journal of Knowledge Synthesis for Nursing*, November 18, Vol. 9, N.7. [[http://www.health-evidence.ca/downloads/A\\_framework\\_for\\_dissemination\\_\(2002\).pdf](http://www.health-evidence.ca/downloads/A_framework_for_dissemination_(2002).pdf)].
- Koon, A., Nambiar, D., and Rao, K. (2012). Embedding of research into decision-making processes, Background paper commissioned by the *Alliance for Health Policy and Systems Research-WHO*. [[http://www.who.int/alliance-hpsr/alliancehpsr\\_backgroundpaperembeddingresearch.pdf](http://www.who.int/alliance-hpsr/alliancehpsr_backgroundpaperembeddingresearch.pdf)]
- Lansang, MA., and Dennis, R. (2004). Building capacity in health research in the developing world, *Bull World Health Organ*. Oct;82(10):764-70.
- McBride, T., Coburn, A., MacKinney, C., Mueller, K., Slifkin, R., and WakefieldJ, M. (2008). Bridging Health Research and Policy: Effective Dissemination Strategies. *Public Health Management Practice*, Lippincott Williams & Wilkins, Wolters Kluwer Health. 14(2), 150–154.
- Nchinda, T. (2003). Research capacity strengthening in the South. The Global Forum for Health Research, Geneva. Switzerland. [<http://www.ncbi.nlm.nih.gov/pubmed/12113452>].
- Salam, A. (1989). Notes on science, technology and science education in the development of the south. Prepared for the fifth meeting of the South Commission, May 27–30, The Third World Academy of Sciences. Maputo. Mozambique.
- Tanner, M., Kitua, Y., and Degrémont, A. (1994). Developing health research capability in Tanzania: From a Swiss Tropical Institute Field Laboratory to the Ifakara Centre of the Tanzanian National Institute of Medical Research. 57, 153-173.
- UNESCO (2012). Research and Development worldwide figures and statistics. Retrieved from UNESCO website. Access on 12 October 2012.
- WHO, (2010). Research for Health Strategy approved by the 63rd World Health Assembly 2010. [http://www.who.int/rpc/research\\_strategy/en/index.html](http://www.who.int/rpc/research_strategy/en/index.html).

WHO, (2012). The WHO strategy on research for health. ISBN 978 92 4 150325 9.  
[\[http://www.who.int/phi/WHO\\_Strategy\\_on\\_research\\_for\\_health.pdf\]](http://www.who.int/phi/WHO_Strategy_on_research_for_health.pdf)

Annex 1: In-depth interviews questions

*“Embedding health research findings into decision making process to develop the health system performance: policymakers and academicians perspective, Palestine, 2013”.*

1. Participant Information Could you tell us/me about yourself?
  - a. Sex \_\_\_\_\_ b. Country \_\_\_\_\_
  - c. Designation \_\_\_\_\_ d. Department \_\_\_\_\_
  - e. No of years in current position \_\_\_\_\_ f. No of years in health \_\_\_\_\_
2. Thanks for participation in this interview ---warm greetings
3. When we mention research findings and policy making, what comes to your mind first?
4. From your perspective, are you pleased with how research findings is embedded, used and exploited in decision making in the health field?
5. Can you summarize the buns and cons of researches impact on the decisions?
6. Let us focus on how research evidences contributed to fulfilling health needs and indicators, and health system performance?
7. Do you think that the research findings are used appropriately in decision make in the health field?
8. In your opinion, do health researches play a role in decision making in the MOH and NGOs in Palestine?
9. What are the relationships between institutions that produce research and the Ministry of Health?, and between researchers and decision makers?
10. Give an example of a recent MAJOR health policy implemented in the last 2-3 years at your institution based on research findings and recommendations?
  - a. Who was involved?
  - b. Who was consulted, what were the processes of deliberation
  - c. What was the decision (services offered, new initiatives, legislation etc.)
  - d. Were there any linkages to ongoing or prior research evidence? If yes, describe? If not, why do you think not?
11. Based on your understanding, what you suggest to increase the chances of research findings embedding and using into health decision making process?
12. Is there anything that you would like to add that I have not asked you about regarding the topic that we have been discussing?

Annex 2: Experts list

Academicians

Yahia Abed, Associate Professor of Public Health (Al-Quds University).

Mohammed Shubair, Associate Professor of Virology and Immunology (The Islamic University of Gaza, IUG), and Head of the Palestinian National Health Research Council.

Mahmoud Sirdah, Associate Professor of Biology (Al-Azar University, Gaza).

Non-governmental Organizations and International NGOs

Dr. Mohammed Almaqadma, Director of Health Program in UNRWA, Gaza.

Palestinian Ministry of Health PMOH

Dr. Naser Abu Sha'ban, Director of Human Resources and Development Directorate in PMOH, Gaza.

Dr. Medhat Mouhaisen, Director of Health Information Department in PMOH, Gaza.

Palestinian Legislative Council PLC

Dr. Khamis Alnajjar, Chairman of Social and Health Committee in PLC, Gaza.

# **HUMANITARIAN MILITARY INTERVENTION IN KOSOVO AND LIBYA: AN ASSESSMENT ON RELEVANT THEORIES OF INTERNATIONAL RELATIONS**

*Sujit Datta*

Assistant Professor, Department. of International Relations, Chittagong University

---

## **Abstract**

The paper aims to make an elaborate discussion on military and humanitarian interventions under relevant theories of international relations. An examination of NATO intervention in Kosovo and Libya reveals that, states responses to humanitarian crises have not dramatically changed before and after R2P was adopted. Although the adoption of R2P represents significant progress of the liberal school, the realist critique of R2P should be seriously considered to avoid intervention based on national interests of great powers. Considering the fact that the intervention in Libya was undertaken to preserve national interests of some of NATO member states, the selectivity of intervention is likely to occur in the future, meaning that states would not intervene in humanitarian crises if their national interests are not at stake.

---

**Keywords:** Humanitarian military Intervention, UN, realism, liberalism, just war.

## **Introduction**

Humanitarian military intervention is now a compelling foreign policy issue. Military intervention in the name of humanitarian assistance or simply humanitarian intervention has emerged as a highly complex and most intense debated topic of international politics today. Like civil wars, conflict resolution, conflict prevention and failed states, it is forming keynotes of security since the demise of cold war; as did the arms race, deterrence, and disarmament until the collapse of the Soviet Union in 1990s. The names Rwanda, Somalia, Bosnia, Kosovo and Chechnya stood at the end of the last century as pointers to future conundrums, tragedies, opportunities and anxieties for the twenty-first century. By far, the topic is both appealing as it abrest humanitarianism and appalling as it relies on force turning it catchy and complex. Naturally, it is difficult and practically one of the most controversial issues debate among scholars. The aim of this paper is to provide a fine-gained analysis, based on the relevant theories of international relations, of the debate on military intervention in the name of humanitarian assistance.

## **Methodology**

The Methodology for this research is descriptive analysis, including the data and relevant information, facts and articles, which are used to support the analytical method to understand and recommend the trend of humanitarian military intervention. The information in this research is mostly from secondary sources: updated articles, news concerning the issue form books, newspapers, magazines and websites including relevant research papers and studies addressing on this issue will also be studied.

## **A common framerwork/ background perspective**

Glosses or terminologies like sovereignty, intervention and assistance, humanitarian etc are crucial for merely understanding and certainly for getting deeper insights. As such,

before the main debate, elaboration of these terms and other associated issues is necessary to set stages and to create the context.

*Humanitarian* refers to humane and altruistic motives for action to support and salvage others in distress with no intention of own gain.

*Intervention* may be defined as an intentional act of one state or group of states or an international agency aimed at exercising overriding authority on what are normally the internal affairs, policies or practices of another state or group of states.

*Military/ Humanitarian Intervention* means the threat or use of force by a state or group of states with or without the authorization of United Nations in the territory of another state without its consent aimed at preventing or ending widespread and grave violation of human rights.

*Humanitarian assistance* implies external aid to respond to as well as prevent, mitigate and prepare for, humanitarian emergencies. Such action could be undertaken by the United Nations, other International Organizations (IO), Governmental Organization (GO) and Non-governmental Organizations (NGOs) to assist people in meeting their basic needs like food, water, shelter, etc. It requires the spontaneous laws, conventions, customs and the decisions of the United Nations.

*Sovereignty* is the exclusive rights to have complete control over an area of governance people, or oneself without an iota of external interference. A sovereign is the supreme lawmaking authority, subject to no other limits.

### **History of evolution of the concept**

Philosopher, Jurist and scholar Hugo Grotius mooted the concept of right to use force on humanitarian ground in seventeenth century. Thereafter number of interventions took place till date. The Western States and Russia carries out interventions against the Turk: in Greece in 1827, in Syria in 1860; in Bosnia, Herzegovina and Bulgaria in 1877 and in Bulgaria, Greece and Serbia in 1913. Humanitarian justifications were also used for the 1978 Vietnamese intervention against the Khmer Rouge in Cambodia, the 1979 Tanzanian intervention against Idi Amin in Uganda, and the 1979 French intervention against the Bokassa regime in Central African Republic. During the Cold War periods the Western states mostly used diplomatic and economic instruments to deal with such crisis, But in the 1990s after the collapse of former Soviet Union, although there was no change in the legal framework, the propensity of intervention increased perhaps due to new world order. The world witnessed interventions in Northern Iraq, Somalia, Rwanda, Haiti, and East Timor.

### **Current realities & perspective**

The modern international system was founded after the peace of Westphalia in 1648 on the premise that sovereignty is absolute and that sovereign states are immune from external intervention. Supremacy of sovereignty in international relations was also recognized by the United Nations through its Charter Article 2, paragraph 4 and 7. These prohibit actions of any states. But due to flawed political system, fragile economy state, acute ethnicity etc. many countries, as for example Kosovo and Libya, face political turmoil, internal conflicts and massive human rights violation. Resultant humanitarian disasters trigger intervention to improve the situation. Hence, though once considered an aberration, today, humanitarian intervention has surfaced as a possible foreign policy option. But the opponent of the concept argue that the idea tantamount to legitimization of military intervention by strong states against weak one.

### **Humanitarian military intervention: an assessment on the political and military causes**

Basically three prominent reasons may lead to intervention. Firstly, to respond to situations of compelling human need with appropriate measures like sanctions, international

prosecution and finally military intervention. Internal conflicts, man-made or even natural calamities, failing state syndromes etc could create the circumstance by putting people at risk. Usually such intervention takes place in a hostile environment, where the political order is contested and the national government lacks the capacity or the will or both to respond to the basic needs of people for safety and sustenance. In some cases the government itself may be respondent for creating the humanitarian crisis in its efforts defeat rebels or impose demographic changes through killing and forced displacement.

Secondly, powerful states may venture such interventions multilaterally or even unilaterally to advance their national interest using it as a mere pretense. The U.S. the Iraq invasion in 2003 is a burning example as the United States tried to justify its actions on humanitarian grounds after its initial justification based on the weapons of mass Destruction (WMD) proves false. The appeal of intervention-albeit waging war to save lives is obvious. In practice, however, interventions begun for allegedly humanitarian reasons seldom have humanitarian outcomes. Indeed, such interventions, as illustrated by the bloody debacle in Iraq, Afghanistan, Somalia ultimately can generate as much or even more evil.

Finally, the military reason for intervention is to provide security and support for saving lives of helpless people including full assistance for recovery, reconstruction, reconciliation to dispel the root cause of human plights.

### **Humanitarian military intervention: critical assessment based on theories of international relations**

From the realist perspective of international relations, states responsibility to protect civilian is nothing but the legitimating of military intervention by strong states against weak ones. A very rational example of this is the U.S. Invasion of Iraq in 2003, when the United States tried to justify such invasion in humanitarian terms after its initial justification-that Saddam Hussein possessed weapons of WMD-was proved false. However, the Human Rights Organizations forced the US administrations of President George W. Bush to back away from the claim when they exposed its absurdity, with reference to the conditions for legitimate humanitarian intervention laid out in the “responsibility to protect”.<sup>113</sup>

Human security as a justification for military intervention under certain circumstances has gained widespread acceptance. The United Nations Secretary General’s High-level Panel on Threats, Challenges and Changes endorsed ‘the emerging norm that there is an international responsibility to protect (civilian)....in the event of genocide and other large scale killing, ethnic cleansing or serious violations of international humanitarian laws which sovereign government have proved powerless or un willing to prevent’.<sup>114</sup> Annan carried forward this endorsement in his report to the UN General Assembly, ‘In larger freedom’<sup>115</sup>. Surprisingly, the General Assembly, at the September 2005 World Summit, endorsed the concept of the sovereign responsibility to protect civilians, including by using force as a last resort against states that do not live up to that responsibility.<sup>116</sup> Despite this endorsement few questions remained unclear and these include- under what conditions should outsiders intervene militarily? Should the intervention force be a UN force, as in Haiti, or a coalition of like-minded states, as in Kosovo and Libya? Should the interveners be combat troops or peacekeeper? How much force is appropriate and at whom should it be directed?

<sup>113</sup> See e.g. ‘War in Iraq: not a humanitarian intervention’ 2004. *Human Rights Watch World Report, 2004: Human Rights and Armed Conflict*, Human Rights Watch: New York, 2, pp. 13–35.

<sup>114</sup> United Nations, 2005. ‘A more secure world: our shared responsibility’, Report of the High-level Panel on Threats, Challenges and Change, UN documents A/59/565, 4 Dec. 2004, and A/59/565/Corr., URL, <http://www.un.org/secureworld>

<sup>115</sup> United Nations, 2005. ‘In larger freedom: towards development, security and human rights for all’, Report of the Secretary-General, UN document A/59/2005

<sup>116</sup> UN General Assembly Resolution 59/314, 2005. The text of this and other General Assembly resolutions referred to in this volume is available at URL, <http://www.un.org/documents/resga.htm>.

Humanitarian aid workers define their role as non-political and impartial, seeking to minimize violence and treat all sides equally. Militaries, on the other hand, take sides and look for enemies. When should intervention happen? Preventive military action is difficult to justify on humanitarian grounds, given the potential destructiveness of a military operation, yet delayed action almost invariably means large-scale loss of life in crises. When soldiers and aid workers interact, how can humanitarian organizations avoid being seen as parties to the conflict? The controversy over provincial reconstruction teams (PRTs) in Afghanistan in recent years highlights the scope for extreme disagreement between military and humanitarian perspectives on appropriate military activities in complex emergencies. Adam Robert observed in the late 1990s that in ‘the history of legal debate about humanitarian intervention, there has been a consistent failure to address directly the question of the methods used in such interventions.’<sup>117</sup>

The debate about military intervention in the name of humanitarian assistance can best be illustrated through the application of the relevant theories of international relations. Although so-called humanitarian interventions have been undertaken in the post cold war era, most of the interventions, in fact, were not purely humanitarian-oriented, but they were driven by states national interests. Before going to make an elaborate discussion about which theory or theories can best assess the implication of the debate on humanitarian assistance and military interventions, it will be rational to illustrate some theories of international relations (i.e. realism, and liberalism.).

International relations are nothing but the struggle for power and survival. According to a prominent scholar of neoclassical realism, Hans J. Morgenthau, all human beings inherently seek to increase their power.<sup>118</sup> Morgenthau argues, “Politics is a struggle for power over men...the modes of acquiring, maintaining, and demonstrating it determine the technique of political action’<sup>119</sup>. In international politics, states are always concerned about national interests such as security and wealth. To preserve their interests, intervention could be an option. Morgenthau argues:

*“Intervene we must where our national interest requires it and where our power gives us a chance to succeed. The choice of these occasions will be determined...by a careful calculation of the interests involved and the power available.”*<sup>120</sup>

Morgenthau defines success as “the degree to which one is able to maintain, to increase, or to demonstrate one’s power over other.”<sup>121</sup>

Unlike neoclassical realism emphasizing human nature, neorealist focuses on an anarchic international system, in which there is no central authority that governs international politics. Kenneth Waltz, a leading scholar of neo-realism, argues that in a self-help international system, the state’s foreign policy is determined based on its national interests.<sup>122</sup> States continuously make efforts to preserve their interests and to ensure their survival because in the self-help system, “no one can be relied on to do it for them.”<sup>123</sup> Tucker argues that states’ interests expand as they gain more power in international politics.<sup>124</sup> Similar to Morgenthau, Waltz argues that success means preservation and

<sup>117</sup> Roberts, A. 1999, ‘NATO’s humanitarian war over Kosovo’, *Survival*, vol. 41, no. 3, p. 110.

<sup>118</sup> Robert Jackson and Georg Sørensen, 2010. *Introduction to International Relations: Theories & Approaches*, 4th ed., New York: Oxford University Press, p.66

<sup>119</sup> *ibid*

<sup>120</sup> Hans Morgenthau, 1967. “To Intervene or Not to Intervene,” *Foreign Affairs*, p.103.

<sup>121</sup> Bettina Dhai. Soendergaard, 2008. “The political Realism of Augustine and Morgenthau: Issues of Man, God, and Just war”, *Turkish Journal of International Relations*, p.6.

<sup>122</sup> Jonelle Lonergan, 2011. “Neo-Realism and Humanitarian Action: From Cold War to Our Days,” *Journal of Humanitarian Assistance*

<sup>123</sup> Kenneth N. Waltz, 1979. *Theory of International Politics* (Illinois: Waveland Press, Inc, p.109.

<sup>124</sup> S. Telbami, 2012. “Kenneth Waltz, Neorealism, and Foreign Policy,” *Foreign Policy, Security Studies* 11.3, p.161.

reinforcement of the state's power.<sup>125</sup> To summarize, classical neo-realism focuses on power-seeking human nature, whereas neo-realism focuses on an anarchic international system. Despite their different focuses, both strands shed light on states' national interests and their desire to increase power.

In contrast to realists' focus on state as a major actor, liberalism emphasizes protection of human rights. Classical liberals argue that human beings possess "fundamental natural rights to liberty consisting in the right to do whatever they think fit to preserve themselves, provided they do not violate the equal liberty of others unless their own preservation is threatened."<sup>126</sup> People also have the right "to be treated and a duty to treat others as ethical subjects and not as objects or means only."<sup>127</sup>

Another core assumption of liberalism is that states can cooperate for a mutual gain.<sup>128</sup> While liberals acknowledge that each individual or state seeks personal gain, they believe that individuals share some interests, which can make both domestic and international cooperation possible.<sup>129</sup> To support this argument, liberals cite emergence of international organizations, such as the United Nations, as an example of prevalence of interstate cooperation.<sup>130</sup>

One of the strands of liberalism discussing the validity of humanitarian intervention is contemporary liberal internationalism. Michael Walzer, a leading scholar of this strand, argues that military intervention can be justified as a last resort and as a means to protect civilians from human rights violations, such as genocide and crimes against humanity.<sup>131</sup> However, such intervention should not be undertaken unilaterally, but rather multilaterally with the authorization of the UN Security Council because liberal internationalists believe that multilateralism prevents great powers from pursuing national interests rather than humanitarian objectives in intervention.

NATO Intervention in Kosovo 1999: A Theoretical Understanding Whether it is Military of Humanitarian

However NATO intervention in Kosovo seems to be humanitarian from the liberal lens, such intervention can also be explained through the realist perspective which emphasis on national interests. This is because through study it was found that, national interest was more evident at stake than humanitarian interest for NATO. The coalition forces of NATO intervene in Kosovo because the western powers were concerned for they thought that the conflict could spread and produce refugee flow, which would undermine regional stability.<sup>132</sup> So it can be said that European security was prioritized most during NATO intervention in Kosovo. Just like that, the United States also had a vital interest. Basically the United States, in the name of humanitarian intervention in Kosovo sought to pursue its strategic interest throughout Europe. Former president Clinton stated that, one of the purposes of the intervention was to ensure the credibility of NATO in Europe.<sup>133</sup>

The realist view of international relations as the struggle for power and survival can best be proved by the NATO intervention in Kosovo. By intervening in the conflict occurring in Eastern Europe, the USA attempted to prevent Russia from becoming influential in the

<sup>125</sup> Waltz, 1979. , p.117.

<sup>126</sup> John Charvet and Elisa Kaczynska-Nay, 2008. *The Liberal Project and Human Rights: Theory and Practice of a New World Order* , London: Cambridge University Press, p.3.

<sup>127</sup> Michael Doyle and Stefano Recchia, 2011. "Liberalism in International Relations," International Encyclopedia of Political Science , p.1434.

<sup>128</sup> Stephen M. Walt, 1998. "International Relations: One World, Many Theories," Foreign Policy 110, p.32.

<sup>129</sup> Jackson and Sørensen, p.66.

<sup>130</sup> Walt, p.32.

<sup>131</sup> Doyle and Recchia, p.38

<sup>132</sup> Grant Stegner, 2008. "American Humanitarian Intervention: How National Interests, Domestic and International Factors, and 'Historical Milieu' Shape U.S. Intervention Policy," *Macalester College* , p.88

<sup>133</sup> *ibid*, p. 99

region. However, the Soviet Union was collapsed, but the United States still consider Russia and communism as a potential threat to US security in Eastern Europe.

### **NATO Intervention in Libya was a Military Intervention Rather Than Humanitarian: A Theoretical Understanding**

The allied forces of NATO intervention in Libya in 2011 to ensure their national interest rather than on humanitarian ground. Restoration of access to Libya's oil reserve was vital for European states. Libya has exported roughly 85 percent of oil to several European states, such as Italy, France, and the UK.<sup>134</sup> Libyan oil accounted for more than 28 percent of Italian oil imports, 17 percent of French oil imports, and 8 percent of UK's oil imports. During the civil war, oil production significantly dropped, amounting to less than 20 percent of Libya's domestic needs.<sup>135</sup> This decline likely caused great damage to the economies of those oil importing European states. Therefore, ending the civil war to restore Libya's oil production was the primary purpose of their intervention. Consequently, those European states played leading roles in the intervention by providing air forces, training the Libyan rebels, and providing them weapons.<sup>136</sup>

Second, Western states feared that Libya could return to a terrorist-sponsored state if Qadhafi won the civil war.<sup>137</sup> Since Qadhafi established terrorist training camps in Libya in the early 1970s, the Libyan government provided a large amount of weapons, money, and safe heaven to various terrorist groups.<sup>138</sup> The US then added Libya to the list of states sponsoring terrorism and implemented trade restrictions against Libya.<sup>139</sup> In 1999, Qadhafi started cutting his ties with terrorist groups, and his efforts eventually made the US decide to remove Libya from the list in 2006. Hence, it can be assumed that Qadhafi did not sponsor any terrorist groups at the time of the civil war. Yet, Western states were afraid of Qadhafi's potential return to a sponsor of terrorism, which would greatly threaten the security of Europe because of Libya's proximity.

Third, Western states feared Libya's possession and potential use of chemical weapons against them. In the mid-1970s, Qadhafi pursued nuclear weapons. Libya's use of chemical weapons against Chad was also severely criticized in the late 1980s.<sup>140</sup> In 2003, the Libyan government announced that it would abandon its weapons of mass destruction (WMD) including nuclear, chemical, and biological weapons.<sup>141</sup> However, Libya still failed to completely give up their chemical weapons. Because Qadhafi was not generally considered a rational actor, his possession of weapons was a threat to Western states. Thus, the interests of NATO member states including economic and security concerns were greater driving forces behind the intervention than humanitarian concerns. Similar to Kosovo's case, realism seems to better explain states' motivations in Libya.

### **Key findings**

Humanitarian intervention or assistance is inherently political in nature. The Western states are highly motivated by political realism as what Morgenthau states in his book namely

<sup>134</sup> Harry Kazianis, 2011. "Intervention in Libya: Example of R2P or Classic Realism," *e-International Relations*

<sup>135</sup> David Anderson, 2011. "The Fight for Libya's Oil," *Politics in Spires*, <http://politicsinspires.org/2011/09/the-fight-for-libyas-oil/>

<sup>136</sup> "Italy, France Sending Troops to Advise Libyan Rebels, 2011." *CNN World*, [http://articles.cnn.com/2011-04-20/world/libya.war\\_1\\_french-troops-rebel-stronghold-military-officers?s=PM:WORLD](http://articles.cnn.com/2011-04-20/world/libya.war_1_french-troops-rebel-stronghold-military-officers?s=PM:WORLD)

<sup>137</sup> Kazianis, 2011

<sup>138</sup> Christopher Boucek, 2005. "Libyan State-Sponsored Terrorism: An Historical Perspective," *Terrorism Monitor Volume 3.6*

<sup>139</sup> Eben Kaplan, 2007. "How Libya Got off the List," *Council on Foreign Relations*, <http://www.cfr.org/libya/libya-got-off-list/p10855>

<sup>140</sup> Ibid

<sup>141</sup> Kazianis, 2011

“Politics among Nations: The struggle for Power and Peace”. However allied forces of the Western states intervene in to a particular state in the name of humanitarian assistance but they influences strongly by their own national interests rather than on a moral ground to intervene.

### **Conclusion and policy options**

By far, legal and moral legitimacy carry significant political weight in the conduct of world affairs. Legitimacy through codified principles of international law can serve to distinguish between aggression and humanitarian intervention and provide standards for nation’s behavior. The right of intervention must be limited to the most flagrant violation of human rights, such as genocide and mass ethnic expulsions. The mode and means of intervention should be likewise restricted as to avoid even a semblance to aggression. Both the right to resort to force and the application of force are crucial, not only to classical just war doctrine, but to winning the “heart and minds” campaign in the community of nations. Law is the policy tool of choice for standard and a valid prism to distinguish humanitarian intervention from aggression. The mischievous blurring of nuances of aggression and humanitarian intervention must be arrested by all means to prevent their use interchangeably for selfish contemptible purposes.

It is imperatives that policymakers and the implementers of intervention-aide workers, soldiers, and civil servants-learn from the past. Humanitarian intervention is a dangerous and expensive enterprise. The mixed record of the past 15 years leaves enormous room for improvement, and there is no easy answer. The balance between political and humanitarian considerations is delicate; the relationship between military and civilian component is both fragile but crucially important, If not done well, humanitarian intervention could waste lives and resources and might perpetuate or exacerbated the problems it is launched to address. Indeed, it could provoke aggression and feared wars unless justly and judiciously waged and concluded in pursuit of altruistic and pure humanitarian overtures only.

### **References:**

- “Italy, France Sending Troops to Advise Libyan Rebels, 2011. *CNN World*, [http://articles.cnn.com/2011-04-20/world/libya.war\\_1\\_french-troops-rebel-stronghold-military-officers?\\_s=PM:WORLD](http://articles.cnn.com/2011-04-20/world/libya.war_1_french-troops-rebel-stronghold-military-officers?_s=PM:WORLD).
- Charvet, John, and Elisa Kaczynska-Nay, 2008. *The Liberal Project and Human Rights: Theory and Practice of a New World Order*, London: Cambridge University Press.
- Chesterman, Simon, 2011. “Leading from Behind: The Responsibility to Protect, the Obama Doctrine, and Humanitarian Intervention after Libya.” *Ethics & International Affairs*, p. 279-285.
- Claes, Jonas, 2011. “Libya and the Responsibility to Protect.” *United States Institute of Peace*.
- Collins, Cindy, and Thomas G. Weiss, 2010. *Humanitarian Challenges and Intervention*, Colorado: Westview Press.
- Doyle, Michael, and Stefano Recchia, 2011. “Liberalism in International Relations.” *International Encyclopedia of Political Science*, p. 1434-1438.
- Dunoff, Jeffery L, Steven R. Ratner, and David Wippman, 2006. *International Law Norms, Actors, Process*. 2nd ed., New York: Aspen Publisher.
- Evans, Gareth and Mohamed Sahnoun, 2002. “The Responsibility to Protect.” *Foreign Affairs*, p. 99-110.
- Evans, Gareth, 2002. *The Responsibility to Protect: Ending Mass Atrocity Crimes Once and For All*, Washington D.C.: The Brookings Institution.
- Evans, Gareth, (2006). “From Humanitarian Intervention to the Responsibility to Protect.” *Wisconsin International Law Journal*, p. 703-722.

- Holzgrefe, J L., 2003. The Humanitarian Intervention Debate. *Humanitarian Intervention Ethical, Legal, and Political Dilemmas*, edited by Holzgrefe, J L. and Robert O. Keohane, Cambridge: Cambridge University Press.
- International Commission on Intervention and State Sovereignty, 2001. "The Responsibility to Protect: Report of the International Commission on Intervention and State Sovereignty" , Ottawa: The International Development Research Centre.
- Jackson, Robert and Georg Sørensen, 2010. *Introduction to International Relations: Theories & Approaches*. 4th ed. New York: Oxford University Press.
- Kaplan, Eben, 2007. "How Libya Got off the List." *Council on Foreign Relations*, <http://www.cfr.org/libya/libya-got-off-list/p10855>.
- Morgenthau, Hans., 1967. "To Intervene or Not to Intervene." *Foreign Affairs*, p. 92-103.
- Moses, Jeremy, 2012. "Sovereignty as Irresponsibility? A Realist Critique of the Responsibility to Protect." *Review of International Studies*, p.1-23.
- O'Connell, Mary Ellen, 2011. "How to Lose a Revolution." *e-International Relations*.
- Pattison, James, 2011. "The Ethics of Humanitarian Intervention in Libya." *Ethics & International Affairs*, p.271-277.
- Ramsbotham, O. and Woodhouse, T., 1996. *Humanitarian Intervention in Contemporary Conflict* , Polity Press: Cambridge, pp. 8–66.
- Rieff, David, 2012. "R2P, R.I.P." *The New York Times*, <http://www.nytimes.com/2011/11/08/opinion/r2p-rip.html?pagewanted=all>.
- Soendergaard, Bettina Dahl, 2008. "The Political Realism of Augustine and Morgenthau: Issues of Man, God, and Just War." *Turkish Journal of International Relations*, p.1-17.
- Stegner, Grant, 2008. "American Humanitarian Intervention: How National Interests, Domestic and International Factors, and 'Historical Milieu' Shape U.S. Intervention Policy." *Macalester College*, p. 82-113.
- Telbami, S. "Kenneth Waltz, 2012. Neo-realism, and Foreign Policy." *Foreign Policy, Security Studies*, p.158-170.
- Thakur, Ramesh, 2011. *The Responsibility to Protect: Norms, Laws and the Use of Force in International Politics*.
- Thakur, Ramesh. 2011. "R2P, Libya and International Politics as the Struggle for Competing Normative Architectures." *e-International Relations*.

# THEORIZING THE EU CONDITIONALITY POLICY AND ITS APPLICATION IN WEST AFRICAN COUNTRIES. THE CASE OF CAPE VERDE<sup>142</sup>

*Jairzinho Lopes Pereira, PhD*

University of Leuven, Belgium

---

## Abstract

The EU is a major international donor and a *de facto* normative power. As such, it uses leverages (including aid support) and its transnational networks to promote long-term structural changes in third countries. These leverages often take the form of conditionality policy. The Cape Verde-EU relations have been intensifying in the last decade resulting in the signing of a Special Partnership between them. Cape Verde keeps counting on the EU's financial support to face basic challenges such as the struggle against poverty and the consolidation of its young democracy. This paper provides an historical overview of the EU-Cape Verde relations and discusses the role of conditionality policy in the shaping of these relations in the last decade. It argues that, although one may contend that the EU agenda for Cape Verde does not escape the logic of EU's typical development agenda for West Africa, the official rhetoric is that the most adequate pattern for the EU-Cape Verde relations is that of political dialogue and policy convergence rather than that of conditionality policy. This is so, the EU explains, because they share common challenges and face common threats. Besides the country has achieved a considerable level of social and political stability and has a remarkable record when comes to the use of European funds. The contribution of Cape Verde in the security dossier is emphasized and pointed as one of the possible reasons for the absence of *explicit* conditionality practices in the framework of the Special Partnership.

---

**Keywords:** EU-Cape Verde relations; conditionality policy; Special Partnership; collective security.

## EU-Cape Verde relations: an historical overview

The origins of the relations between what is today the EU and the so-called developing countries are intimately linked to the European colonialism (Broberg, 2012: 1-7). "It was the weight of colonial inheritance that forced the European nations engaged in the late 1950s in the creation of the European Community (EC), to deal in a common fashion with the diverse 'countries and territories' still under their national jurisdiction" (Grilli, 1994: 1). Following the independence of the African colonies in the 1960's and 1970s the relations between the EC and the newly independent African states called for a new approach. The first attempts to regulate those relations were materialized in the Yaoundé Conventions of 1963 and 1969 between the EC and the Associated African and Malagasy States (AAMS), and later, on February 1975, through the signature of the famous Lomé Convention, (renewed three times, Lomé IV being signed in 1989 and revised in 1995 between the EC and ACP group of states (Grilli, 1994: 1-49 and Brown, 2002). The Lomé approach was essentially the EC trying to "buy" political and institutional reforms through aid and cooperation programmes relying on political and economic conditionality. It failed. The failures of Lomé led to the signing of the

---

<sup>142</sup>. I wish to express my heartfelt gratitude to my dear friends and colleagues Suzano Costa and Victor Barros for all the discussions and insights on EU-Cape Verde relations which contributed substantially for the discussion developed in this paper. My gratitude goes also to Fundação Calouste Gulbenkian which provided me with the financial support to develop my research and write this paper.

Cotonou Agreements (first signed on 23 June 2000, revised in 2005 and 2010). The Cotonou rhetoric places emphasis on the concept of “ownership” and argues that the donor-beneficiary framework is no longer the basis for EU-Africa relations but rather that of promotion of common interests.

With regard to the case of Cape Verde, its relationship with the EC/EU institutions dates back to the year of 1975, only few months after the country ascended to independence on 5 July 1975. In October that year, the Cape Verdean authorities took the initiative and advanced with a proposal for the accession of the newly independent country to the Lomé Convention (see Ministério dos Negócios Estrangeiros, 1975). On 28 March 1977 the Republic of Cape Verde acceded to the Convention. In 1980, Cape Verde, as ACP member, was one of the signatories of the renegotiated version of the Convention, commonly known as the Second Lomé Convention.

To explain such urgency on the part of Cape Verdean authorities in seeking approximation to the EC is rather very simple. A newly independent state, struggling with its concerning lack of resources, Cape Verde saw in the approximation to some major international donors an important asset not only for its progress and preservation of its independence and sovereignty but also for its very survival. “The new leaders of Cape Verde faced the dual challenges of ‘viability’ and ‘vulnerability’, common to island countries. Structurally unable to achieve self-sufficiency in food production and with only limited export potential, *Cape Verde needed donor support to survive* [my emphasis]” (Meyns 2002: 157). At least in the first years following the country’s independence, the State’s budget depended essentially on foreign aid (Enders, 2013: 133). The approximation to the European supranational institutions, was (and, to some extent, it may still be) part of this survival strategy. There is no denial that the European financial support over the years has been a major contribution for the alleviation of poverty in the country as well as for the consolidation of democratic institutions itself.

Once acceded to the Lomé Convention, Cape Verde became just one member of ACP among many others whose relationship with the EU is regulated through the Lomé-Cotonou Conventions/Agreements. With the transition to multi-party democracy in the early 1990s and subsequent consolidation of civil and political rights, the country started to be held in high esteem by the international community. This fact, combined with the old claim of historical and cultural affinities with Europe, fostered what has been called the Cape Verde “European aspiration”. Thus, the first years of the 2000s brought about the talks of “special status” in or a “special partnership” with the EU. What makes it interesting is that of the seventy-nine ACP states, only Cape Verde has been given the status of “special partner of the EU<sup>143</sup>”. The immediate question here is why Cape Verde and no other ACP state? According to the MEP Maria da Graça Carvalho, there are several reasons for that. The first reason has to do with the fact that Cape Verde is geographically and culturally closer to Europe and it has been a platform or a bridge between Europe, Africa and America. The second reason has to do with the good governance which is an indicator very dear to the EU in cooperation programmes and international relations. The EU has Cape Verde in high regard because the country is an example of stability and good governance and makes good use of the European funds. Regardless the government in power there has been a continuity in development and democracy hardly possible to be verified in any other ACP state (Interview).

---

<sup>143</sup>. Another reason has to do with the fact that decisions taken lately by the Union authorities in the framework of the Special Partnership give some signs of consolidation of the bilateral cooperation that are worth pointing out. Among these decisions are the approval of the readmission agreement and the decision to allow visa free travelling for specific groups of Cape Verdean citizens in the EU. As it has been pointed out, this “is highly symptomatic since other countries claiming special relations with the EU, such as Ukraine and Moldova, have only obtained to date the agreements, which imply facilitation rather than lifting the visa requirements” (Vieira and Ferreira-Pereira, 2013: 568).

To understand the process that resulted in the establishment of the Special Partnership between the EU and the Republic of Cape Verde it is of utmost importance to look into the historical and political development of Cape Verdean state vis-à-vis that of the West African and sub-Saharan states. Unfortunately Africa remains at the epicentre of the literature on collapsed/failed/endangered/weak states (Zartman, 1995). There are doubts whether it is even possible for democracy to survive at all in the continent (Bratton and de Walle, 1997: 236). Cape Verde's historical and political development may be regarded as a fortunate example that Africans too are able to embrace democracy and live under the rule of law. Few African countries have experienced renewed change of government after successful founding elections, Benin and São Tomé e Príncipe are among them; few other have also recorded remarkable changes of government through elections in recent years (Ghana, Senegal and Mauritius) The obvious question here is: what does explain the Cape Verdean success where many other countries failed? Why was such a peaceful transition possible in Cape Verde and not in almost any other African country?

The answer for these questions requires to take into consideration several factors including the very process of colonization in Cape Verde. The archipelago was inhabited at the moment of its discovery. It was populated with African slaves and Europeans. There was no space for ethnic strifes, tension or violence (about 71% of the population is of mixed ethnic descent). Unlike in many other African countries, in the aftermath of its independence, Cape Verde faced no ethnic struggles (although ethnic diversity is not a problem per se, the way it is addressed and used in several African countries makes of it a major problem) simply because by the time of its independence it was a fairly homogeneous society, with a defined national identity, not a puzzle of ethnic groups (Lorentz, 2001 and Baker, 2006: 504-506).

Another reason for the Cape Verdean success is certainly the absence of armed conflicts which avoided the militarization of society, a common problem in Africa to this very day. Linked to this absence of militarization of society is what is perhaps the most important reason of all, namely the way political actors in Cape Verde, whether in power or in opposition have been dealing in conflicts. "Drawing on intellectual traditions of debate within their society and aware of the vulnerability of their country, they have developed a nonviolent political culture that has shaped the process of democratic transition" (Meyns, 2002: 164; for a detailed analysis of the transition process, see Almada, 2013 and Évora 2013).

The fact that Cape Verde decided to travel the road of social and political stability, definitely a less travelled road in African context, can hardly go unnoticed to the international community given that it has been producing concrete and remarkable results at various levels. Cape Verde is one of the very few African countries considered "free" by the Freedom House's Democracy Report (see Freedom House, 2012: 14; 2013: 14; 2014: 18). On 06 December 2007, after over seven years of negotiations, Cape Verde saw the gates of the World Trade Organization (WTO) opening to it. On 23 July 2008, only few months following the country's graduation from the list of Least Developed Countries (LDCs), it became WTO's 153<sup>rd</sup> member (for a more detailed information on Cape Verde's graduation from LDCs, see Fialho, 2013). Very recent reports indicate that Cape Verde is also one of the few African countries in a good position to reach the United Nations Millennium Development Goals (MDGs) set for 2015 (United Nations, 2013: 26). For all these reasons, in the last years leading countries such as United States of America and supranational Organizations such as the EU have been looking at Cape Verde as an example to be followed in Africa.

Let us return to the EU-Cape Verde relations. The Cape Verdean success is of utmost importance to understand the establishment of the Special Partnership with the EU. This has essentially to do with two main factors: the first is that the country's "European aspiration" has been fostered by and is anchored on its own success. The second has to do with fact that this same success has been the element of consensus among Portuguese politicians, diplomats and scholars whose support was decisive in the negotiation process leading to the Special

Partnership (Vieira and Ferreira-Pereira, 2013). In March 2005, the former Portuguese President of Republic, Mario Soares and the renowned Portuguese scholar Adriano Moreira (former Minister of Overseas) publicly supported the European vocation of Cape Verde by launching a petition urging the EU to start membership talks with the country<sup>144</sup>. Despite the fact that the initiative was supported by the Foreign Minister of Portugal, Diogo Freitas do Amaral, it was not followed up by Cape Verdean authorities who decided not to submit any official membership application. The initiative did not lead to the recognition of Cape Verde as an EU member, but to date the petition has not received any official denial either.

The push for membership, however, seems to have given space to a more realistic approach and it was in this context that the idea of membership or special “status” start to be replaced with the idea of a special “partnership”. There is no denial that the Special Partnership between the EU and Cape Verde was materialized much due to the efforts of Portugal that used its Chairmanship of the Council of Ministers in the second half of 2007 to “lobby” for Cape Verde at EU level. However, the Special Partnership only became possible on account of a wide convergence of interests and inter-institutional support. The Commission played a crucial role. Maria da Graça Carvalho, a Portuguese national who worked with President José Manuel Barroso in his first mandate and is currently MEP, argues that, although the Portuguese Presidency of the Council played an important role, the most decisive factor in the shaping of the Special Partnership had to do with the interest of the Commission in the person of its President, Barroso. It was President Barroso who, making use of his extensive knowledge of ACP countries, the bridge between Europe and Africa and African cooperation, pushed, designed, decided and proposed the Special Partnership to the College of Commissioners. Then the Commission used its right of initiative to formulate the proposal to the European Parliament (EP) and to the Council. To make the process as smooth as possible, Portuguese MEPs supported the Special Partnership and engaged in the promotion of Cape Verde in the European Parliament. It was all this that made it possible that the Special Partnership was signed on 19 November 2007 (Interview).

Conditionality policy in the EU-Cape Verde relations.

Conditionality policy: an analytical assessment.

The practice of conditionality policy is of key importance in international politics. By studying the practice of conditionality clear patterns and trends in international politics can be established. This certainly holds true for the EU conditionality policy, intimately linked to its development policy. What is important is to bear in mind that the EC/EU’s action in the international politics is a moving target which means that the EU conditionality policy is also a moving target, highly dependent on changes of environment. For instance, it was only by the end or in the aftermath of the Cold War, that the democratization process in Eastern Europe led the EC/EU to adopt a clearer and more precise language in the definition of requests laid down in international agreements in order to encourage third countries to establish democracies and protect human rights. In 1987, the Single European Act had gave to the EP the veto power in agreements with third countries and it was only by then that, for instance, the insistence on introduction of human rights clauses in EC’s international agreements start to gain wide support (Smith, 1998: 260; Bartels, 2008). Up to that moment the Community’s relations with the developing countries was known for its non-political character (Grilli, 1993: 101-102).

This “neutrality” changed in the aftermath of the dismemberment of the Soviet World. The 1990s seems to have brought great ambitions to the Community. The original ambitions

---

<sup>144</sup>. Confronted with the fact that the Treaties are very clear that European Union membership is reserved to European countries only, the petitioners argue that this issue ultimately comes down to the matter of “cultural identity” (and claim that only following this line of reasoning can one understand why the EU accepted to enter into accession negotiations with Turkey) and that in this aspect “Cape Verde is Europe as well” (Adriano Moreira in *Afrol News/A Semana*, 2005).

of the Maastricht Treaty were very optimistic when comes to Europe's international role. It envisaged that the CFSP would lead the EU to a status of a significant international actor, and, as such, Europe would be in a good position to shape the international affairs. The Treaty established for Europe the role and responsibility to promote global democracy and development. Hence in the revised Lomé as well as the agreement with the Latin America and Asia in 1990's the EU saw the application of conditionality as *sine qua non* condition and, by 1995, unequivocal suspension clauses were being foreseen in these agreements, particularly in case of serious violations of human rights and democratic principles (Smith, 1998: 264). By the 1990's the EU was profoundly convinced that sustainable development can only result where there are secure and effective institutions to promote democracy and civil society. Experience had shown that, economic conditionality was, by itself, inadequate. Concepts/practices such as good governance had become a developmental prerequisite, not an optional extra (Holland, 2002: 121).

Let us now look into the concept of conditionality. Painted in broad strokes conditionality is a concept easy to define. It has essentially to do with a body of principles and conditions that regulate the relations between a normative power and third parties, namely with a set of conditions defined by the former in order to enter negotiations and build up a relationship with the latter. Applied to the EU's action in the international scene, conditionality has to do with "the practice of making the conclusion and implementation of agreements, cooperation and assistance by the EU dependent on certain conditions being met by third countries" (Keukeleire and Delreux, 2014: 205). The impact of conditionality policy is often profound and some scholars go to the point of speaking of "governance by conditionality". In the context of EU-Africa relations it does make some sense given that the EU is in a position to use leverages and influence "good" governance policies in ACP states making use of its transnational networks. Consider, for example, the CFSP. It has been an instrument through which the EU "transfer rules of conduct that presupposes political, social, and economic, which in long-term determine the nature and shape the EU interests in third countries. These rules entail good governance, which is sound economic policies, competent public administration, and open accountable government together with policies aimed at combating corruption that characterise the interstate system of the EU" (Mugenyzi, 2012: 69).

Needless is to say that conditionality policy is often the channel through which policy transfer is materialized. Policy transfer is no more than the "transportation of policies and/or practices *already in operation* in one jurisdiction/country to another" (Page, 2000: 2). The Union is continuously engaged in selling its policies as "best practices" to the outside world. Conditionality policy, thus, should not be dissociated from the concept of external governance that has to do with the application or introduction of EU norms, rules and principles beyond its borders (Lavenex, 2004 and Lavenex and Schimmelfennig, 2009). This point is of crucial importance to grasp not only how the EU impacts political and institutional changes in the candidate countries but also in non-candidate countries (especially those in weaker position) aiming at some sort of relationship with the Union. Thus, it comes as no surprise that the EU often aims to be the catalyst for changes in third countries even when accession to the Union is clearly excluded. A good example of this is the EU Neighbourhood policy towards its Eastern and Southern neighbours.

Although often vehemently criticized and accused of inefficiency (particularly in the context of developing countries where conditionality is often portrayed as an attempt to "buy" reforms through aid), it is hardly possible to deny that the EC/EU's conditionality policies (inextricably related to the *acquis communautaire* in the accession processes) has proved to have major impact in European politics of the last decades. Suffices to look into the radical political and social transformations (for which the EU has been largely responsible) in the Central and Eastern European Countries (CEEC's) (Grabbe, 1998 and 2002) and in the (Western) Balkan region. What is relevant for the present study is the fact that the rationale of

conditionality (and, to some extent, that of *acquis communautaire*) is applied by the Union, with more or less consistency, in its relations with third parties even when the accession to the Union is not being discussed. In other words, the conditionality policy of the EU is not confined to the relations with countries aspiring to the Union. Conditions such as good governance and market economy, human rights are also often at the core of EU relations with non-candidate countries, especially when it comes to trade, aid, assistance, and cooperation programmes.

In order to make the practice of conditionality clearer is of utmost importance to stress that conditionality assumes different contours. One may establish a dichotomy between political and economic conditionality; it can also be internal or external. Conditionality can be prescriptively explicit (when the mechanisms, forms and outcomes of a policy is described in detail) or general in its description (when only outcomes and goals are described and the methods and policies to achieve them are left to the good judgment of the third parties). Conditionality can be *ex ante* (typical to IMF that requires that prior action be taken before the loan is given) or *ex post*; it can take legal or informal forms or be peculiarly “European” or new in nature or derived from existing global standards and definitions (Holland 2002: 119-120).

It is also important to notice that the nature and rationale of the conditionality policy tend to vary from entity to entity and assume different contours in different circumstances. For example, the EU conditionality policy applied in the accession negotiation with the CEECs is considered to be too vague given that the Copenhagen Criteria do not define what constitutes a market economy or a stable democracy. Other international actors, namely international financial institutions and development banks tend to adopt a more straightforward and blunt approach when defining conditions that the third parties have to meet if they are to receive assistance. With international financial institutions such as the IMF or the World Bank, conditionality “links perceived benefits to the fulfilment of certain conditions [...] conditionality is primarily linked to the implementation of specific economic policies, such as those aimed at structural adjustment, and the main benefit is finance” (Grabbe 2002: 252). As Mosley *et al.* (1991: 65) put it, the World Bank conditionality “is simply a side condition designed to ensure the execution of a contract”. It is about “a promise by one party to do something now in exchange for a promise by the other party to do something else in the future”. This linkage between fulfilling particular tasks and receiving particular benefits tends to be much less clear in EU conditionality policy than in the international financial institutions and one reason for this is that in the EU conditionality policy (for instance as applied to the accession negotiation with the CEECs) “the tasks are complex, and many of them are not amenable to quantitative targets that show explicitly when they have been fulfilled” (Grabbe, 2002: 252).

The nature of conditionality policy varies. The focus at this stage of the discussion is to make an inquiry on the specific case of European-Cape Verde relations in the context of the Special Partnership. Are there conditions involved? If so, which sort of conditions? Economic? Political? Direct? Indirect? My findings indicate that in the establishment of the Special Partnership between Cape Verde and the EU no conditions were *explicitly* imposed on the African country. This is in line with the behaviour of other international donors, such as the IMF, which has been dealing with Cape Verde in adjustment programmes without imposing any *explicit* political conditionality. “In Cape, governance does not seem to be an issue at all: donors are satisfied with the relative efficiency of the government” (Dijkstra 2002: 329).

With regard to the EU the MEP Maria da Graça Carvalho argues that it would not make any sense to impose conditions on Cape Verde because not even the possibility of a Special Partnership would be open for discussion if Cape Verde had not already met the necessary conditions. Besides, according to the *Communication from the Commission to the*

*Council and the European Parliament on the future of relations between the European Union and the Republic of Cape Verde*” (hereinafter the 2007 *Communication*) of 24 October 2007, the aim of the Special Partnership is “to strengthen dialogue and policy convergence between the two parties, so enhancing the traditional donor-beneficiary relationship with a framework of mutual interests” (Commission of the European Communities, 2007: 2). The official rhetoric is, thus, that due to political and social stability in the country, the conditionality rationale is not appropriate but rather that of total ownership and political dialogue.

The 2007 *Communication* limited itself to set the rules for the implementation of the action plan. This is to be “monitored by means of meetings at political level, to be organised at an interval to be determined, and annual technical-level meetings in Cape Verde or in the European Union. [...] At local level the inter-ministerial group set up by the Government of Cape Verde, chaired by the foreign minister, will hold regular special partnership monitoring meetings with the EC Delegation and Member State diplomatic missions” (Commission of the European Communities, 2007: 7). This, however, does not mean the EU is entirely satisfied with the state of things in the country. For instance, under the topic of good governance, the Commission *Communication* foresees that “special attention will in particular be paid in this connection to strengthening and consolidating democracy, the rule of law and civil society participation in the political life of the country. Enhanced policy dialogue and cooperation will be pursued, especially in the areas of democracy and human rights. There will be an increased focus on the rights of children and women, the regularisation of immigrants and tackling domestic violence. The Government will undertake a reform of the justice sector and implement a national plan to tackle corruption” (Commission of the European Communities, 2007: 4). To sum up, positive and *implicit* conditionality may be present in these bilateral relations aiming at the consolidation of civil society in Cape Verde.

Conditionality and EU’s objectives in international scene. Does the EU have a defined policy for Cape Verde?

To evaluate the Union’s attempts to impact reform policies in third countries one should take into consideration that the EU regards itself as a normative power with capacity to produce major structural changes<sup>145</sup>. The concept of normative power is important when addressing the EU’s action in the international scene not only because it is intimately linked to the Union’s practice of conditionality but also because, when exercising its normative power, the Union (or any other normative power for that matter) influences/shapes, changes or consolidate structures. In other words, the Union is a normative and a structural power. The practice of conditionality is never an *end* in itself; it is always a *mean* to an end and that end is to promote EU norms and values. The promotion of these norms and values, in its turn, aims at shaping/changing/supporting structures at various levels. The interconnection here is established by the fact that the norms and values will not prevail without the appropriate structures and the desired structural changes cannot be operated unless through the acceptance of the same norms and values.

The practice of conditionality by the EU only becomes understandable when its theoretical basis are considered. The Union’s actions in the international scene (and consequently the conditions it imposes on third parties in order to establish relationship with them) are inspired by many sources such as the international law or the UN Charter of Human Rights, but first and foremost by the Union’s own Treaties. The principles and objectives of the EU’s international action (CFSP and CSDP; humanitarian policy, trade and development policy) are delineated in the Title V TEU (which deals with general provisions on the Union’s

---

<sup>145</sup>. In an interview with John Peterson (2008: 69) the President of the European Commission José Manuel Durão Barroso declared that “we [the EU] are one of the most important, if not the most important, normative power in the world” and argued that it is so because the EU has been “successful in establishing norms, and applying them to different realities”. Accordingly, Mr. Barroso contends, the EU is to be regarded as a “laboratory of globalisation, the most advanced ever”.

external action and specific provisions on the CFSP), particularly in Article 21 TEU. Article 21(1) TEU points to the main objectives and principles guiding the EU's international action and reads as follows:

The Union's action in the international scene shall be guided by the principles which have inspired its own creation, development and enlargement, and which it seeks to advance in the wider world, democracy, the rule of law, the universality and indivisibility of human rights and fundamental freedoms, respect for human dignity, the principles of equality and solidarity, and respect for the principles of the United Nations Charter and international law. Article 21(1) is of utmost importance to understanding conditionality policy and policy transfer in the context of the Union's external action, not only because these are the values that the Union preaches to and endeavours to promote in the wider world but also because, at least in theory, the Union claims to deal only with third parties that promote the values it upholds or at least show some interest in embracing such values. Claims such as those found in Article 21 TEU confer consistency to Ian Manners' emphasis on EU as a "normative power", a concept he uses to underpin the EU's "ability to shape the conceptions of 'normal' in international relations" (Manners, 2002: 239). From this focus on values - indeed, an essential feature of the EU and its foreign policy (Manners, 2002; 2006 and 2012) stems the Union's belief that it is in a position to say to third parties what is to be regarded as "normal" and what is not.

These value-centred approach and the Union's self-awareness of its position as a normative power should not be neglected when analysing its conditionality policies. Normative power emanates from the capacity of a normative power to influence others by convincing them that its own ideas and identity are the basis for "best practices". Thus to define the EU as a normative power is to admit that the EU is able to somehow influence the rest of the world (or, at least, certain parts of it) in key issues such as peace, democracy, the rule of law, liberty, human rights, sustainable development, good governance, regional integration, market economy, among other values. If that is so, a great deal of power emanates from the Union's ability to influence others through the ability to set the standards of "normal". Manners (2002: 253) is probably right when he claims that "rather than being a contradiction in terms, the ability to define what passes for 'normal' in world politics is, ultimately, the greatest power of all".

The Union's actions in the international arena shows also that it is a structural power. Foreign policy, it has been noted, goes beyond shaping or managing relations with other actors. "On a more ambitious level, foreign policy is also about influencing the *structures* that determine how other actors behave". (Kuekeleire and Delreux, 2014: 27). This brings us to a concept of crucial importance to understand the nature and scope of EU impact on reform policies in third countries - the concept of structural foreign policy. In their definition of structural foreign policy Keukeleire and Delreux (2014: 28) place emphasis not only on structures but also on a *long durée* approach: "Structural foreign policy is a foreign policy which conducted over the long-term, aims at sustainably influencing or shaping political, legal, economic, social, security or other structures in a given space". When looking into the objectives of structural foreign policy one easily understands that they vary. Sometimes the objective of a structural foreign policy is "to promote and support structural changes and structural reforms, tackle structural problems and constraints", but sometimes a structural foreign policy is designed aiming only to support and sustain existing structures (*Ibidem*). These variations in the objective depend on various aspects (including the capabilities, aims and ambitions of the structural power, the feasibility of certain reform policies and the very way the structural power regards the current structures in the third country/region)

At this stage of analysis one has to ask to what extent the EU exercises its normative power to define conditionality practices in the framework of the Special Partnership with Cape Verde. How does the EU sees the current structures in the country? It has been said that

the current EU-Cape Verde relations are based more on political dialogue than in *explicit* conditionality practices. The Union claims it does not aim to change structures in Cape Verde but rather support their consolidation. This is due to the fact that the two parties share strong “socio-political values” and “common concerns and challenges”. The 2007 *Communication* is particularly clear in this respect. The country, the document stresses, embraces the values of democracy, human rights, good political and economic governance. [Furthermore,] the guarantees offered by the rule of law in force in Cape Verde [...] also seeks to promote peace, security and the fight against terrorism and crime. [...] Closer ties between Cape Verde and the European Union will in particular strengthen relations and bring about further integration between it and the outermost regions; Cape Verde also shares a number of strategic priorities with the European Union, especially as regards certain security issues, for instance action to tackle trafficking (drugs, illegal immigration, etc.). In this connection, Cape Verde is expected to become a partner in increased police and judicial cooperation with Europe. Because of its geographical location, the country can make an important contribution to tackling illegal trafficking, and its open approach on security is one of its key strengths in its efforts to build closer ties with the EU. The special partnership is therefore intended to strengthen dialogue and policy convergence between the two parties, so enhancing the traditional donor-beneficiary relationship with a framework of mutual interests (Commission of the European Communities, 2007: 2).

The passage just quoted is crucial to understand the nature of the Special Partnership between the EU and Cape Verde and the absence of a conditionality-like approach (at least in the official discourse) by the EU. The passage, however, contains few remarks that are germane to the discussion on within which policy area or framework the EU-Cape Verde relations fits the best. CFSP? CSDP? External action with its development policies? In light of documents available it is extremely difficult if not impossible to answer to these questions. The answer may be in the combination of those policy domains. Another difficult task is to scrutinize whether the EU has a defined policy for Cape Verde. The official documents point the consolidation of state’s structures, eradication of poverty, regional integration and collective security among the priorities. The Union’s main aim, however, seems to be to capitalize the African country’s potential in the struggle against the threats that transnational crime networks in the West Africa represent for Europe. In fact, it must be stressed that this aspect may partially explain the absence of a conditionality-based approach in the framework of the Special Partnership. Cape Verde has indeed something to offer to the Union. Although, as it has been said, in practice the Special Partnership does not escape the logic of EU’s development agenda and the donor-beneficiary framework, this should not be overstated. Apart from allowing the Union the access to the country’s marine resources through the fisheries agreement, Cape Verde represents an important asset in the promotion of the Union’s interest in West Africa, especially when it comes to the problem of security and transnational crime networks. Cape Verde is one of the few stable countries in the region and this makes it a good partner in the security sector. Given the crucial importance of this topic, it deserves a discussion, even if it is only a summary one.

### **Cape Verde’s contribution in the security dossier of the Special Partnership. The EU’s alternative in a region of failed states?**

It has been said that one of the EU’s main objectives in the framework of the Special Partnership with Cape Verde is to use its development agenda in the country to promote its own interests. Among these interests are the attempt to capitalize the country strategic position (surrounded by many weak and highly unstable states) to minimize some of the perceived security threats against Europe stemming from West Africa, namely drug trafficking, terrorist activities and illegal migration. Insecurity in West Africa and the states incapacity to dismantle and stop criminal networks in the region is regarded as a serious threat

to the Union's own security. The Union welcomes the Special Partnership because these threats concern both parties and the Cape Verdean contribution to the challenge of overcoming them should not be neglected but rather capitalized. At least this is the argument the Commission used to convince the EP and the Council in the 2007 *Communication* where is stated that

Closer ties between Cape Verde and the European Union will in particular strengthen relations and bring about further integration between it and the outermost regions; Cape Verde also shares a number of strategic priorities with the European Union, especially as regards certain security issues, for instance action to tackle trafficking (drugs, illegal immigration, etc.). [...] Because of its geographical location, the country can make an important contribution to tackling illegal trafficking, and its open approach on security is one of its key strengths in its efforts to build closer ties with the EU. (Commission of the European Communities, 2007: 2).

The passage just quoted clearly demonstrates the importance of security sector in these bilateral relations and emphasises the geo-strategic driving force behind the Special Partnership. This geo-strategic approach to the Special Partnership aims at the neutralization of serious security threats against the Union by tackling security issues in the West Africa. The EU has, indeed, motives to be concerned with the deterioration of the situation in the region. Consider, for instance, drug trafficking. Recent reports published by the United Nations Office on Drugs and Crimes (UNODC) have been pointing West Africa as an important transit area for cocaine trafficking between Latin America and Europe (UNODC, 2007, 2008a, 2008b; 2013). An aspect underlined by those reports that helps one to understand the need for institutional reforms and structural changes in the region is the fact that the logic behind the increasing use of West Africa as transit space for drug trafficking “has less to do with where West Africa is placed geographically than with the ability of traffickers to operate in the area with impunity” (UNODC, 2008: 5). This impunity stems essentially from the fact that in some of Western African states drug barons are infiltrating states' structures and are protected by high rank politicians and army officers (UNODC 2008: 5)<sup>146</sup>.

Although the West Africa's drug trafficking problem is still relatively small compared with that of West Asia, the Caribbean or Latin America, “it is growing exponentially and threatens to turn the region into a center of lawlessness. [...] The affected countries and the international community must act before the situation spirals out of control” (Costa, 2008). The United Nations is not the only major international actor calling for coordinated actions in order to face the deteriorating situation in the West Africa. A telling example is NATO which

---

<sup>146</sup>. António Maria Costa, Executive Director of UNODC, could hardly put it more plainly when he observed that in most West African countries “Drug planes don't have to fly below the radar, because in most cases there is no radar (or electricity). Soldiers sometimes help smugglers by closing airports and unloading the cargo. Police cars run out of gas when giving chase or are left in the dust by smugglers' all-terrain vehicles. There are no local navies to intercept the ships coming from Latin America or to chase the 2,000-horsepower boats that speed drugs up the coast to Europe. Traffickers are seldom brought to trial; in some cases, there are no prisons to put them in. Even when they are charged, they are usually released because evidence is not collected or needed laws are not in place. [...] Drugs have become a security issue. Drug money is perverting the weak economies of the region. In some cases, the value of the drugs being trafficked is greater than a country's national income. The influence that this buys is rotting these fragile states; traffickers are buying favors and protection from candidates in elections” (Costa, 2008). What is important for the present study is that there was a moment that Cape Verde was under a serious threat of being in the same situation as some its West African neighbours currently are. Some ten years ago a quick intervention of the international community prevented that from happening. “Cooperation among customs officials, border guards, the police and counter-narcotics agents at ports and airports, for example has made Cape Verde a less attractive transit point for drug traffickers” (Costa, 2008). An interesting challenge would be to scrutinize the EU's role on this process, but it must be said that with the available materials, the task may be impossible given that, the reforms of security sector in Cape Verde in the last years were driven by a plethora of domestic and foreign influences.

has been looking at Cape Verde with an increasing geo-strategic interest to the point of choosing the country to host the exercise Steadfast Jaguar in 2006, with participation of Cape Verdean soldiers. In 2003 the EU High Representative for the CFSP, Javier Solana, stressing the dynamic nature of the new threats, pointed State failure as one of the major threats for the Union and alerted that “State failure and organized crime spread if they are neglected – as we have seen in West Africa” (Solana, 2003: 11). Mr. Solana’s concerns seems to be shared by the EU and this is visible in the increasing securitization of the Union’s development agenda in West Africa. The Cape Verde-EU Special Partnership should not be dissociated from the securitization agenda. A Council document, dated 16 November 2007, welcomed the willingness of the Cape Verdean authorities “to promote collective security through close cooperation with the European Union in sector such as the control of illegal trafficking (drugs, illegal immigration, arms, etc.), the fight against terrorism, etc.”; stressing that “these sectors are of paramount importance for both Cape Verde and the European Union” (Council of the European Union, 2007: 4).

What is crucial to understanding the key role played by the security dossier in the current relations between the EU and West-African states is to bear in mind that the EU is increasingly aware that African insecurity more and more affects Europe’s own security. To make this plain it may be useful to briefly map the evolutions and trends in the EU relations with the so-called Third World. These evolutions and trends make the focus on security dossier in the Special Partnership between Cape Verde and the EU easier to understand. Europe’s relations with the developing countries changed dramatically in the last three decades. Defining moments in the shaping of European integration such as the successive enlargements, the fall of communist ideology and structures in Central and Eastern Europe or the reorganization of international trade under the supervision of the WTO called for significant revisions in the Community/Union’s relations with the Third World (Grilli, 1994, Holland, 2002; Holland and Doidge, 2012). Amongst the best sources to grasp this policy revision processes are certainly the texts of Lomé Conventions (1975-2000) and those of Cotonou Agreements (signed in Cotonou on 23 June 2000, revised in 2005 and 2010).

Although the Cape Verde-EU relations labelled as “special” and said to go beyond the traditional donor-beneficiary framework (and it is, in fact true, that Cape Verde does offer a great deal in return to the EU), in practice it does not escape the logic of EU’s typical development agenda for (the West) Africa. It, thus, needs to be addressed and understood within the framework of EU-Africa relations, regulated by the Cotonou Agreements. Only within this analytical framework can it be understood. This holds true, especially when comes to the role played by the security dossier. It is important to recall that the political conditionality that started shaping the post-Cold War EC’s policies towards the ACP states resulted in total failure in most African countries. It did not manage to trigger the economic development that had been so long hoped for. Thus major political crisis and conflicts in sub-Saharan Africa (such as Somalia, Rwanda, Sierra Leone and Liberia, to name some) fed a significant literary production on “collapsed”, “failed” and “weak states” (Zartman, 1995 and Migdal, 1998) and deepened the International Community’s intervention in the region. The concept of “good governance” emerged in the agenda of international actors’ political discourse regarding sub-Saharan Africa states. The EU was no exception. It got deeply involved in Africa through political monitoring, crisis management, conflict preventions and development programmes addressing the causes of instability in several African states.

All this needs to be contextualized. In line with the International Community, the EU’s development policies have been expanding towards a holistic understanding of development where security and governance are regarded as *sine qua non* conditions for economic prosperity and a broad set of reforms needs to be implemented to ensure these two prerequisites (Bagayoko and Gibbert, 2009). In other words, the EU’s recent policies towards Africa is based on the development-governance-security triangle; motivated by a strong

conviction that without development there will be no sustainable peace and security and that without peace and security there can be no sustainable development (see Partnership Agreement, 2010, Article 11)<sup>147</sup>.

The obvious question here is: why such a change in approach? Why the sudden especial emphasis on the security sector? Insecurity was already in previous decades a major problem in most African states. One may even contend that in this particular topic things did not get worse over the years. Why was it, then, not so important in the EC/EU agenda for Africa as it tends to be now? The answer to this question lies in the evolvments or changes in the way African insecurity and underdevelopment are perceived in Europe. Marie V. Gibert (2009: 623) rightly argues that until the end of the 1990s, Africa's insecurity and underdevelopment were regarded to be a threat primarily to its own peoples and Western interventions were, at least at official and rhetoric levels, motivated by "morality and a disinterested humanitarianism". The 9/11 events, the same scholar goes on explaining, transformed perceptions, and "Africa's insecurity and underdevelopment are increasingly understood, defined and addressed according to the alleged threats they pose to the rest of the world stability and prosperity". The same line of reasoning is found in Fearon and Laitin (2004: 13) where it is argued that "given the dangers posed by collapsed states and rogue regimes in a world with WMD, open economies, and easy international travel, all would benefit from political order and responsible (if possible, democratic) governments in the periphery". Promoting development and good governance is in the interest of international community as a whole since it will help prevent local conflicts and insecurity from spilling over (Gibert, 2009: 623).

It is within this framework, one in which the donor's intervention in Africa is no longer motivated by the apparent post-colonial and paternalistic solidarity with African countries but rather guided by an "enlightened self-interest" that EU development policy for Africa and its emphasis on security sector reforms must be approached. The description just made allows one to conclude that the increasing drug trafficking in the West Africa as well as other security threats in the region such as terrorist activities and illegal migration and the inability of the regional states to handle the problem increases the urgency for coordinated actions. These threats are not only West Africa's problem, they are also Europe's. The Special Partnership between Cape Verde and Europe is regarded by the EU as an important instrument and a sort of viable alternative in the challenge of overcoming the same threats through coordination of policies. Obviously this does not mean that the Special Partnership with Cape Verde and its security dimension are regarded as a sort of panacea for the security problems that transnational crime networks in West Africa poses to the Union. The partnership with Cape Verde is seen as part of the solution, an important contribution in the task of overcoming the security problems in the region.

## Conclusions

On 5 July 1975 Cape Verde gained its independence under a tremendous pressure which had to do with survival and viability as an independent state. Respected international institutions, renowned politicians and scholars publicly argued that the country was not viable due to its lack of resources. Much due to the efforts of international community, Cape Verde survived as an independent state. In early 1990s the country embraced democracy. Political and civil rights flourished and the country start to be able to punch above its weight in

---

<sup>147</sup>. It was certainly not by chance that the EU newly established ESDP found in African soil its ideal experimentation field. EU operations such as Artemis RD Congo (2003), EU support to AMIS action (Darfur, 2005-2007) EUPOL RD Congo (2006-present), EUFOR RD Congo (2006), EUFOR Tchad (2008-2009) EUSSR Guinea-Bissau, EUNAVFOR Somalia-Operation Atlanta (2008-present), some other military peacekeeping missions as well as naval monitoring and deterrence missions in Africa managed to find consensus among the EU member states (for a detailed discussion on these missions, see Koutrakos 2013).

international scenario. These considerations are important to understand the development and the contours of EU-Cape Verde relations.

To a certain extent it is accurate to say that the partnership between the EU and the Republic of Cape Verde stands out as an atypical form of cooperation in the context of relations between the EU and African states. Looking into the historical and political development of Cape Verde and into its relationship with European institutions within the framework of ACP-EC/EU relations, it is easy to conclude that the Special Partnership came about as a corollary of the convergence of interests: Cape Verde needs the EU's financial support to overcome some basic challenges, namely poverty and budget constraints; the EU finds a country it can use to promote its own interests in the West Africa region. To handle security issues such as terrorist activities, drug trafficking and illegal migration is part of these interests.

Strategically located, a stable country and with a relatively well organized security forces (if compared to most West African states, of course), Cape Verde can, for instance, give substantial contribution in maritime surveillance, an essential element in the fight against drug transportation up to the European continent. More, the country is open to coordinate efforts with the EU to face security problems, regarded as common threats to be neutralized; common challenges to be overcome. The contribution of Cape Verde in security dossier, along with significant concessions on the African country's part (namely those involving fisheries agreement with the EU) can be said to be the factor that brings the EU-Cape Verde relations close to a "true partnership"; the factor that one can use to argue that the current EU-Cape Verde relations have, *de facto*, surpassed the donor-beneficiary framework and is guided by a dialectics of mutual interests. Seen from this angle, and considering the unusual historical and political development the country has experienced since its independence (again, if compared to most African countries), it becomes understandable that the establishment of the Special Partnership with the EU and its implementation did not follow a conditionality-based approach but was and has been guided by the principles of political dialogue and policy convergence. Obviously, Cape Verde's good record in the use of European funds throughout the years also contribute to the exclusion of conditionality policy in the establishment of the Special Partnership.

## References:

### Primary sources

AFROL NEWS/A SEMANA (2005) "Portugal Assume Causa Cabo-Verdiana na União Europeia", 18 March 2005 (url: [www.afrol.com/articles/15926](http://www.afrol.com/articles/15926), accessed on 21 February 2014).

COMMISSION OF THE EUROPEAN COMMUNITIES (2007), *Communication from the Commission to the Council and the European Parliament on the future of relations between the European Union and the Republic of Cape Verde*, Brussels 24<sup>th</sup> October 2007 (Ref. COM (2007) 641 final).

(2012), *Proposal for a Council Decision on the conclusion of the Agreement between the European Union and the Republic of Cape Verde on facilitating the issue of short-stay visas to citizens of the Republic of Cape Verde and of the European Union*, Brussels, 25 September 2012, Ref. 2012/0271 (NLE).

COUNCIL OF THE EUROPEAN UNION (2007), *Conclusions of the Council and the Representatives of the Government of the Member States Meeting Within the Council on a Communication from the Commission on the Future of Relations Between the European Union and the Republic of Cape Verde*, Brussels, 16 November 2007, (Ref. 15113/07).

EUROPEAN UNION (2010), *Consolidated Treaties/Charter of Fundamental Rights*, Luxembourg, Publications Office of the European Union.

- FREEDOM HOUSE (2012), *Freedom in the World 2012: The Arab Uprisings and their Global Repercussions*, New York.
- (2013), *Freedom in the World 2013: Democratic Breakthrough in Balance*, New York.
- (2014), *Freedom in the World 2014: The Democratic Leadership Gap*, New York.
- INTERVIEW with MEP Maria da Graça Carvalho at the European Parliament on 30 January, 2014 at 3 p. m. Brussels time.
- MINISTÉRIO DOS NEGÓCIOS ESTRANGEIROS (11 October 1975), Ofício n° 346/75, Praia 11 October 1975. A copy and the reply to the letter can be found in the Archives Centrales, Communautés européennes: le Conseil, Bruxelles, 3 November 1975. Relations avec les Etats ACP –Project de réponse de la Communauté à la demande d’adhésion de la République du Cap-Vert à la Convention de Lomé, with reference S/1441/75 (ACP 141 FIN 62).
- UNITED NATIONS (2013), *The Millennium Development Goals Report*, New York.
- UNITED NATIONS OFFICE ON DRUGS AND CRIME (2007), *Cocaine trafficking in West Africa: situation report*.
- (2008a), Guinea-Bissau: new hub for cocaine trafficking, (Perspectives, issue 05).
- (2008a), *Drug trafficking as a security threat in West Africa*.
- (February 2013), *Transnational Organized Crime in West Africa: a threat assessment*.
- Secondary literature
- ALMADA, José Luís Hopffer (2013), “Cabo Verde: Regime de Partido Único e Consolidação Democrática numa Pequena Nação Crioula Soberana”, in SARMENTO, Cristina Montalvão and COSTA, Suzano, *Entre África e a Europa: Nação, Estado e Democracia em Cabo Verde*, Coimbra, Almedina, pp. 43-115
- BAGAYOKO, N. and GIBERT, M. V. (2009), “The linkage between security, governance and development from an institutional perspective: The European Union in Africa”, *Journal of Development Studies*, 54, issue 05, pp. 790-815
- BAKER, Bruce (2006), “Cape Verde: the most democratic nation in Africa?”, *The Journal of Modern African Studies*, vol. 44, Issue 04, pp. 493-511.
- BARTELS, Lorand (2008), *Human Rights Conditionality in the EU’s International Agreements*, Oxford, Oxford University Press.
- BROBERG, Morten (2012), “From Colonial Power to Human Rights Promoter: on the Legal Regulation of the European Union’s Relations with the Developing Countries”, *Cambridge Review of International Affairs* vol. 26 issue 04, pp. 1-13.
- BROWN, William (2002), *The European Union and Africa: The Restructuring of North-South Relations*, London, I.B. Tauris Publishers.
- COSTA, António Maria (2008), “Cocaine finds Africa” Washington Post, July 29,2008, url: <http://www.washingtonpost.com/wp-yn/content/article/2008/07/28/AR2008072802466.html>, accessed on 1 December, 2013.
- DIJKSTRA, A. Geske (2002), “The Effectiveness of Policy Conditionality: Eight Country Experiences”, *Development and Change* vol. 33, issue 02, pp. 307-334.
- ENDERS, Armelle (2013), *Histoire de l’Afrique lusophone* (third edition), Paris, Chand eigné.
- ÉVORA, Roselma (2013), *Cabo Verde: A Abertura Política e o Processo de Transição Democrática*, Praia, Spleen-Edições.
- FIALHO, Djalita (2013), “Cape Verde’s LDC Trajectory: From Admission to Graduation (1977-2007)”, in SARMENTO, Cristina Montalvão and COSTA, Suzano, *Entre África e a Europa: Nação, Estado e Democracia em Cabo Verde*, Coimbra, Almedina, pp. 743-775.
- GIBERT, M. V. (2009), “The securitization of the EU’s development agenda in Africa: insights from Guinea-Bissau, in *Perspective on European Politics and Society*, vol. 10 issue 04, pp. 621-637.
- GRABBE, Heather (2002), “European Conditionality and the *Acquis Communautaire*”, *International Political Science Review*, vol. 23, issue 03, pp. 249-268.

- GRABBE, Heather and HUGHES, Kristy (1998), *Enlarging the EU Eastwards*, London, The Royal Institute of International Affairs/Continuum.
- GRILLI, Enzo R. (1994), *The European Community and the Developing Countries*, Cambridge, Cambridge University Press.
- HOLLAND, Martin (2002), *The European Union and the Third World*, New York, Palgrave McMillan.
- HOLLAND, Martin and DOIDGE, Mathew (2012), *Development Policy of the European Union*, New York, Palgrave McMillan.
- KEUKELEIRE, S. and DELREUX, T. (2014), *The foreign policy of the European Union*, New York, Palgrave McMillan.
- KOUTRAKOS, Panos (2013), *The EU Common Security and Defence Policy*, Oxford, Oxford University Press.
- LAVENEX, Sandra (2004), "EU external governance in 'wider Europe'", *Journal of European Public Policy* vol. 11, issue 04, pp. 680-700.
- LAVENEX, Sandra and SCHIMMELFENNIG, Frank (2009), "EU Rules Beyond EU Borders: Theorizing External Governance in European Politics", *Journal of European Public Policy* vol. 16, issue 06, pp. 791-812.
- LORENTZ, Kevin (2001), "Homogeneity and Democracy: the Effect of Ethnicity on Democratization Nigeria and Cape Verde", *The Sovereign*, vol. 21, pp. 54-60.
- MANNERS, Ian (2002), "Normative power Europe: a Contradiction in terms?", *Journal of Common Market Studies* vol. 40, issue 02, pp. 235-58.
- (2006), "Normative power Europe reconsidered: beyond the cross roads", *Journal of European Public Policy*, vol. 13, issue 02, pp. 182-189.
- (2012), "The European Union's normative power in global politics", in ZIMMERMANN, H. and DÜR, A., *Key Controversies in European Integration*, Basingstoke, Palgrave Mcmillan, pp. 192-199.
- MEYNS, Peter (2002), "Cape Verde: an African Exception", in *Journal of Democracy*, vol. 13, issue 03, pp. 153-165.
- MIGDAL, J. S. (1998), *Strong Societies and Weak States: State-Society relations and State capabilities in the Third World*, Princeton, Princeton University Press.
- MUGYENZI, Joachim T. (2012), "International Models of Policy Influence: Does the EU Influence Good-Governance Policies in African, Caribbean and Pacific States?", *Journal of Politics and Law* vol. 5, issue 01, pp. 69-81.
- PETERSON, John (2008), "The Profession José Manuel Barroso: Political Scientist, ECPR Member", *European Political Science*, vol. 07, pp. 64-77.
- SOLANA, Javier (2013), *A Secure Europe in a Better World: European Security Strategy*, Brussels.
- VIEIRA, Alena Vysotska Guedes and FERREIRA-PEREIRA, Laura C. (2013), "Cape Verde and the European Union: The Role of Portugal in the Creation of a Special Partnership" in SARMENTO, Cristina Montalvão and COSTA, Suzano, *Entre África e a Europa: Nação, Estado e Democracia em Cabo Verde*, Coimbra, Almedina, pp. 567-578.
- ZARTMAN, I. W. (editor) (1995), *Collapsed States: the disintegration and restoration of legitimate authority*, Boulder Co. Lynne Rienner.

# THE CHALLENGES AND DIFFICULTIES OF SINO-US MILITARY DIPLOMACY IN THE AFRICAN CONTINENT

*Ailton Jose F. Barbosa,*

(International Relations and Chinese Diplomacy, MA  
Fudan University, Shanghai, China

---

## Abstract

The Sino-US relationship is increasingly intertwined and this article looks at the military presence of both nations in the African continent. In particular a look from the military present in the post-9/11 world, where the war on terror have been launch by US and where the African continent is see witnessing a rise on terrorism. The article also looks at the Sino-US military action in Africa from the perspective of trade and arms sales where the securitizing a shipping lanes and factories are becoming of great concern for both the Chinese and the Americans. The article also looks at the current race between the more established “Washington consensus, and the relative “Beijing consensus”. This race is taking part in Africa it is part of a bigger race which is for a unipolar and multipolar diplomatic world and the support of each African country is crucial. The Asian and the American contenders are using their military capability to secure support to different African political and institutions.

---

**Keywords:** Sino-US diplomacy, Military Diplomacy, Africa

## Introduction

The Sino-US (China-American) relationship expands from the simple day-to-day issues like the increasing number of exchanging student between the two countries and their individual diplomatic impact<sup>148</sup>, to more complicated issues such as the new race between Beijing and Washington toward the moon<sup>149</sup>. The interconnection between these two countries has also clearly presented itself in the “New Scramble” toward the African continent. This paper addresses this recent, yet important development in the Sino-US relations, the military agenda of the Asian and American superpowers toward the African continent. In particularly, exemplifying how each power is tackling current concerns and how they are preparing to address future hesitations.

The research is divided into three sections, in which the first section is the introduction of the article and also serves to highlight the historical background of Sino-American military relationship and their unique entrance to the African affairs. The second section and body of the article will tackle several points. First, in the section 2.1. looks at the post-9/11 world, its diplomatic impact and the fight against terrorism and arms sales in the African continent. Secondly, it describes the different types of leadership agenda pursued by both Washington and Beijing and the support to different African institutions by both Washington and Beijing in section 2.2 and 2.3. The fourth sub-section, 2.4. of the article presents the African voices in regard to understanding the increasing participation of China and United States in Africa’s affairs. Lastly, the article is concluded with the conclusion put in retrospective the implications of the “triangle diplomatic relationship” between the United States, China and

---

<sup>148</sup> Yang N. More, “More Students Choose to Study Abroad” China Daily 2011-04-25  
<[http://www.chinadaily.com.cn/cndy/2011-04/25/content\\_12383944.htm](http://www.chinadaily.com.cn/cndy/2011-04/25/content_12383944.htm)> (11/14/12)

<sup>149</sup> Hickman J. “Red Moon Rising” July/ August 2012 Foreign Policy Magazine  
<[http://www.foreignpolicy.com/articles/2012/06/18/red\\_moon\\_rising](http://www.foreignpolicy.com/articles/2012/06/18/red_moon_rising)> (11/14/12)

the different African nations and suggest further research on the subject in section 2.5. The conclusion on the article is presented in the third section of the article.

### Historical Background

The initial military interactions between the two nations began in the early 17th century with the entrance of United States into the newly open shores of China. By the end of the First Opium War in 1842, the first Sino-US Treaty was signed: the Treaty of Wanghia<sup>150</sup>. The United States continued to be involved in Chinese affairs, and during the political struggle between Chiang Kai-shek and the Kuomintang Party (KMT) against the Communist Party, US supported the former. This support continued in the aftermath of the war, being as most visible with the American propagation for the sovereignty of the Taiwan Island<sup>151</sup>. In the autumn of 1944, the relationship between Washington and the Chiang Kai-shek's government was not in the same footing, and this ushered by the prospects for friendly relations with the other side, the Chinese Communist Party<sup>152</sup>. These ups-and-downs of the Sino-US relations continued during the Cold War era, where China sided with the Soviet Union against the "imperialist" agenda of US. Setting in motion the policy of containment by Washington D.C. which included communist countries like China and neighboring states like Vietnam. Furthermore, to "help" the South Vietnamese in maintaining their non-communist stance, the Lyndon B. Johnson administration continued the Vietnam War and further hopes of containment. On the other hand, then chairman Mao Zedong pronounced that "your [Vietnamese] business is my business; my business is your business"<sup>153</sup>, setting China in direct course of military conformation with United States.

The hostility and the low-communication that plagued the Sino-US military during the Cold war seemed to be coming to an end with the American President Richard M. Nixon's visit in 1972 to Beijing. President Nixon then recognized that the US should help bring China out of its international isolation, in the same way that his predecessor Theodore Roosevelt had advocated and helped bringing the Soviet Union into the international system in 1940<sup>154</sup>. Relations between Washington and Beijing experienced a rapid and extensive development during the 1980s with the visit of high elected official and with the visit of the first Chinese head of state visit to US, Deng Xiaoping, the Sino-US military relations once again became "shaky" during the 1990s, in which the bombing of the Chinese Embassy in Belgrade became the most critical point for Sino-US relations. Whilst the US stated that the bombings were accidental, China stated that the bombings were deliberately conducted. The US President Bill Clinton gave an official apology to China. Recently, the "China Threat", Beijing military build-up, China's economic growth and the independence of Taiwan, has received a crucial importance in shaping the commanding of the Sino-US military agenda. US leadership often uses this argument in the process of keep a close eye on the Asian country and even in this new military positioning in pacific coast.

The entrance of the Chinese and American military actions in the African continent was the result of a spill-over of the uncertainty by the Cold War. During Mao Zedongs years in power, China aspired to become the leader of the Third World and in its aspiration for "liberation and social revolution", the Chinese government funneled billions of dollars to the recently independent African nations. The United States then swiftly responded by creating anti-China propaganda, a solid support to the independence of Taiwan and by helping the retention of KMT's government seat in the UN Security Council.

<sup>150</sup> The "Treaty of Wanhia" was just one of the many treaties which China was forced to sign after its defeat against international powers during the 19th and early 20th century. Also referred to as the Unequal Treaties.

<sup>151</sup> Lanteigne M., *Chinese Foreign Policy: An Introduction*, Routledge England, 2009

<sup>152</sup> Cohen W. *America's Response to China*, Columbia University Press-5th Ed., 2010

<sup>153</sup> Mao L., "China and the Escalation of the Vietnam War: January to July 1965". PhD. Dissertation of University of Georgia, USA 2004

<sup>154</sup>

In the 1970s there was a change in the Chinese approach to the African continent. Lacking the financial backing of the USSR, China “hoped to gain more by spreading revolutionary ideology” in the continent instead of directly funneling money to individual countries. Therefore, it focused more on dissident groups, such as the Sawaba movement in Niger, Tutsi in Burundi and opposition groups in Kenya. This happened despite the fact that the Chinese leadership was committed, at least on paper, to the Non-Aligned Movement (NAM) and Five Principles of Non-Interference. During this period Washington also conducted its own propaganda in the name of its ideals and also supported dissident groups in various countries.

In the 1980s China began to reverse course and began to establish diplomatic ties with economy goals in mind rather than with strictly ideological or military goals and continue to call for the Non-Alignment Movement. At this period, we witness an existing of United States from African affairs and a concentration of its Aid provision from Washington to different African nations.

### **Main Text**

The diplomatic agenda of both the United States and Chinese toward the African continent cross in many different points. In this chapter these crossing points are evaluated further. First in chapter 2.1., these points are analyzed in a post-9/11 world, where the United States of America is much more aware of terrorist organizations and China is enjoying important political and economic position in African continent. In the following chapter 2.2. and 2.3., the issue of terrorism, and trade and arm sales are presented. Lastly, the Chinese and American competition for a leadership position in the Africa and the support for African institutions are debated in chapter 2.4. and 2.5. respectively.

### **Post-9/11 World**

The Sino-US military diplomacy toward Africa took a new turn with the 9/11 terrorist attacks in United States. Although the attacks in 2001 occurred on American soil, the shock wave was spread around the world and heightened the awareness toward the root cause of such attacks. The United States hastily responded offensively and declared the ongoing “War on Terrorism”<sup>155</sup> and found supporters around the world, including China, to address this new threat. The call for action sent by Washington was well-received by Beijing that presented its solidarity, and gave the Sino-US diplomatic relationship a new boost. Yet, this boost was short-lived. Mass military mobilization, increased presence of the American military in China’s border states like Afghanistan in combination with the US unilateral declaration of war in Iraq, quickly made the Chinese government insecure about the United States military position. At the same, Washington began to include Africa in its strategic war on terror, and recognized that the continent gave the ideal environment for the non-state military groups to appear and spread due to its large number of refugees, potential militants, big stockpile of weapons and a large number of Muslims<sup>156</sup>.

In the post-9/11 world, the African continent once again became a territory for military trials for China and United States. This because on the ground, United States’ “Washington Consensus” was now being challenged by China’s relative new term; “Beijing Consensus”<sup>157</sup>. China’s position in the African continent was cemented through the establishment of the Forum on China-Africa Cooperation (FOCAC)<sup>158</sup> in 2000 which allowed the pursue of economic goals regardless the military situation of different African nations, while

<sup>155</sup>Bush G. Addressing the US Congress on September 21. The guardian.com

<sup>156</sup> Bellamy W. M., *U.S. Security Engagement in Africa*. African Security Brief No.1 Pg1

<sup>157</sup> Ramo J. “The Beijing Consensus” Foreign Policy Center. May, 2004

<sup>158</sup> FOCAC-Brings the Chinese Leadership with their Africans counterpart every three years. The FOCAC meeting happened in 2000 in Beijing. Again the Chinese capital help de 2012 FOCAC Meeting.

proclaiming its undisputed commitment toward political and military non-interference. At the same time, China deals diplomatically with the continent through trade rather than aid. This is contrary to the United States approach to issues related to the African continent. The Washington Consensus has emphasized in distributing aid to different African nations with the purpose to spread democracy, human rights and other liberal ideas<sup>159</sup>. Therefore, the US military intervention in the continent has been much more pronounced and lasting than their Chinese counterpart. The US has deployed huge military actions to ensure that the values held by Washington to become universal and applied/ exercised in Africa.

#### Terrorism

In battle against terrorism, the approach of the US and China towards the African continent diverge in the methods deployed, however there is a consensus that eradicating terrorism in Africa should be a common objective. Especially in the Horn of Africa where there has been a long history of internally inspired terror which threatens both domestic and international interests. At same time in the last fifteen years, terrorism in East Africa is also increasing, partly due to the recent push for radical Islamist agendas in the region.<sup>160</sup> The African continent is home to more than the 600 million Muslims, (which is accounts a higher figure than the Middle East), yet this large body of Islamic membership has mostly been “un-radicalized”. However, “little attention from the West, the generally pacific and syncretistic African Islam is being swept aside by a militant Islamism imported from the Middle East.”<sup>161</sup>

In the light of increase and treat of militarization, the United States has increased its military efforts in the African continent to combat terrorism, and has for instance established the Combined Joint Task Force in Djibouti, in the Horn of Africa<sup>162</sup>. The Joint Task Forces originated under Operation Enduring Freedom – Horn of Africa (OEF-HOA) as part of the United States response to the 9/11 attacks<sup>163</sup>. In October 1<sup>st</sup> 2008, Washington launched the full sub-department under the Department of Defense that deals with African affairs, and named it the African Command (AFRICOM). Newly established department was quasi-military unit, where non-military operation actions could also be taken. Thus, AFRICOM coordinates US military support by bringing the humanitarian work of the State Department, the US Agency for International Development (USAID), and other US government agencies engaged with Africa, under the direction of the US Department of Defense<sup>164</sup>.

On the other hand, terrorism in the African continent was something of a less concern to Beijing For once it seemed that the message of hate from the Islamic terrorist groups is directed toward the United States, was not shared toward China<sup>165</sup>. Nevertheless, as China expands in the continent it has been caught in the “Cross fire” in terrorist attacks<sup>166</sup>. Terrorist activities in the African continent derive mainly from domestic issues and China’s support,

<sup>159</sup> Africa-China-U.S. Trilateral Dialogue Summary Report

<[www.cfr.org/content/publications/attachments/Trilateral\\_Report.pdf](http://www.cfr.org/content/publications/attachments/Trilateral_Report.pdf)>

<sup>160</sup> *More than Humanitarianism: A Strategic U.S. Approach Toward Africa Security and Terrorism Concerns*, Council of Foreign Relations < [www.cfr.org/content/publications/.../Africa\\_Task\\_Force\\_Web.pdf](http://www.cfr.org/content/publications/.../Africa_Task_Force_Web.pdf)> pg.79

<sup>161</sup> Pham J. P., “Next Front? Evolving United States-African Strategic Relations in the War on Terrorism and Beyond” Pg.43

<sup>162</sup> *More than Humanitarianism: A Strategic U.S. Approach Toward Africa Security and Terrorism Concerns*, Council of Foreign Relations < [www.cfr.org/content/publications/.../Africa\\_Task\\_Force\\_Web.pdf](http://www.cfr.org/content/publications/.../Africa_Task_Force_Web.pdf)> pg.86

<sup>163</sup> Combined Joint Task Force – Horn of Africa- *Wikipedia*.

<[http://en.wikipedia.org/wiki/Combined\\_Joint\\_Task\\_Force\\_%E2%80%93\\_Horn\\_of\\_Africa](http://en.wikipedia.org/wiki/Combined_Joint_Task_Force_%E2%80%93_Horn_of_Africa)>

<sup>164</sup> Osikena J. “Geo-politics beyond Washington: Africa’s alternative security and development partnerships”. Foreign Policy Center < <http://fpc.org.uk/fsblob/1203.pdf>>

<sup>165</sup> Even though China has large amount of trouble with Muslim groups asking for independence from the predominantly Muslim area of Xinjian, in Africa, China has little trouble.

<sup>166</sup> Nigeria: Chinese Workers Killed by Gunmen in Benisheikh <BBC- <http://www.bbc.co.uk/news/world-africa-20255072>>

through its non-interference policy to the leadership of rogue states<sup>167</sup>, are making the Chinese increasing the target over domestic matters. The same can be said to Chinese companies, which are becoming active players in domestic politics with their unique labor practice.

### Trade and Arms Sales

Differently than issues of terrorism, the protection of economic trade and the openness of arms sales to the African continent are two issues that are becoming more important to the Chinese camp than of United States'. The rapid economic growth in the last 30 years has pressured domestic resources and forced China to search for natural resources around the world, including African regions that are considered as unstable by Western countries and institutions. An estimated 25% of China's total oil imports currently comes from Africa.<sup>168</sup> For instance in 2009 China received in 16% and 6% of its total crude oil imports from Angola and Sudan respectively.<sup>169</sup> Therefore, securing those energy outlets is a security priority for Beijing<sup>170</sup>. At the same time, approximately 2% of total Chinese arms production from 2005-2010 was sold to the African continent<sup>171</sup>. Even though this figure is relatively small slice of the total weaponry sold to Africa from international arms producers, some of Beijing's African customers hold a poor record on Human Rights and have often been banned by the international community from acquiring weapons. The reason why China can hideaway with selling arms to such countries is again because Beijing "place importance on the sovereign equality and respect for every government's right to determine its own domestic policies"<sup>172</sup>

Faced with this overwhelming situation, Washington finds itself in the defense in trying to maintain a favorite position in Africa. In 2000, the US passed the African Growth and Opportunity Act (AGOA) to increase trade with Africa, with the objective to "lower trade barrier, increase investment and improving human rights"<sup>173</sup>. The importance of African's oil fields has also taken a center stage in US energy policy, which has become a reoccurring topic in reports delivered to policy makers.<sup>174</sup> Just over 18% of U.S. oil comes from Africa, and oil makes over 76% of the value of all imports from the continent<sup>175</sup>.

The African coastline is of extreme vulnerability and is witnessing an increase in illegal maritime commerce and weapons smuggling. In approaching the situation, the US leadership introduced its first National Strategy for Maritime Security, "identifying the freedom of the seas and the facilitation and defense of commerce as top national priorities and indicating plans to fund border and coastal security initiatives with African countries."<sup>176</sup>

<sup>167</sup> Hess, S and Aidoo, R. "Beyond the Rectories: Noninterference in China's African Policy". Africa and Asian Studies (2010) pg.373

<sup>168</sup> Brookes P. "China's Influence in African Implications for the United States". The Heritage Foundation, February 2006

<sup>169</sup> U.S.A. ANNUAL REPORT TO CONGRESS, "Military and Security Developments Involving the People's Republic of China" 2011

<sup>170</sup> Hess, S and Aidoo, R. "Beyond the Rectories: Noninterference in China's African Policy". Africa and Asian Studies (2010) pg.375

<sup>171</sup> U.S.A. ANNUAL REPORT TO CONGRESS "Military and Security Developments Involving the People's Republic of China" 2011

<sup>172</sup> Hess, S and Aidoo, R. "Beyond the Rectories: Noninterference in China's African Policy". Africa and Asian Studies (2010) pg.390

<sup>173</sup> Brookes P. "China's Influence in African Implications for the United States". The Heritage Foundation, February 2006

<sup>174</sup> Martin W. G. "Beyond Bush: The Future of Popular Movements & US Africa Policy" Review of African Political Economy, Vol. 31, No. 102, (Dec.,2004), pp. 585-597< <http://www.jstor.org/stable/4007030>> 06/11/2012

<sup>175</sup> Comparing Global Influence: China's and U.S. Diplomacy, Foreign Aid, Trade, and Investment in the Developing World

<sup>176</sup> Ploch, L. "US Africa Command: A More »Active« American Approach to Addressing African Security Challenges?"

< [library.fes.de/pdf-files/ipg/ipg-2009-1/06\\_a\\_ploch\\_us.pdf](http://library.fes.de/pdf-files/ipg/ipg-2009-1/06_a_ploch_us.pdf)>

Here, one sees a great deal of conversation between Washington and Beijing is establishing joint venture to secure shipping lanes and merchandise transport in the coast line of the African continent.

#### Leadership Role

The Chinese and American military position in the African continent goes beyond the necessity of the African people and it is rather a reflection of the ongoing battle for leadership of the world between the two super powers. The two countries are not directly engaged in world leadership competition, as USA and the USSR were during the Cold War but Beijing and Washington are in a sort of entanglement best described as a “Hot peace”<sup>177</sup>. Much of the dispute generating over the African continent comes from China’s quest for a multipolar world and from the United States’ quest to maintain the status quo. Even though Washington has shown some degree of leadership in the continent, it has failed to draft a long-term policy for the continent; approximating to the African shores when needed, but also leaving it as quickly. The nations in the continent have to some extent, been left without any certainty about America’s leadership role and how to adapt to it. Exemplified by the Somalia incident where US soldiers were ruthlessly killed, thus making the US reluctant to intervene in the Darfur Genocide. This uncertainty, has allowed the Chinese some space to maneuver militarily in the continent.

At the same time Beijing recognizes that it holds a unique development model and if the African continent, with its 54 recognized countries, follows the “secret” formula behind the Asian country, this in turn would translate to a tremendous international political cloud. Washington has no doubt felt the closing up of the Chinese government in Africa and it has counterattacked by portraying China in some US media as an “evil empire”<sup>178</sup> looking toward Africa only to quench its thirst for natural resources and market for cheap products.

#### Support to African Institution

The race between China and the US and the military intervention in the continent by both the American and by the Chinese has not happened without the observant eyes of the African Institutions like the African Union (AU). The AU is an example of organizations which both China and the United States are engaging in the African continent. The two world powers do show a great deal of respect and knowledge toward these institutions, yet both suffer from having mixed records of support where there are high and low notes present. The United States has put out a reasonable effort in reaching out to the AU and other African Institutions, but at the same time it often undercuts its own efforts by acting militarily unilaterally. Similarly the North American policy institutions like USAFACOM have been useful in tackling social issues like AIDS/HIV epidemic with its military arm, but falls far from the expectation while it maintains a high level of weaponry sold to the continent and opposite stricter UN weaponry regulation<sup>179</sup>.

As for China, the positive marks of engaging African Institutions come from the start in the modern Sino-Africa diplomatic agreement; FOCAC. From the start the Chinese spell out its role in support of the different institutions and specially the AU<sup>180</sup>. This services China in two ways. First, China maintains itself away from the more sensitive political and military situation, that normally the United States would often find itself in, because Beijing spells out clearly, on paper, its commitment to the non-interference clause. In another word, keeping its non-interference policy in place allows Beijing the space to pursue

<sup>177</sup> Wang J., “ ‘Hot Peace’ -Not Cold War-Between the US and China” *New Perspectives Quarterly* Vol. 18, Issue 3, pages 16–19, Summer 2001 <<http://onlinelibrary.wiley.com/doi/10.1111/0893-7850.00412>>

<sup>178</sup> Wang P., Pg. 17

<sup>179</sup> *More than Humanitarianism: A Strategic U.S. Approach Toward Africa Security and Terrorism Concerns*, Council of Foreign Relations <[www.cfr.org/content/publications/.../Africa\\_Task\\_Force\\_Web.pdf](http://www.cfr.org/content/publications/.../Africa_Task_Force_Web.pdf)> pg.89

<sup>180</sup> FOCAC “Six-point Proposal Offered in FOCAC Beijing Declaration to Boost New Strategic Partnership” 2012/07/23 <http://www.focac.org/eng/> (November 2012)

trade independently of international held sanction. Secondly, by following its policy of noninterference, mutual benefits and win-win policy<sup>181</sup>, Beijing has neglect rules put in place by the AU and United Nations on issues dealing with different African nations, and has finance many of the project put forward by these “Failed States”.

## Conclusion

This section presents the conclusion of the article, along with the limitations of this article.

The Sino-US relationship is increasingly becoming intertwined, and this connection can be viewed clearly in their military action in the African continent. In the post-9/11 world, security concerns have sent the two superpowers looking to Africa in the effort to stop or eradicate terrorism there and abroad. Although the African continent is home to large amount of Muslim, many living under hash condition, there have not been little radicalization of this group of people. Still, this is changing fast and many African countries are finding the presence as terrorist cells within their border.

The security concerns for China and US in the African continent also expands to the securitizing of ship lanes and production lines. The rise of economy activity in the African continent has expose both the Asia and North American country to in piracy and other types of terrorist attack. Giving way to a gradually build-up of military presence from both Beijing and Washington in the continent.

The African continent has also become the testing ground for “hot peace” which reins between the China and US. Each country thus looks to secure its military position in the different African countries by first providing weaponry to different ethnical, political or military groups, or extends to other governmental and non-governmental institutions. Lastly, the “new race” undergoing now between Beijing and Washington toward Africa, is the translation of bigger race that is a race for the leadership of the world. Therefore, the African continent finds itself in the racetrack and it is a sort of prize that could dictate the faith of the international world.

## Research limitations

This scope of this research is limited; much more conclusive conclusion can be reach once the material expanded. Due to the limitation of time and location, a third voice, the African voice, is not present in the research. This third voice would have increased to a great extend the conclusion of this article.

## References:

- Bellamy W. M., *U.S. Security Engagement in Africa*. African Security Brief No.1 Pg1  
 BBC, (2012) Nigeria: Chinese Workers Killed by Gunmen in Benisheikh. <BBC-  
<http://www.bbc.co.uk/news/world-africa-20255072>>  
 Bush G. Addressing the US Congress on September 21. [www.guardian.com](http://www.guardian.com).  
 Brookes P. (2006). “China’s Influence in African Implications for the United States”. The Heritage Foundation, February  
 CRS Report for Congress, (2008). “*Comparing Global Influence: China’s and U.S. Diplomacy, Foreign Aid, Trade, and Investment in the Developing World*”.  
 <[http://assets.opencrs.com/rpts/RL34620\\_20080815.pdf](http://assets.opencrs.com/rpts/RL34620_20080815.pdf)>  
 Ramo J. (2004) “The Beijing Consensus” Foreign Policy Center. May,  
 Hess, S and Aidoo, R. (2010) “*Beyond the Rectories: Noninterference in China’s African Policy*”. Africa and Asian Studies. Pg.373

<sup>181</sup> Hess, S and Aidoo, R. “Beyond the Rectories: Noninterference in China’s African Policy”. Africa and Asian Studies (2010)

U.S.A. ANNUAL REPORT TO CONGRESS, (2011) “Military and Security Developments Involving The People’s Republic of China”.

Martin W. G. (2004) “Beyond Bush: The Future of Popular Movements & US Africa Policy” *Review of African Political Economy*, Vol. 31, No. 102, pp. 585-597<<http://www.jstor.org/stable/4007030>>

Ploch, L. (2009) “US Africa Command: A More »Active« American Approach to Addressing African Security Challenges?”

< [library.fes.de/pdf-files/ipg/ipg-2009-1/06\\_a\\_ploch\\_us.pdf](http://library.fes.de/pdf-files/ipg/ipg-2009-1/06_a_ploch_us.pdf)>

Osikena J. “*Geo-politics beyond Washington: Africa's alternative security and development partnerships*”. Foreign Policy Center < <http://fpc.org.uk/fsblob/1203.pdf>>

Wang J.,(2001) “ ‘Hot Peace’-Not Cold War-Between the US and China” *New Perspectives Quarterly*

Vol. 18, Issue 3, pages 16–19, Summer 2001

<<http://onlinelibrary.wiley.com/doi/10.1111/0893-7850.00412>>

## THE 2011 LANDING OF TURKEY ON SOMALIA: THE “STATE TO PEOPLE” ASPECT OF TURKISH FOREIGN POLICY TOWARDS SUB-SAHARAN AFRICA

*Volkan İpek*

Bilkent University, Department of Political Science, Bilkent Üniversitesi, Bilkent, Ankara

---

### Abstract

Although Turkey's relations with the African continent have had a long history, an unprecedented level of interaction is recently being observed between Turkey and Sub-Saharan Africa. Started by the growing importance of non-Western world in Turkish foreign policy apart from the 1990s, Sub-Saharan Africa became one of the regions where Turkey intensified its relations. The Africa Opening Plan that was prepared in 1998 has been the catalyzer of the Turkey's foreign policy initiative towards Sub-Saharan Africa. Through comparing the plan's initial objectives with the outcomes, we argue that the Turkey has successfully put the 1998 Plan into action. Behind this success was careful implementation of the cultural component of the plan, which helped to encourage not only state-to-state but also state-to-people and people-to-people relations. These two latter relations made Turkey's foreign policy initiative in Sub-Saharan Africa both sustainable and equitable.

---

**Keywords:** Turkey, Sub-Saharan Africa, Turkish foreign policy, Turkey-Africa relations, the 1998 Opening Action Plan

### Introduction

On the 19th of August 2011, a delegation composed of four Turkish ministers and several members of Turkey's cultural and business elite paid a visit to Mogadishu under the leadership of Prime Minister Erdogan. In addition to its official dimension, the visit was aimed at bringing moral support to Somalis who were suffering from a regional food scarcity. At that time, 2.8 million people were under serious threat of death at a rate of 10,000 adults per day in Somalia. Malnutrition exceeded 38% in some areas which left 20 % of the whole Somalia population without food.<sup>182</sup> The situation was so acute that famine was declared in the state by the United Nations for the very first time since 1984.

The August visit was not the first step Turkey took to resolve the famine crisis in East Africa. The Turkish government had sent 200 million USD to Somalia the month before, in addition to 350 million dollars collected by several Turkish NGOs for the East African famine<sup>183</sup>. The total Turkish contribution not only exceeded that of 54-member African Union which had pledged 350 million USD,<sup>184</sup> but it alone amounted to 10% of the 2 billion USD necessary to cope with such a famine according to the United Nations.

Nevertheless, it would be insufficient to measure Turkey's interest in the East African famine merely through its economic dimension. Prime Minister's visit in August 2011 also carried an important symbolic meaning. Erdogan became the first Western statesman who visited Somalia in the last twenty years<sup>185</sup>. By visiting the people of a country strained by the

---

<sup>182</sup> “Turning Japanese”, *The Economist*, July 30-August 5, 2011, pp.32.

<sup>183</sup> “Türkiye’den Somali’ye Yardım Eli Uzandı” available at

<http://siyasetdergisi.com.tr/Haber/TURKIYE'DEN-SOMALI'YE-YARDIM-ELI-UZANDI/129>

<sup>184</sup> “Ten Years on”, *The Economist*; September 3-9 2011, pp.36.

<sup>185</sup> Interview with the Somalian Ambassador to Turkey Nur Sh. Hamud, *Turkey Magazine*, Fall 2011, 34-37.

impacts of civil war, the actions of the Islamist group Al Shabaab and piracy, Erdogan pledged moral support to Somalis as well. His visit impressed not only the Somali people, but also the people of whole Sub-Saharan Africa.

If Turkey's recent engagement with East Africa and Somalia is addressed in a wider perspective, one might observe that the increasing level of Turkey-Somalia relations is not an isolated incident, but an extension of the Turkish state's opening up to Sub-Saharan Africa. Somalia was the 11th Sub-Saharan African country visited by the top Turkish state officials in 2011. Turkey also intensified its diplomatic representation in Sub-Saharan Africa by opening embassies in seven different Sub-Saharan countries, including Burkina Faso, Zambia and Mozambique. Turkish import and export rates with respect to Sub-Saharan Africa reached their peak with each amounting to 3.2 million USD<sup>186</sup>. Turkish Airlines launched its first flight to Mogadishu, which was the first service to the Somali capital by any European airline in two decades<sup>187</sup>. Five different official summits about Sub-Saharan Africa were held in Ankara and İstanbul. Moreover, 875 students from 39 different Sub-Saharan African countries were granted undergraduate scholarships in Turkey.<sup>188</sup>

The increasing level of interaction between Turkey and overall Sub-Saharan Africa in 2011 attests to the fact that the Somalia visit was actually part of a larger foreign policy schema. Once declared as the Africa Opening Plan, Turkey's Africa initiative dates back to 1998 and it is the main strategy which led to Turkey's recent success in building bridges between Turkey and Sub-Saharan African countries. In this framework, this article analyzes the motivations behind the Turkish state's opening to Sub-Saharan Africa by referring to 1998 Plan. By illustrating the steps Turkey took and the mechanisms it utilized in building closer relations with Sub-Saharan African states through 2012, we highlight the importance of the 1998 Opening Plan in Turkish-Sub-Saharan Africa relations. By comparing the plan's initial objectives with the actual outcomes, we argue that Turkey has had considerable success in its Africa opening throughout deliberate planning and initiative by the Turkish government and its commitment to take into account both Turkish and African societal demands. Once monitoring the level of success in the 1998 Plan, we resume how Somalia visit of 2011 reflects the state to people aspect of Turkish foreign policy towards Sub-Saharan Africa.

#### Sub-Saharan Africa in the pre-1998 Turkish Foreign Policy: A History

Until the end of the Cold-War, Turkish foreign policy has mainly focused on relations with the Western powers. The international circumstances of WWII and Cold War together with Turkey's domestic social, economic and political problems limited Turkey's outreach to non-Western societies.<sup>189</sup> Nonetheless, Turkish foreign policy has witnessed brief periods of attempts at a more proactive and multidimensional foreign policy which coincide with a relative increase in Turkey's relations with Sub-Saharan Africa. Turkey's opening up to non-Western world has gained a fresh momentum when Turkey's room for maneuver greatly increased especially after the Cold War. Along with newly independent states of Former Soviet Union and the Middle Eastern countries, Africa has emerged as a new focus of interest for Turkish foreign policy.

During the early Republic between 1923 and 1945, Turkey's relations with Sub-Saharan Africa were based on establishing limited diplomatic contacts. Even though the anti-imperialistic character of the Turkish War of Liberation triggered independence feelings for Sub-Saharan African communities, bilateral relations with Sub-Saharan Africa could not move beyond that point<sup>190</sup>. Ethiopia became the first and only Sub-Saharan African state

<sup>186</sup> T.C. Ministry of Economy, "Foreign Trade Statistics –February 2012" available at <http://www.ekonomi.gov.tr/index.cfm?sayfa=79192159-19DB-2C7D-3D5AE56731D11E50>

<sup>187</sup> "Nuclear Energy", *The Economist*, March 10–17, 2012, pp.13.

<sup>188</sup> Student Selection and Placement Center, *The Number of Foreign Students by Nationality* available at <http://www.osym.gov.tr/dosya/1-58220/h/21yabanciogrenciuyruk.pdf>

<sup>189</sup> Nasuh Uslu, *Turkish Foreign Policy in the Post-Cold War Period*, (New York: Nova Publishers, 2004)

<sup>190</sup> Ahmet Davutoglu, *Stratejik Derinlik*, (39<sup>th</sup> Edition), (Istanbul: Kure, 2009) pp. 207

where Turkey was diplomatically interested in opening an embassy in this period. The Embassy of Addis Adaba opened in 1926 became the first Embassy of Turkey in Sub-Saharan Africa. In 1945, Turkey implied health measures against Madagascar where plague revealed all of a sudden<sup>191</sup>.

Turkey's membership to the UN in 1946 and its entry into NATO in 1952 were defining points in Turkish foreign policy, not only in terms of its relations with the Soviet Union, but also with respect to its relations with Asian and African countries. Turkey's pro-British stance in Cyprus and the Suez Crisis and its disbelief in the effectiveness of neutrality in the face of Soviet expansionism, led to confrontation between Turkey and African states that took part in Non-Aligned Movement. The pro-Western attitude Turkey displayed in the Bandung Conference of 1955 caused tension between sides. Moreover, Turkey's failure to support Algeria's independence in the UN General Assembly in 1956<sup>192</sup> inflicted a serious blow to Turkish-African relations<sup>193</sup>. Apparently, Turkish foreign policy on Sub-Saharan Africa seemed dominated by total Western dependence in this period.<sup>194</sup> Despite all, this period witnessed a number of positive developments with respect to Turkey-Sub-Saharan Africa relations. Turkey's support for the UN General Assembly decision to send economic assistance to the Sahel region<sup>195</sup> in 1948 helped to warm relations with Sub-Saharan Africa.<sup>196</sup> Turkey also opened a General Consulate in Nigeria in 1956<sup>197</sup> and an Embassy in Ghana in 1957. The opening of the Ghana Embassy was a clear sign of Turkey's recognition of Ghana's independence.<sup>198</sup>

From mid-1960s onwards, Turkey tried to redress its relations with the non-Western world as Turkey-US relations deteriorated due to Cyprus issue.<sup>199</sup> This period also converged with the decolonization process in the African continent. Turkey recognized newly independent countries and attempted to develop economic, cultural and political relations with them.<sup>200</sup> In the next five years, Turkey opened embassies in Lagos (Nigeria) in 1960, in Dakar (Senegal) in 1962, and in Nairobi (Kenya) in 1968.<sup>201</sup> Emperor of Ethiopia Haile Selasiye visited Turkey in March 1967 whereas Turkish President Cevdet Sunay visited Ethiopia in December 1969.

The 1970s started with the ongoing deterioration of relations between Turkey and the US. The US pressure on poppy cultivation in Turkey, Turkey's Cyprus intervention and the subsequent US arms embargo not only exacerbated the anti-American feelings in Turkish public opinion but also gave a new boost to diversification of Turkey's foreign relations. As expected, these feelings were implicated on Turkey's relations with Sub-Saharan Africa. In November 1971, Selasiye paid his second visit to Turkey. The 1976 opening of Turkey's Embassy in Kinshasha (Democratic Republic of the Congo), the medical assistance package

<sup>191</sup> Decision No. 5944, Sıhhat ve İçtimai Muavenet Bakanlığının Madagaskar Muvarıdatına Karşı Vebaya Mahsus Tedbirler Konulduğuna Dair Tamimi, Official Gazette of Republic of Turkey, 01 March 1945

<sup>192</sup> Meliha Altunışık, "Worldviews and Turkish Foreign Policy in the Middle East." *New Perspectives on Turkey, Special Issue on Turkish Foreign Policy* 40, (2009):.169-92; 174.

<sup>193</sup> Mehmet Ozkan, "Türkiye'nin Afrika Acilimi ve Asya ile İlişkileri" in *Türkiye'de Dış Politika*, (ed) İbrahim Kalin (Istanbul: Meydan Yayıncılık, 2011): 115-139, 121

<sup>194</sup> Mustafa Aydın, "Determinants of Turkish foreign policy: Changing Patterns and Conjectures During the Cold War," *Middle Eastern Studies* 36, no.1 (2000):103-139; 105.

<sup>195</sup> Northern region of present-day Burkina Faso.

<sup>196</sup> Feridun C. Erkin, "Turkey's Foreign Policy", *Proceedings of the Academy of Political Science* 24, no. 4, (1952):122-133., 127-128

<sup>197</sup> Salih Zeki Karaca, "Turkish Foreign Policy in the Year 2000 and Beyond: Her Opening up Policy to Africa" *Dış Politika (Foreign Policy)* Vol: 25, no. 3-4 (2000): 115-119; pp. 116

<sup>198</sup> Numan Hazar, "The Future of Turkey-Africa relations, *Dış Politika (Foreign Policy)* Vol:25,no:3-4 (2000), 110.

<sup>199</sup> Aydın, 2000, 130

<sup>200</sup> Hazar, 2000, 110.

<sup>201</sup> Numan Hazar, *Küreselleşme Sürecinde Afrika ve Afrika-Türkiye İlişkileri* (Ankara: Yeni Türkiye Medya Hizmetleri, 2003).

sent to Zimbabwe in 1978 and the Economic and Technical Cooperation agreement signed with Sierra Leone<sup>202</sup> in 1979 underlined the beginnings of a new sensitivity in Turkish foreign policy towards Sub-Saharan Africa.<sup>203</sup> Furthermore, Turkey designed an Action Plan and established a new administrative system in the Ministry of Foreign Affairs to materialize its multifaceted foreign policy objectives<sup>204</sup>. One crucial element was creation of regional desks, each responsible for Turkey's relations with different regions. However, lack of personnel in the Ministry led to the abandonment of the Plan.

In the 1980-1983 period, Turkey was under a direct military rule whose influence in politics remained during the next few years. Due to the economic difficulties, Turkey had to close its Ghana Embassy in 1981. In January 1982, the President of Sudan, Mohammed Nimeyri visited Turkey. Same year, Turkey's first graduate program on African Studies was opened at Gazi University. Towards the end of the 1980s, however, "activism" and "multi-faceted" foreign policy was again on the agenda with the impact of economic liberalization and Turkish President Ozal's strong convictions about liberal economic development and foreign policy. While Turkey's fast economic liberalization estranged a few Sub-Saharan countries<sup>205</sup>, official economic agencies like State Planning Organization (SPO) and Treasury became assets in Turkey's new foreign policy implementation mechanism. In 1985, SPO started Turkey's first official development program which amounted to 10 million USD to be used for institutional capacity building in Gambia, Guinea, Guinea-Bissau, Mauritania, Senegal, Somalia and Sudan.<sup>206</sup> Turkey signed a cooperation agreement with Uganda on industry, trade, agriculture and air transportation in 1987.<sup>207</sup> It also made trade, economic and technical cooperation agreements with Botswana,<sup>208</sup> Chad,<sup>209</sup> Djibouti,<sup>210</sup> Gambia,<sup>211</sup> and Zambia<sup>212</sup> in 1989.

The end of Cold War made Turkish policy makers to reconsider Turkey's strategic importance to the US. Turkey's foreign policy activism and multi-dimensionalism in the post-Cold War was based on an understanding that Turkey's future with the West would rely on its relations with the non-West. Accordingly, Özal administration signed more international agreements with the non-West than any other previous administration in Turkish history.<sup>213</sup>

<sup>202</sup> Decision No. 7/18294 "Türkiye Cumhuriyeti Hükümeti ile Sierra Leone Cumhuriyeti Hükümeti Arasında Ekonomik ve Teknik İşbirliği Anlaşması" *Official Gazette of Republic of Turkey*, no. 16823, November 28, 1979.

<sup>203</sup> Hazar, 2003.

<sup>204</sup> Karaca, 2000, 117- 118.

<sup>205</sup> One of these countries was Ethiopia. The Communist Derg regime in Ethiopia forced Turkey to close its embassy there in 1984

<sup>206</sup> Turkish Ministry of Foreign Affairs, "Turkey's Development Cooperation" available at <http://www.mfa.gov.tr/turkiyenin-kalkinma-isbirligi.tr.mfa>

<sup>207</sup> Dec. No. 87/12077 Uganda Cumhuriyeti Hükümeti ile Hükümetimiz Arasında Sanayi, Ticaret, Tarım, Bayındırlık ve Hava Ulaşım Alanlarında İşbirliğine Dair Mutabakat Zaptının Onayı Hakkında Karar *Official Gazette of Republic of Turkey*, no.19635, November 15, 1987.

<sup>208</sup> Dec. No. 90/1057 Botswana Cumhuriyeti Hükümeti ile Türkiye Arasında Teknik İşbirliği Anlaşmasının Onaylanmasına Dair Karar *Official Gazette of Republic of Turkey*, no. 20315, November 21, 1990

<sup>209</sup> Dec. No. 89/14552 Nijer, Türkiye ve Çad Arasında İmzalanan Teknik İşbirliği Anlaşmaları ile Tutanaklarının Onaylanması Hakkında Karar *Official Gazette of Republic of Turkey*, no. 20329, November 1, 1989

<sup>210</sup> Dec. No. 89/14402 Cibuti Cumhuriyeti ile Türkiye Arasında İmzalanan Ticaret, Ekonomik ve Teknik İşbirliği Anlaşmasının Onayına Dair Karar *Official Gazette of Republic of Turkey*, no. 20272, September 04, 1989

<sup>211</sup> Dec. No. 89/14701 Gambiya Hükümeti ile Türkiye Arasında İmzalanan Teknik İşbirliği Protokolünün Onaylanmasına Dair Karar *Official Gazette of Republic of Turkey*, no.20339, November 11, 1989

<sup>212</sup> Dec. No. 89/14527 Zambiya ve Botswana Cumhuriyetleri ile Türkiye Arasında Yapılan Teknik Yardım İşbirliği Mutabakat Zaptının Onaylanması Hakkında Karar *Official Gazette of Republic of Turkey*, no. 20315, October 17, 1989,

<sup>213</sup> Muhittin Ataman, "Leadership Change: Ozal Leadership and Restructuring in Turkish Foreign Policy" *Alternatives: Turkish Journal of International Relations* Vol. 1, No.1 (2002):120-153; p. 132

With respect to Sub-Saharan Africa, Turkey signed cooperation agreements with Sudan on health,<sup>214</sup> security<sup>215</sup> and culture,<sup>216</sup> and economic and technical cooperation agreement with Senegal<sup>217</sup> in 1993. Formal bilateral visits have also become more frequent in this period. Foreign Affairs Minister of Cameroon Jacques Roger Booh paid a visit to Turkey in August 1991. In 1993, President Özal visited Senegal. In 1996, Turkish Prime Minister Necmettin Erbakan visited Nigeria to sign a trade cooperation agreement<sup>218</sup> and the President of Kenya Daniel Arap-Moi visited Turkey. Moreover, Turkey opened an embassy in Republic of South Africa in 1994.

Whereas Turkey's international economic relations showed a dramatic development in the post-Cold War, its political relations suffered a serious blow in 1997 when the European Union denied Turkey official candidate status due to problems regarding relations with Greece and Cyprus. In response, Turkey decided to freeze its political dialogue with the European Union.<sup>219</sup> The frustration with the EU and the popular distrust of the EU's sincerity, as a result, led to reconsiderations about the need for a more multidimensional foreign policy. Africa has become one of the foci of these considerations. While Turkey went on its normal relations by signing bilateral agreements with African countries,<sup>220</sup> preparations were made for a more sustained effort to develop Turkey's relations with Africa in general, and with Sub-Saharan Africa in particular.

Preparation of the 1998 Opening Action Plan involved multiple actors among Turkish politics, diplomacy, business groups and civil society. In addition to representatives of several ministries, private organizations and individual companies, ambassadors and honorary consuls of African states attended series of meetings to discuss recent Turkey-Africa relations. Consequently, the 1998 Plan consisted of multiple components, which embody a wide array of issues and domains. Its diplomatic component aimed at improving official Turkish representation in Africa, whereas its political component was designed to increase bilateral contacts. Moreover, its economic component was designed to develop economic and trade relations between sides. The cultural component, on the other hand, was designed to familiarize Sub Saharan Africa in Turkey and Turkey in Sub-Saharan Africa.

### **Taking "Action" on Sub-Saharan Africa: The 1998 Opening Plan**

Designed in four components, the 1998 Opening Action Plan aimed at bringing vitality to Turkey's relations with African states. However, the coalitional confrontations and the

<sup>214</sup> Dec No.91/1634 Sudan Cumhuriyeti ile Yapılan Sağlık Alanında İşbirliğine İlişkin Anlaşmanın Onaylanmasına Dair Karar *Official Gazette of Republic of Turkey* no. 20843 April 12, 1991.

<sup>215</sup> Dec No. 92/3632 Sudan Cumhuriyeti İçişleri Bakanlığı ile İçişleri Bakanlığımız Arasında Güvenlik İşbirliği Protokolünün Onaylanmasına Dair Karar *Official Gazette of Republic of Turkey*, no.21401, November 10, 1992.

<sup>216</sup> Dec. No. 93/4783 Sudan Cumhuriyeti Hükümeti ile Hükümetimiz Arasında 1993-1994-1995 Yılları için Kültür Anlaşması İcra Programının Onaylanması Hakkında Karar *Official Gazette of Republic of Turkey*, no. 21719, October 5, 1993.

<sup>217</sup> Dec. No. 93/3963 Senegal Cumhuriyeti Hükümeti ile İmzalanan Ticaret, Ekonomik ve Teknik İşbirliği Anlaşmasının Onaylanmasına Dair Karar *Official Gazette of Republic of Turkey*, no. 21487, February 5, 1993

<sup>218</sup> Dec. No. 96/8896 Nijerya ile Türkiye Arasında İmzalanan Ticaret Anlaşmasının Onaylanması Hakkında Karar *Official Gazette of Republic of Turkey*, no. 22855, December 22, 1996.

<sup>219</sup> F. Stephen Larrabee and Ian O. Lesser, "Turkish Foreign Policy in an Age of Uncertainty", RAND Corporation (MR-1612), 2003, 51-52.

<sup>220</sup> Dec. No. 97/9604 "Gana ile Türkiye Arasında Ticaret ve Ekonomik ve Teknik İşbirliği Anlaşmasının Onayına Dair Karar" *Official Gazette of Republic of Turkey*, no. 23067, August 1, 1997 and Dec. No. 97/9273 "Gine ile Türkiye Arasında İmzalanan, Ticaret, Ekonomik ve Teknik İşbirliği Anlaşmasının Onaylanması Hakkında Karar" *Official Gazette of Republic of Turkey*, no. 22977, May 2, 1997.

economic crisis of 2000-2001 that drifted Turkey into a significant political and economic turbulence restricted Turkish policy makers' capacity to implement it on time<sup>221</sup>.

Once the effects of economic crisis began to fade and a single party (Justice and Development Party –JDP) was brought to power by the general elections of 2002, the plan was revisited. With the support of business groups and civil society, “The Strategy for Developing Economic Relations with Africa” was prepared by the Under-Secretariat of Foreign Trade in March 2003. This strategy was used by JDP as the catalyst for the 1998 Plan<sup>222</sup>.

### Diplomatic Component

The diplomatic component of the 1998 Plan would consist of four main measures. Specifically, the level of Turkey's diplomatic representation would be increased, existing infrastructures of Turkish embassies would be improved, and Turkish honorary consuls would be appointed in Africa. Last but not least, ambassadors to embassies in Africa would be given direct accreditation.<sup>223</sup>

The diplomatic component basically gave priority to expansion of Turkish embassies in Africa. Accordingly, ambassadors were given direct accreditation to fourteen<sup>224</sup> new Turkish embassies in Sub-Saharan Africa from Ankara. Whereas the Turkish embassies in Ivory Coast and Tanzania were opened in 2009, the ones in Angola, Cameroon, Ghana, Madagascar, Mali and Uganda were opened in 2010, and the ones in Mauritania, Mozambique, Zambia and Zimbabwe were opened in 2011. The very same year, Turkey signed necessary protocols to open embassies in Burkina Faso, Chad, Gabon, Gambia, Guinea, Namibia, Niger and South Sudan by 2012.

Similarly, between 2003 and 2011 new Turkish Honorary Consulates were opened in Sub-Saharan African countries including, Botswana, Burkina Faso, Central African Republic, Congo, Equatorial Guinea, Eritrea, Gabon, Gambia, Guinea, Guinea Bissau, Mauritania, Mauritius, Sierra Leone, Sudan, Swaziland and Togo<sup>225</sup>. In line with the 1998 Plan, infrastructures of some Turkish Embassies in Sub-Saharan Africa were also improved. In 2010, the Turkish Embassies in Madagascar and Ghana moved to proper buildings from the hotel rooms they were operating until that time.

Table 1: Opening years of Turkish Embassies in Sub-Saharan Africa in the Republican period.

Year	1926	1960	1962	1968	1974	1978	1994	2009	2010	2011	2012
Number of embassies opened	1	1	1	1	1	1	1	2	6	4	8

Note: Sub-Saharan Africa includes all countries in Africa except North African countries. Source: Turkish Ministry of Foreign Affairs

### Political Component

The political component of the 1998 Opening Action Plan would also consist of four measures. Mutual official visits would be paid between Turkey and Africa, more contacts with African policy makers would be established through international organizations, political consultation mechanisms would be founded between sides, and peacekeeping and humanitarian assistance would be provided<sup>226</sup>.

<sup>221</sup> Mehmet Özkan and Birol Akgün, “Turkey's Opening to Africa”, *The Journal of Modern African Studies*, Vol. 48, No. 4 (2010): 525-546, 533; "Kemal Kirişci and Neslihan Kaptanoğlu, "The Politics of Trade and Turkish Foreign Policy" *Middle Eastern Studies* 47.5 (2011): 705-724, 713.

<sup>222</sup> Alain Vicky, “La Turquie à l'assaut de l'Afrique”, *Le Monde Diplomatique*, Mai 2011, available at <http://www.monde-diplomatique.fr/2011/05/VICKY/20450>

<sup>223</sup> Hazar, 2000, 110.

<sup>224</sup> Turkish Ministry of Foreign Affairs, “Turkey-Africa Relations” available at <http://www.mfa.gov.tr/turkiye-afrika-iliskileri.tr.mfa>

<sup>225</sup> Turkish Ministry of Foreign Affairs “Sub-Saharan Africa” available at <http://www.mfa.gov.tr/turkiye-afrika-iliskileri.tr.mfa>

<sup>226</sup> Hazar, 2000, 110.

The 1998 Plan prioritized mutual official visits that mainly concerned President, Prime Minister, Foreign Affairs Minister and the Parliament. In addition to President of Chad who visited Turkey in April 2000, Turkey hosted presidents of sixteen Sub-Saharan African states during the First Turkey-Africa Cooperation Summit in 2008, the 4<sup>th</sup> UN Least Developed States Conference in 2011, and regular trips<sup>227</sup>. On the other hand, Turkey paid Presidential visits to Senegal in 2008, Kenya and Tanzania in 2009, Congo Democratic Republic, Cameroon, Nigeria in 2010, Ghana and Gabon in 2011.

Beyond mutual Presidential visits, six Sub-Saharan African Prime Ministers and twenty six Foreign Affairs Ministers have paid visits to Turkey since 2003.<sup>228</sup> Similarly, most of these visits were paid around the First Turkey-Africa Cooperation Summit, the 4<sup>th</sup> UN Conference on the Least Developed states, and on regular trips<sup>229</sup>. On the other hand, Turkey paid Prime Minister level visits to Ethiopia and South Africa in 2005, Sudan in 2006, Ethiopia in 2007 and Turkish Minister of Foreign Affairs visited Ethiopia, Republic of South Africa and Somalia in 2011. These high level officials were the first to visit these states. Whereas Erdogan became the first Turkish Prime Minister to give a speech at an African Union Assembly in his 2007 Ethiopia visit, Gül became the first Turkish President to give a speech in the parliament of a Sub-Saharan African state in his 2011 Ghana visit. Between 2008 and 2011, seventy five other Ministerial meetings were held between Turkish and Sub-Saharan African states<sup>230</sup>.

Table 2: High level visits from Turkey to Sub-Saharan Africa in the Republican period

Years	President	Prime Minister	Foreign Affairs Minister	Total
1923-1998	2	1	1	4
1998-2003	-	-	-	-
2003-2012	8	4	3	15

Note: 1<sup>st</sup> of January 2012 is the limit to the years. Source: Turkish Ministry of Foreign Affairs

Mutual official visits did not only include President, Prime Minister and Foreign Affairs Minister levels but also inter-parliamentary ones. Inter-parliamentary Friendship Committees were the main mechanism in organizing these visits. Turkish parliament established friendship committees with Sudanese Parliament in 1999, the Malian Parliament in 2006, the Ghanaian Parliament in 2009, and the Tanzanian Parliament in 2010. In addition, delegations from the Foreign Affairs Commissions of the Sudanese National Parliament and the Senegalese National Parliament visited the Turkish parliament in 2009 and 2010 respectively. Also, a delegation from Kenyan Parliamentary Committee on Local Authorities and Accounts Funds visited Turkey in 2010<sup>231</sup>.

Apart from visits, the meetings of international organizations were also utilized for establishing contacts between Turkish and Sub-Saharan African policy makers. Turkish President Gül met the Presidents of Benin, Cameroon, Cape Verde, Central African Republic, Madagascar, Namibia, Swaziland and Zimbabwe at the 63<sup>rd</sup> UN General Assembly in

<sup>227</sup> Presidents of Mauritius, Senegal, and Sudan in 2008, President of Djibouti in 2009, Presidents of Mauritania, Tanzania, Uganda, Somalia and Zambia in 2010, Presidents of Nigeria, Benin, and Zanzibar in 2011 visited Turkey for regular trips.

<sup>228</sup> Turkish Ministry of Foreign Affairs, Directorate General for Bilateral Political Affairs (Africa, East Asia and Oceania) "Turkey-Africa Partnership: Developments since the Turkey-Africa Cooperation Summit", December 2011, 8-9.

<sup>229</sup> Foreign Affairs Ministers of Benin, Gambia, Guinea, Guinea Bissau, Nigeria, Mauritania, Malawi and Prime Ministers of Togo and Niger attended the First Turkey-Africa Summit in 2008; Foreign Affairs Ministers of Uganda, Rwanda, Malawi, Sierra Leone, Central African Republic, and Prime Minister of Lesotho attended the 4th UN Conference on the Least Developed States in 2011. Foreign Affairs Minister of Botswana in 2009, Foreign Affairs Ministers of Botswana, Senegal and Tanzania in 2010; Foreign Affairs Minister of Ghana in 2011 and Foreign Affairs Minister of Cameroon in 2012 visited Turkey for regular trips.

<sup>230</sup> "Turkey-Africa Partnership," 13-14.

<sup>231</sup> "Turkey-Africa Partnership," 19-20.

September 2008. One year later, Turkish Prime Minister Erdogan met the Prime Minister of Somalia and the President of Tanzania at the 64<sup>th</sup> UN General Assembly in September 2009. During the 65<sup>th</sup> UN General Assembly that took place in 2011, President Gül met with the Presidents of Gabon and Namibia, whereas the Turkish Foreign Affairs Minister Davutoglu met with the Foreign Affairs Ministers of Cameroon, Central African Republic, Democratic Republic of Congo, Eritrea, Gambia, Madagascar, Mozambique, Rwanda, South Africa, Tanzania, Uganda. Moreover, Turkey was represented at the African Union Summits<sup>232</sup>. As envisaged in the 1998 Action Plan, Turkey signed protocols to establish political consultation mechanisms with Kenya in 2008, Ethiopia, Republic of South Africa, Sudan, Tanzania and Uganda in 2009, Cameroon and Gabon in 2010, Ethiopia, Sudan and Ghana in 2011<sup>233</sup>. The Turkish government also held two international conferences on Somalia; Istanbul I in 2010 and İstanbul II in 2012, which aimed to build international consensus to state-building and economic development in Somalia. The conferences also sought to include representation from Somali people in order to promote home-grown solutions to Somalia crisis<sup>234</sup>.

There have also been efforts to carry out the last part of the political component, providing peacekeeping and humanitarian assistance to Africa. In this context, Turkey has taken part in nine UN Peacekeeping operations<sup>235</sup> since 2008. Seventeen officers have been appointed to UN Mission in Ivory Coast (UNOC), fifteen police corps have been appointed to UN Mission in Democratic Republic of Congo (MONUC), twenty seven police corps have been appointed to UN Mission in Liberia (UNMIL), twenty seven officers have been appointed to UN Mission in Sudan (UNMIS), three police corps have been appointed to UN Mission in Central African Republic and Chad (MINURCAT), eleven police corps have been appointed to UN Mission in Darfur (UNAMID), and twelve officers have been appointed to UN Mission in South Sudan (UNMISS) since 2008. Moreover, Turkey donated 1 million USD to the African Union's mission in Somalia. Concerning humanitarian assistance, the Turkish state donated 6,375 million USD to Comoros, Chad, Democratic Republic of Congo, Djibouti, Ethiopia, Kenya, Madagascar, Malawi, Mali, Niger, Somalia, and Uganda between 2006 and 2011.<sup>236</sup>

### **Economic Component**

The economic component of the 1998 Plan would consist of nine measures. According to the Plan, the foreign trade volume with African states would be increased; trade, economic and technical cooperation (TET) agreements with African states would be signed, government officials from Ministries of Trade, Industry, Health, Agriculture and Education in African states would be invited; short term training programs for African experts in the fields of health, agriculture, pharmaceutical industry, mining, water managements would be organized, a special technical assistance fund would be established for African states, Turkey's membership to African Development Bank as a non-regional donor and to African exports and Imports Bank as a shareholder would be realized, Joint Business Councils or Chambers of Commerce with African states would be founded, communication and transportation links (both air and maritime) with African states would be set up, and finally Turkish contractors would be encouraged to enter African markets<sup>237</sup>.

Building on the 1998 Action Plan, the 2003 Strategy aimed at establishing country-based action plans for each and every African state<sup>238</sup>. Consequently, the 2003 Strategy was a

<sup>232</sup> "Turkey-Africa Partnership" 14.

<sup>233</sup> "Turkey-Africa Partnership" 16-17.

<sup>234</sup> II. Istanbul Conference on Somalia Official Website, <http://somalikonferansi.mfa.gov.tr/about.en.mfa>

<sup>235</sup> Turkish Undersecretariat of Foreign Trade "Strategic Plan 2009-2013" 51, available at

<http://www.ekonomi.gov.tr/upload/strateji/belge.pdf>

<sup>236</sup> "Turkey-Africa Partnership" 39-40.

<sup>237</sup> Hazar, 2000, 110.

<sup>238</sup> "Strategic Plan 2009-2013", 54.

milestone concerning the trade between Turkey and Sub-Saharan Africa. Between 1998 and 2012, Turkey's annual import average with Sub-Saharan Africa was 1,597 billion USD. Whereas this average was 454 million USD between 1998 and 2003, it reached 2,232 billion USD between 2003 and 2012. A similar trend was observed in Turkey's export with Sub-Saharan Africa. Between 1998 and 2012, Turkey's annual export average with Sub-Saharan Africa is 1,378 billion USD. Whereas this average was 342 million USD between 1998 and 2003, it reached 1,954 billion USD between 2003 and 2012. In 2011, Turkey's overall foreign trade volume with Sub-Saharan Africa reached to 6.9 billion USD compared to 1.3 billion USD in 2003.

Table 3: The import-export of Turkey with Sub-Saharan Africa between 1996 and 2011 in million US dollars

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Import	265	283	457	704	558	820	1589	1835	2526	3168	2503	2158	2108	3384
Export	316	311	285	371	430	554	765	1087	1469	1947	3212	2735	2258	3558

Source: TUIK data on the import-export rates of Turkey with Sub-Saharan African states. For further details, please visit <http://www.ekonomi.gov.tr/index.cfm?sayfa=7155BE01-D8D3-8566-45208351967592CF>

Instrumental to increasing the foreign trade volume between Turkey and Sub-Saharan Africa, were the TET agreements, signed with Mali and Congo in 2000, Uganda and Sudan in 2005, Burkina Faso and Malawi in 2006, Madagascar and Kenya in 2007, Ivory Coast and Angola in 2008, and Cameroon in 2010<sup>239</sup>. With these agreements, eighty one technical ministers from Sub-Saharan African states visited Turkey to discuss the cooperation possibilities in related domains<sup>240</sup>. The Turkish International Cooperation and Development Agency (TIKA) were appointed as the responsible organ for managing special technical assistance fund. To facilitate its operations, TIKA opened branches in Addis Ababa, Khartoum and Dakar. In the context of African Development Program, TIKA concluded seventy projects in twenty two countries since 2006. These projects were diverse in terms of their purposes and functions, ranging from the inspection of water resources in Djibouti and the donation of a garbage truck to Mali, to building a village of six hundred houses, a police station and a mosque in the Darfur region<sup>241</sup>. Through these projects and donations, several Turkish experts were sent to Sub-Saharan Africa.

The Turkish government also took steps towards participating in African regional economic organizations. The Turkish Embassy in Nigeria became accredited to the West African Economic Community (ECOWAS) in 2005. Moreover, Turkey became the 25th non-regional member of African Development Bank, a member of African Exports and Imports Bank, and a member of the International Partners Forum of the Inter-governmental Development Authority in 2008. Joint economic commissions were established with the Democratic Republic of Congo, Ethiopia, Mali and Sudan in 2009, Burkina Faso, Djibouti, Kenya, Senegal, Nigeria and Uganda in 2010 and with Mali in 2011<sup>242</sup>. Business Forums were created with Nigeria and Ghana in 2010; and with Ghana, Gabon and South Africa in 2011 along with Trade and Investment Forums established with Cameroon in 2010 and Tanzania in 2011<sup>243</sup>. Seven more Trade Attachés were appointed to Sub-Saharan Africa from

<sup>239</sup> *Strategic Plan 2009-2013*, 53

<sup>240</sup> In 2008, Gambian Minister of International Cooperation, Gabonese Minister of Economy; in 2010 Ivory Coast Minister of Trade, Ghanaian Minister of Trade, and Cameroonian Minister of Industry; in 2011 Angolan Minister of Finance, Swaziland Minister of Economy and Development and Zimbabwean Minister of Finance visited Turkey for technical cooperation talks. "Turkey-Africa Partnership Developments since the Turkey-Africa Cooperation Summit report", 24-26.

<sup>241</sup> "Turkey-Africa Partnership" 38.

<sup>242</sup> "Turkey-Africa Partnership" 32.

<sup>243</sup> "Turkey-Africa Partnership", 33

Turkey in 2007. Moreover, the Turkish Union of Chambers and Commodity Exchanges (TOBB) and the Union of African Chamber of Commerce, Industry and Agriculture Professions (UACCIAP) met for further cooperation to establish a Turkey-Africa Chamber<sup>244</sup>.

In order to facilitate movement of people and goods, transportation agreements were signed with Kenya, Gambia, Somalia, Mali and Ghana in 2009, Uganda and Zambia in 2010 and Sierra Leone in 2011. Recently, Turkish Airlines launched direct flights to Khartoum (Sudan), Addis Ababa (Ethiopia) and Lagos (Nigeria) in 2006, Johannesburg and Cape Town (South Africa) in 2007, Nairobi (Kenya) and Dakar (Senegal) in 2009, Dar'es selam (Tanzania), Entebbe (Uganda) and Accra (Ghana) in 2010, and Kigali (Rwanda) and Mogadishu (Somalia) in March 2012<sup>245</sup>.

In addition to government sector, Turkish business groups also took initiatives. Turkey-Africa Trade Bridges were organized by Confederation of Turkish Businessmen and Industrialists (TUSKON). Organizing seven Foreign Trade Bridges meetings since 2006 in Turkey, TUSKON provided a stable atmosphere where business possibilities in Sub-Saharan Africa and Turkey were discussed<sup>246</sup>. TUSKON also organized the 4th United Nations the Least Developed Countries Summit in 2011, where policy makers and businessmen from around the world had the opportunity to meet and address problems regarding Africa. In addition, the Commission of Foreign Economic Relations (DEIK) organized a Turkey- South Africa Forum in 2011 to increase the attention of Turkish businessmen to Africa.

### Cultural Component

The cultural component of the 1998 Opening Action Plan would consist of five measures. In this framework, cultural agreements would be concluded with African states, scholarships would be granted to African students, African scholars would be invited to various international seminars or international festivals, trainings for African military and diplomatic personnel would be organized, and an Institute of African Studies would be found.<sup>247</sup>

In line with the 1998 Plan, Turkey signed cultural agreements with Cameroon, Djibouti, Ethiopia, Gabon, Nigeria, Senegal and South Africa between 2005 and 2011. Moreover, several delegations related to culture visited Turkey between 2009 and 2012<sup>248</sup>. Technical cooperation agreements on education were signed with Djibouti, Ethiopia, Nigeria, Republic of South Africa in 2009, and similar agreements on tourism were signed with Kenya and Nigeria in 2010, and Ghana in 2011.

Offering scholarships to African students has been the most effective part of the cultural measures. Regular undergraduate and graduate scholarships to students from all African states have been offered by the government since 2003. The scholarships attracted 5554 students from Sub-Saharan Africa to Turkish universities between 2003 and 2012.<sup>249</sup> With these offers, a larger number of Sub-Saharan African students were granted scholarships. It is also important to note that the number of the recipient Sub-Saharan countries has also increased.

<sup>244</sup> Akgün and Özkan, 2011, 536.

<sup>245</sup> Turkish Airlines, [www.thy.com.tr](http://www.thy.com.tr).

<sup>246</sup> 1st Turkey-Africa Trade Bridge was held on 8th-9th of May 2006, 2nd Turkey-Africa Bridge was held on 18th-19th of May 2007, 3rd Turkey-Africa Bridge was held on 13th-15th of May 2008, 4th Turkey-Africa Bridge was held on 3rd-5th of June 2009, 5th Turkey-Africa Bridge was held on 4th-5th of November 2010 and the 7th Turkey-Africa Bridge was held on 16th of December 2011 in Turkey.

<sup>247</sup> Hazar, 2000, 111.

<sup>248</sup> In 2009, Education Minister of Ivory Coast and a delegation from the Mozambique Ministry of Education; in 2010, Congolese Minister of Education and Ivory Coast Minister of Youth and Sports; and in 2011, Nigerian Minister of Education visited Turkey.

<sup>249</sup> Student Selection and Replacement Center (OSYM) *Book of Statistics of Higher Education in Turkey*. Available at <http://osym.gov.tr/belge/1-128/sureli-yayinlar.html>

Table 4: Number of Sub-Saharan African students and number of different Sub-Saharan African states in Turkish universities between 1998 and 2011.

Academic Year	Number of Sub-Saharan African students/Total Number of Foreign students in Turkish universities	Number of Sub-Saharan African students' countries
2002-2003	236/15017	27
2003-2004	326/14693	27
2004-2005	278/14794	22
2005-2006	296/15481	27
2006-2007	348/15893	27
2007-2008	422/16829	34
2008-2009	484/18158	36
2009-2010	643/21361	36
2010-2011	875/25545	39

Source: Student Selection and Replacement Center (OSYM) *Book of Statistics of Higher Education in Turkey*. Available at <http://osym.gov.tr/belge/1-128/sureli-yayinlar.html>

As the 1998 Plan envisaged, The Center for African Studies (AÇAUM) was founded by the Ankara University in 2008. The Center invited professors to lecture on Sub-Saharan Africa in its master program such as Dr.Nancy Walker and Dr.Getie Gelaye<sup>250</sup>. AÇAUM publishes its monthly “Afrika Gündemi” (The African Agenda), and has launched the first issue of biannual scholarly journal *Afrika*. It also organized cultural events like African Poetry, Movie, Book Days and occasional seminars on African countries.

The Turkish government also organized “the Young Diplomats Training Program” in which several diplomats from nineteen Sub-Saharan African states participated between 2009 and 2011.<sup>251</sup> Moreover, more than 200 military personnel from Africa received training at Turkish military schools. As of 2011, 60 students from 12 different Sub-Saharan African states have been trained in these schools.<sup>252</sup>

The cultural relations between Turkey and Sub-Saharan African countries have moved beyond steps foreseen in the 1998 Plan, by the active involvement of civil society and private sectors. After AÇAUM, several graduate programs, think tanks, corporations and associations focusing on Africa were founded. Izmir Economy University, Kadir Has University and Kırklareli University opened graduate programs in African Studies in 2009, 2010 and 2011 respectively. Think-tanks with special desks on Africa like the Turkish Eurasian Research Center (TASAM) and private corporations such as Afroturk and African Innovation and Development Ankara (AIDA) were also founded. Africa Brotherhood and Cooperation Association were founded in 2010 to provide humanitarian assistance to African peoples.<sup>253</sup> Turkish education did not only accept African students, but also spread into Sub-Saharan Africa with the Turkish primary schools and colleges in Angola, South Africa, Burkina Faso, Ivory Coast, Gambia, Guinea, Cameroon, Kenya, Congo, Congo Democratic Republic, Liberia, Senegal, Tanzania, Mauritania, Nigeria, Sudan and Zambia. The Turkish media and private cultural institutions have also become more interested in Sub-Saharan Africa.<sup>254</sup> Accordingly, in May 2012, a Turkey-Africa Media forum was organized by the Directorate General of Press and Information of Turkey (DGPI) with the support of the African Media

<sup>250</sup> Ankara University, Afrika Çalışmaları Araştırma ve Uygulama Merkezi <http://www.acaum.org/arastirma-egitim/konuk-ogretim-uyeleri.html>

<sup>251</sup> “Turkey-Africa Partnership,” 68.

<sup>252</sup> “Turkey-Africa Partnership,” 52.

<sup>253</sup> Africa Brotherhood and Cooperation Association Website, <http://www.afkad.org/Afkad%2BHakk%C4%B1nda>

<sup>254</sup> “Yedek Yaşamlar” *Cumhuriyet*, 9 April 2012; “Memleket Meselesi” TRT Gap, 2 January, 2012. Haber Afrika Website <http://www.haberafrika.com>; are examples for growing interest in Turkey about African affairs. Afrika Gündemi by AÇAUM and Afrika Günlüğü by TASAM, provide daily reviews on developments in Africa

Initiative (AMI).<sup>255</sup> 270 Media representatives from 54 African countries met during the forum and agreed to establish a journalist exchange program under the auspices of the DGPI and AMI. The growing interest in African culture is also manifest in organizations like Africa Movie Festival by the Istanbul Modern Art Museum on 5-22 January 2012<sup>256</sup>.

### Turkey's Opening up to Sub-Saharan Africa: An Assessment

A comparison of the initial goals of the 1998 Plan, and the development of Turkey-Sub-Saharan Africa Relations in its aftermath shows that Turkey has successfully implemented its components. In this part, two questions are addressed. Firstly, why did Turkey open up to Sub-Saharan Africa? Secondly, what are the factors behind Turkey's success in Turkey's foreign policy toward Sub-Saharan Africa? As regards to the first question, we argue that both international and domestic factors enabled and encouraged Turkey's opening. The international factors are the post-Cold War international security environment and globalization. The domestic factors are enhanced capacity and transnationalization of Turkey's small-and-medium sized enterprises (SMEs). With respect to the second question, we argue that successful implementation of the 1998 plan's cultural component, through which state-to-people and people-to-people connections are established and maintained, is the reason behind the overall success of Turkey's Sub-Saharan Africa initiative.

The post-Cold War international structural change along with the increasing economic globalization, are the international factors behind Turkey's enthusiasm in building closer relations with Sub-Saharan Africa.<sup>257</sup> The post-Cold War international structural change, which generated the current security environment and the power vacuum in Afro-Eurasia, has enabled states to pursue a more independent and multidirectional foreign policy. The realization of the current system as a multipolar one, rather than a unipolar one, eased the hands of the Turkish political elite and encouraged them to take bolder steps.<sup>258</sup> The fact that Turkey's recent experience in a more independent and assertive foreign policy is not unique,<sup>259</sup> shows that similar factors have also instigated the rise of non-Western societies as powerful actors, especially in the economic realm.<sup>260</sup> Therefore, Turkey's opening to Sub-

<sup>255</sup> Turkey-Africa Media Forum Official Website, available at <http://www.turkeyafricamediaforum.org/en/>

<sup>256</sup> İstanbul Modern, "Afrika: Afrika Sinemasının Sasirtici Cesitliliği" available at [http://www.istanbulmodern.org/tr/basin/basin-bultenleri/afrika-sinemasinin-sasirtici-cesitliliği\\_89.html](http://www.istanbulmodern.org/tr/basin/basin-bultenleri/afrika-sinemasinin-sasirtici-cesitliliği_89.html)

<sup>257</sup> William Hale, *Turkish Foreign Policy, 1774–2000* (London: Frank Cass, 2000); F. Stephen Larrabee and Ian O. Lesser, *Turkish Foreign Policy in an Age of Uncertainty* (Santa Monica, CA: RAND, 2003); Lenore G. Martin and Dimitris Keridis (eds.), *The Future of Turkish Foreign Policy* (Cambridge, MA: MIT Press, 2003); Alan Makovsky, "The New Activism in Turkish Foreign Policy" *SAIS Review*, Vol.19, No.1 (Winter/Spring 1999), pp.92–113.

<sup>258</sup> Ziya Öniş and Şuhnaz Yılmaz "Between Europeanization and Euroasianism: Foreign Policy Activism in Turkey during the AKP Era" *Turkish Studies* Volume 10, Issue 1, (2009): 7-24; Binnur Ozkececi-Taner "The Impact of Institutionalized Ideas in Coalition Foreign Policy Making: Turkey as an Example 1991–2002," *Foreign Policy Analysis* Volume 1, Issue 3, pages 249–278. F. Stephen Larrabee "Turkey Rediscovered the Middle East" *Foreign Affairs*, July/August 2007, available at <http://www.foreignaffairs.com/articles/62649/fstephen-larrabee/turkey-rediscovered-the-middle-east>; İbrahim Kalın "Turkey and the Middle East: Ideology or Geo-Politics?" *Private View* August 2008, available at [www.setavakfi.org.tr/public/HaberDetay.aspx?Dil=tr&hid=11010](http://www.setavakfi.org.tr/public/HaberDetay.aspx?Dil=tr&hid=11010)

<sup>259</sup> Ziya Öniş "Multiple Faces of the "New" Turkish Foreign Policy: Underlying Dynamics and a Critique" *Insight Turkey* Vol 13, no. 1 (2011): 47-65; p. 56. Aydın also gives examples of India, Brazil and Poland as newly emerging potential regional powers: Ersel Aydın "Bölgesel Güç Olmak ve Türk Dış Politikasında Yön Arayışları" in *Yeni Dönemde Türk Dış Politikası: Uluslararası IV. Türk Dış Politikası Sempozyumu Tebliğleri*, Dincer, Osman Bahadır, Habibe Özdal, Hacı Necfeoğlu (eds) (Ankara:USAK) 2010.

<sup>260</sup> Suat Kınıklıoğlu, "Turkey's Neighbourhood and Beyond: Tectonic Transformation at Work?" *The International Spectator*, Vol. 45, No. 4, December 2010, 93–100; Mehmet Babacan, "Whither an Axis Shift: A Perspective from Turkey's Foreign Trade" *Insight Turkey*, Vol. 13, No. 1 (2011):129

Saharan Africa have also been facilitated by economic globalization, which encourages finding new markets, increasing trade and accessing the cheap resources and labour.<sup>261</sup>

The foremost domestic implication of economic globalization in Turkey, has been felt in business sector. It has become one of the most important actors which take part in Turkey's Africa Opening. Since the liberalization wave of the 1980s, business associations started to assume a more active role in Turkey's economic life, which translated into their formal participation in policy making. The Turkish state has gradually make room for private sector to play a role in the process, "because it is deemed to be capable of administering specific functions more efficiently than the state."<sup>262</sup> In addition to their enhanced capacity, they have transnationalized their activities.<sup>263</sup> Especially SMEs in Turkey, mostly known as "Anatolian tigers," the firms from rising centers of the Anatolian capital, have begun to assert increasing influence towards the government for finding new markets. Since these capital owners, most of whom have an Islamic, socially conservative outlook, are argued to be the basis of AKP's political support,<sup>264</sup> their demands are more easily translated into foreign policy initiatives.<sup>265</sup> Thus, the business associations, which represent these rising centers of industrialization and capital accumulation in Turkey, TOBB, MÜSİAD and TUSKON, have become leading instigators of Turkey's African opening. Turkish foreign policy has increasingly been driven from below, so much so that it is "no longer the monopoly of politicians and diplomats."<sup>266</sup>

In order to understand why Turkey's opening to Africa has been successful so far, one should consider the dynamics which not only enable but also shape and sustain Turkey's foreign policy initiatives. While the post-Cold War environment and globalization have been the necessary conditions for Turkey's attempt, they do not successfully explain why Turkey has achieved most of its goals. Indeed, the increasing level of relations between Turkey and Sub-Saharan African countries is not an isolated incident, but an extension of Turkey's recent foreign policy activism. For the last decade, Turkey has been building a complex web of international and global relations, which covers not only other governments but also other peoples. Defined as "multidimensional foreign policy" by Foreign Minister Ahmet Davutoğlu,<sup>267</sup> this activism surpasses Turkey's immediate neighbourhood and reaches out to formerly neglected regions such as Latin America or Sub-Saharan Africa.<sup>268</sup> In addition to geographical expansion, the defining characteristic of multidimensionality in Turkish foreign policy is to establish and maintain relations state-to-people relations as well as to encourage more people-to-people relations.

<sup>261</sup> Kemal Kirişçi, "The Transformation of Turkish Foreign Policy: The Rise of the Trading State," *New Perspectives on Turkey*, No. 40 (Spring, 2009), pp. 29-57; Kınıklıoğlu, 2010; Mustafa Kutlay, "Economy as the 'Practical Hand' of Turkish Foreign Policy: A political Economy Explanation" *Insight Turkey*, Vol. 13, No. 1, 2011, pp. 67-88; Öniş, 2011; "Out of the ruins", *The Economist*, March 27th-April 4th 2010.

<sup>262</sup> Altay Atlı, "Businessmen as Diplomats: The Role of Business Associations in Turkey's Foreign Economic Policy" *Insight Turkey*, Vol. 13, No.1, 2011, pp. 109-128.).

<sup>263</sup> Öniş, 2011,56.

<sup>264</sup> Öniş, 2011, 57.

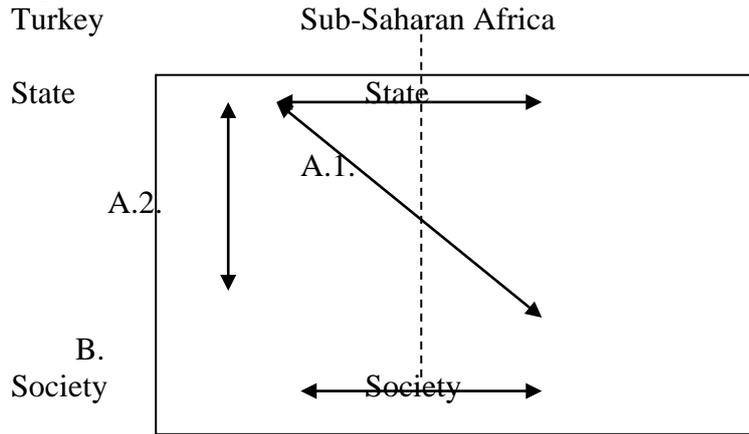
<sup>265</sup> Kirişçi, 46.

<sup>266</sup> Öniş, 2011, 56.

<sup>267</sup> Ahmet Davutoğlu, "Turkey's Foreign Policy Vision: An Assessment of 2007" *Insight Turkey* Vol. 10, No. 1 (2008): 77-96

<sup>268</sup> Bülent Aras, "Davutoğlu Era in Turkish Foreign Policy" *Insight Turkey*, Vol. 11, No.3, 2009, pp. 127-142

Figure 1: State-Society Relations Aspect of Multidimensionality in Turkey's Foreign Policy Turkey



By encouraging state-to-people relations (Figure 1; A.2 and A.1.), economic and ideational demands of both Turkish and African people are projected into foreign policy initiatives. Two dynamics are at play. The first one comprises of the institutions and platforms where policy demands of different segments of Turkish society are heard (A.1.). The second one is to establish direct contacts with the Turkish state and sub-Saharan African people to hear their needs and concerns (B.1.). In return, these demands provide the definitive impetus behind Turkey's continuous engagement and the subsequent success in Sub-Saharan Africa.

In many cases, Turkish foreign policy efforts are a mixture of formal initiatives by the government and the informal activities of NGOs in Turkey.<sup>269</sup> This unprecedented parallelism between the state and Turkish civil society shows signs of a new complexity, which does not lend itself to be defined as either top-down or bottom-up. Instead, a simultaneous and two-way demand-response-feedback-reformulation mechanism is at work. In this framework, sub-state actors with distinct economic and ideational concerns find mechanisms to voice their demands in formal foreign policy making platforms, provide and receive feedback on the steps that are taken, and help in reformulating the initial policies on the basis of originating issues and needs. Thus, state-civil society nexus presents itself not only in the implementation but also continuation and reformulation of Turkish foreign policy.

With respect to Turkey-Sub-Saharan Africa relations, business associations and research centers emerged as the leading partners in the above processes. For example, focusing on economic cooperation, investment and trade, TUSKON played a leading role in funding and organizing Turkey-Africa Trade Bridges. It was supported by both state institutions like Turkish Ministry of Foreign Affairs, Undersecretariat of Foreign Trade and TİKA, as well as civil society organizations like Turkish-African Cultural, Social and Economic Cooperation Association, Turkish Exporters Assembly (TİM), İstanbul Exporters Union, İstanbul Mineral and Metals Exporters Association (İMMİB) and the İstanbul Textile and the Apparel Exporters Association (İTKİB).<sup>270</sup>

Other than business, research centers (think-tanks) have increasingly become instrumental in providing input for foreign policy initiatives. Their numbers have risen enormously and the variety in their political orientation and activities are unprecedented. These think-tanks host not only Turkish but also foreign officials, discussing and shaping Turkish foreign policy.<sup>271</sup> While the 1998 Plan foresaw establishment of a single research

<sup>269</sup> Kemal Kirişçi, "The Transformation of Turkish Foreign Policy: The Rise of the Trading State," *New Perspectives on Turkey*, No. 40 (Spring, 2009), pp. 29-57; Suat Kınıklıoğlu "Turkey's Neighbourhood and Beyond: Tectonic Transformation at Work?" *The International Spectator*, Vol. 45, No. 4, (2010) 93-100

<sup>270</sup> TUSKON Website, [http://www.tuskon.org/icerik/haber\\_detay.php?id=265](http://www.tuskon.org/icerik/haber_detay.php?id=265)

<sup>271</sup> Sedat Laçiner "Yeni Dönemde Türk Dış Politikasının Felsefesi, Fikri Altyapısı ve Hedefleri" p. 39 in *Yeni Dönemde Türk Dış Politikası: Uluslararası IV. Türk Dış Politikası Sempozyumu Tebliğleri*, Dincer, Osman Bahadır, Habibe Özdal, Hacı Necefoğlu (eds) (Ankara:USAK )2010

institute, numerous research centers and think-tanks were established, with some extensively focusing on Africa. The conferences and fora they organize bring Turkey's state and non-state organizations together, while their research projects inform both Turkish state and people about Africa.

Business associations and think tanks are also instrumental in providing venues for African state institutions and business groups to voice their concerns. Therefore, they are also instrumental in the second dynamic of state-to-people relations, i.e. to encourage relations between the Turkish state and Sub-Saharan African peoples. TASAM's ongoing Turkey-Africa Congresses, where issues discussed ranged from African history to performances of environmental NGOs in Africa, from foreign aid to climate change,<sup>272</sup> and TUSKON's Trade Bridges are illustrative of this second function.

Connections between Turkish state and Sub-Saharan African people are also maintained by active involvement of governmental institutions. In collaborating with African civil organizations, they ensure that sub-Saharan African peoples are also at the receiving end of the benefits that would emanate from increasing bilateral relations. As such, these institutions greatly contribute to Turkish foreign policy's successful implementation. For example, cooperation of Directorate General of Press and Information of Turkey (DGPI) with African Media Initiative is illustrative of their function in building further connections. Office of Public Diplomacy and DGPI also cooperated with Selçuk University and Mardin Artuklu University in organizing two Turkish Foreign Policy workshops, which bring together over 200 graduate students and academics with government officials.<sup>273</sup> In both workshops, there were sessions where relations with Africa have been on focus. Appointment of honorary consuls in Africa have a similar function. Mostly prominent African businessmen, they establish semi-formal links between Turkey and Sub-Saharan African countries. They are also sources of information and guidance for both African and Turkish policy makers and individual businessmen.

Nevertheless, among government institutions, Turkish International Cooperation and Development Agency (TIKA) stands out. Since providing official development aid is the most important means to connect the Turkish state and Sub-Saharan African societies, TIKA plays a vital role. Through TIKA, Turkey has provided funds to several Sub-Saharan countries since the end of the Cold War. Substantial amounts of development aid by TIKA goes to diverse activities in various fields, such as economic and industrial infrastructure development, the health and education sectors, and academic cooperation. TIKA assisted the Sub-Saharan African infrastructure with seventy projects in twenty two countries. As a public institution, TIKA primarily addresses issues and problems that have a direct effect on local African people. To that effect, it cooperates with African associations like "Chantal Biya Foundation" in Cameroon and Africa Technology Center in Sudan. Moreover, it provides knowledge and guidance for Turkish NGOs, operating in Sub-Saharan Africa. For example, it collaborates with several Turkish health care NGOs like ESADER, SAMEDER, DESADER in organizing free check-ups in Madagascar, Kenya, Tanzania, Malawi and Cameroon. Therefore, it operates as one of the most important mechanisms through which both Turkish and African societal demands are addressed.

Encouraging more "people-to-people contact"<sup>274</sup> (See Figure 1, B) between Turkish and Sub-Saharan African societies, comprises of establishing links of inter-societal information, communication and cooperation. Therefore, the first steps were directed at building infrastructure mechanisms in Africa to connect Turkish and African societies. Improving conditions of trade, business, communication and transportation, changing visa

<sup>272</sup> See Webpage of TASAM African Institute for details. <http://tasamafrika.org/>

<sup>273</sup> Prime Ministry of the Republic of Turkey, Office of Public Diplomacy, "Foreign Policy Workshops" available at <http://kdk.gov.tr/faaliyetler/dis-politika-calistaylari/25>

<sup>274</sup> Kınıklioğlu, 2010, 94.

requirements, and building primary channels of bilateral communication at the societal level, like designing web pages, broadcasting Turkish TV Channels in Africa, supporting joint associations, funding research centers and providing scholarships were among many other activities through which Turkish state facilitates “people-to-people” relations. They also show that Turkey’s engagement with Africa is neither superficial nor short term.

Tourism, sports, economy and culture are the main venues to which this encouragement is directed.<sup>275</sup> Tourists from Sub-Saharan Africa are growing in numbers thanks to changing visa policies, which facilitate the free movement of people, goods, services and ideas. Thanks to some sports clubs’ investment on Sub-Saharan African players, demands to Turkey have been made from sub-Saharan African countries to assist building soccer infrastructures.<sup>276</sup> In the economic realm, six Turkish export products fair were organized in Senegal, Kenya, Nigeria, Tanzania, Ivory Coast, and Ghana in the last two years and joint business forums were organized with South Africa, Ghana, Nigeria, Cameroon and Kenya in 2009, 2010 and 2011. In the cultural sphere, African movie days are organized, African writers are being invited, and studies have been made on African history.<sup>277</sup>

Looking at these various dimensions, it is clear that foreign policy does not exclusively consist of behaviours of official actors or implemented by conventional means. Turkey’s relations with Africa are not only state-to-state dealings, which have little direct projection to the lives of the people but actual relations which could improve conditions of both peoples. By improving state-to-people and people-to-people relations, it is ensured that Turkey’s attempts at multidimensional foreign policy are accompanied by Turkish civil society initiatives on the one hand, and they are specifically tailored to the needs and demands of the domestic constituents of the countries in question.<sup>278</sup> Since only such foreign policy initiatives bare sustainable and equitable results, state-to-people and people-to-people relations are vital in ensuring foreign policy success. Accordingly, cooperation in development, education, culture, tourism and trade, where more people-to-people contact is possible (low-politics), are the fundamental spheres for cooperation in other spheres (high politics). Developing these relations is also the best response to the pressures of globalization, whereby citizens are increasingly pushing for interests, demands and world-views which transcend the borders of states.

## Conclusion

The way how Turkey regarded Sub-Saharan Africa has changed since the formulation of the 1998 Opening Action Plan. Whereas Turkey’s relations with Sub-Saharan Africa were minimal until 1998, a multifaceted opening to the region was introduced with the 1998 Plan, which specified Turkey’s involvement with the region with respect to diplomatic, political, economic and cultural spheres. While, changes in the international security structure and globalization encouraged Turkish foreign policy makers to seek closer relations with the region, the enhanced capacity and transnationalization of business sector, were the domestic factors which increased interest in Sub-Saharan Africa.

By 2012, the premises of the 1998 Plan have been realized. Indeed, the extent of Turkey’s relations with Sub-Saharan Africa has surpassed the level that was stipulated by the plan. In that regard, Turkish foreign policy towards Sub-Saharan Africa has been successful. The main reason behind this success was Turkish government’s ability to include different

<sup>275</sup> Kınıklıoğlu, 2010, 95.

<sup>276</sup> Fotomac Daily, “Gençlerde Afrika Esintileri” (“African Breeze in Youth”)

<http://www.fotomac.com.tr/Genclerbirligi/2012/03/01/genclerde-afrika-esintileri>

<sup>277</sup> Melek Firat “Türkiye- Afrika İlişkilerinin Tarihsel Arka Planı Ve Afrika Açılışında Sivil Toplum Kuruluşlarının Rolü” IV. Turkey-Africa International Congress, available at

<http://www.tasamafrica.org/pdf/afk5/12-Prof-Melek-FIRAT.pdf>

<sup>278</sup> Mehmet Ozkan, “What drives Turkey's involvement in Africa?” *Review of African Political Economy* 37, no.126, (2010): 533-540, Aras, 2-3; Uslu, 8.

segments of the Turkish and sub-Saharan peoples. In addition to expanding its zone of action in Africa, Turkey also deepened its state-to-people relations through collaborating with sub-state groups like research centers, associations and business groups. Government agencies like TIKA acted as intermediaries between various civil society organizations. Moreover, Turkish state facilitated improvement of the people-to-people relations by building primary social and material infrastructure for inter-societal relations. Thus, Turkey's opening to Sub-Saharan Africa has begun to take a more long-term and sustainable course.

In these regards, Erdoğan's Somalia visit of 2011 shall be best viewed as a recent example of how Turkey moved beyond conventional state-to-state dealings in implementing its foreign policy. With a focus on the needs and conditions of the Somali people, the visit was more than an official visit, and carried an important symbolic meaning for those suffering from famine, civil war and crisis.

# THE CHALLENGES OF REGIONAL INTEGRATION IN AFRICA

*Jailson E. da G.R. Gomes,*  
Master in International Relation & Researcher

---

## Abstract

After the World War II mankind entered a new phase of international relations development. It is characterized by extension of international economic, political and cultural collaboration; intensification of internationalization and globalization processes, further more world community tends to greater integration, greater foreseeability, and growth of organization and development control mechanisms. In this job the accent is laid upon analyses of regional integration, which is one of the key methods of solving globalization challenges. Before dwelling upon integration in Africa, it is necessary to define the notion of integration and globalization, analyze the way they intercourse and trace the way globalization process influences the integration process in Africa.

---

**Keywords:** Regional integration, globalization, African Union,

## Introduction

The word «integration» originates from the Latin «integer» — «whole». Thus, integration implies the development of some new alliance or new integrity of separate parts, which start to act as an independent unity. It should be underlined that integration is seen as a positive amount game, which makes it profitable for each player as well for the whole community. It should be said, that, что global competitive landscape is a kind of environment in which only the strongest survive along with the countries and economies that unite the efforts facing the blows and challenges of globalization. On the other hand, regional integration guarantees its participants preferential economic, commercial, political regime which undermines certain universal regulative instruments. Integration is possible only under the following conditions:

- Continental solidarity, implying community spirit, which appears as the result of the delamination from the outside world and inner homogenization; as the result of political centralization, administrative centralization; judicial uniformity; territorial organized division of labor; mass education and mass communication;

- Economic growth, which enables the constantly growing part of population enjoy the economic prosperity on a bigger scale;

- Legal capacity of the governments that manage to guarantee common people relatively high living standards regardless of individual market success. It is important to remind of the fact that the problem of globalization and regional integration correlation is tending to come out in the foreground recently. It tackles upon a wide range not only geopolitical, geo-economic and geo-civilizational issues, but also political-economic, financial, currency and other problems.

Thus, regional integration, firstly, allows the countries of the region to stand up to the challenges of globalization, endure the pressure of global leaders who dictate the rules of the game.

Secondly, it allows creating regional preferential advantages in global competitive landscape at the world goods, services, technologies and labor markets.

Thirdly, regional integration lowers cost of production and marketing expenses, encourages international labor disintegration, specialization and cooperation of goods and services production encourages dynamic development of national economies, the growth of their competitive ability in global environment. There are some examples of integration in the world history based on the contingency of economic interests and this way seems to be the most effective in solving multiple problems of African reality. The decision made by the Union to provide support in development of international processes relying on the current political and administrative unities of the South and the North of the continent, western and eastern Africa show the understanding by the heads of the governments the problems they are going to face on the long and difficult way and the readiness to overcome them.

As for regional integration in Africa, it is necessary to underline that for the detailed analyses of African international processes we should turn to earlier periods, as the tendency of African countries to unite originates in the 1950-1960-ies, the period of political independence acquisition. In this precise period the first integration alliances were formed, which were considered the key way of gaining economic independence for the countries free from the colonial dependence, an instrument of reformation and integration of the national economies into world economy. It should be stated that the problems of regional integration in Africa are mostly determined by the character of political processes organization on the African continent. Africa is the only region in the world where the growth of poverty is not only recorded but also predicted. The situation is worsened by the external debt problem, the growth of which exceeds the development possibilities of African economies. It also should be mentioned that the majority of economic exponents are still at low level, for example the employment exponents. African economic structure renders its position at the global economic system, and the combination of negative external and internal factors intensify the economic instability in Africa even more.

Due to the current international division of labor Africa specializes mostly on the export of primary goods with the prices established at the global level and not in Africa. Such models of unequal exchange not only lessen the opportunities for development of African countries at the expense of export but also result in competitive ability loss of African countries at the world market.

Many Africanists think that Organizations of African Unity (OAU) – the biggest political unity of African continent was created in 1963 on the basis of African solidity and unity principles and from the very beginning concentrated on the fight for the complete freedom of Africa from the colonial dependency. One more priority was the fight for the destruction of apartheid regime in South Africa and all forms of racial discrimination. Particularly in this the organization demonstrated outstanding decisiveness and firmness and managed to mobilize the efforts of all countries on the continent and draw the attention of the world to these problems, which resulted in final success of its intentions.

At the moment there are some factors which in my opinion contributed to the achievement of the compromise and the creation of Organizations of African Unity. Firstly, it clear understands by the African countries that it's impossible to break free of the colonial burden by the forces of one or several countries only. Secondly, young African countries were inclined to unite and collaborate.

At the moment the real reasons for creating African Union which substituted OAU were cardinal changes in the alignment of political forces in the world at the period of its existence (1963–2001) and the fulfillment at the brink of the new millennium some high priority tasks that were appointed to OAU. The problems of current economic development in Africa call for new approaches and mechanisms. The main difference of AU from OAU is that economic integration is proclaimed the main priority of the new organization while OAU viewed political integration as the main task for taking measures to guarantee national independence and territorial integrity of young African states.

It is necessary to mention that the aim of the new organization, as it is underlined in the organizational act of AU, is the readiness of the heads of governments and countries – AU members to promote unity, solidarity, cohesion and collaboration among the nations and countries of Africa. As the main tasks of AU were announced: leading a dialogue with the world community on unanimity of view point on the part of African countries (including decisions which will be able to answer the challenges of globalization), protection of sovereignty, territorial integrity of countries, support of peace, safety and security, stability on the continent, effective resolution of regional conflicts.

It is worth mentioning that at the conference of the heads of OAU in June 1979 a historic Monrovia declaration was carried which laid the basis for Lagos plan of actions (LPA), the main points of which are the following:

- great resources of Africa should be used above all to satisfy the needs of people;
- it is necessary to deal with the dependency of Africa from the export of raw material;
- Africa should mobilize all its own human and material resources for the sake of development;
- these efforts should lead to economic integration of Africa;
- governments should pursue the economic, social and cultural policy in accordance with LPA aims.

On the other hand the analyses I made allows me to state that Cairo plan defined the following priorities for the continent's invigoration:

- a) government, peace, stability, development;
- b) food safety;
- c) human resources development and the growth of their efficiency;
- d) resource mobilization;
- e) economic collaboration and integration on the regional level;
- f) structural reorganization of African countries economies.

As for the foundation of the United states of Africa and the establishment of OAU Kaddafi not only broke the statute of OAU in which it is said that the revision of the statute is only possible in a year after its project will be put over to all the countries-members of the Union. He also reopened discussion about the organizational form of pan Africanism, which originates from the early 60-ies before OAU was established.

The head of International Affairs Committee of the Federation Council Mikhail Margelov says: «African integration today is a fight among different groups of countries for the influence on the continent, which represents not only the interests of African states but also the USA, the European Union, China and other serious international players, the is why political and economic unity of the continent being the optimal way-out from a number of crisis situations in Africa still is a matter remote future and it is a long way to go till all the problems AU faces are solved.»

Executive economic program of the newly reestablished all-African organization became NEPAD (New Partnership for Africa's Development) – new major program of Africa strategy development which determines its place in the world, it includes a certain complex of measures in the economy sphere of African countries and a hope is expressed for the partnership on the global level in the process of its realization and to promote mutual commercial and investment relations. This program has essentially two bases : the partnership program to revitalize the development of Africa in the new century and the Omega Plan , which aims to resolve intra - African conflicts , investment and financial assistance among African countries. In the early '90s both in Africa with expansion abroad there was an extremely pessimistic information regarding the strategies and prospects to solve socio - economic development of Africa apocalyptic situations in different African regions , in my

opinion the source of African pessimism and ma economic development of most African countries.

According to the Russian Africanist Sumbatyan J.G. program that gives priority to develop the agriculture, education, health, and infrastructure. African leaders considered the African Union and NEPAD as two social factors inter - linked, integrated social, political and economic relations and replicate Africa's access to the world Economic. It is clear that the activities of the African Union determines the existence of NEPAD , requiring new qualities of solidarity of African States, waives the selfish political tendencies of African leaders . In July 2001, a new program that known as' New African Initiative «, it had raised the fusion of the two aforementioned programs, the new program has the following goals by the year 2018 was approved:

- I. Reduction of the number of people living below the poverty line (less than \$ 1 per day)
- II. Ensure primary education for all children of school age,
- III. Achieving Equality of gender in relation to populations facing education, primary, secondary and higher education,
- IV. Reduce child mortality for 3/2,

The African Union and the regional economic integration groups argued that new approaches to the formation of connections " cross-country " is required and improve the forms , methods and tools for mutual cooperation in economic and social fields .The creation of the AU was an absolute step forward in the development of the idea and practice of African integration. The AU has contributed to the development of the African states position face the global challenges. Key factors of disintegration in Africa:

- Reduced size and capacity of markets and economies of African countries: GDP per capita well below average, poor diversification of production and exports, leading to the need to share resources;
- The integration of many member countries into one group (to 27 countries), which prevents the development of a common policy;
- The concern of governments with regard to the unequal distribution of benefits and costs of integration between the various Member States;
- Extremely low the role of the private business sector;
- Weakness of the structures of state power.

In Africa, there are a large proportion of the world's poorest countries, with a GDP per capita below \$ 950 on average per year. The factors of disintegration are clearly manifest poor performance of almost all African regional groups. Thus , it should be noted that the economic development of most African countries are at an extremely low level .In general Africa which is formed by 54 countries , but Africa still plays a minor role in the global economy .

In the book titled «Feature integration processes in Africa ", Shkvarov L.V. explained that unlike many other regions of the world, the internal contradictions of the groups of African integration (with some exceptions) do not contribute to the growth of bilateral trade. Unless a low share of exports relative to total exports of member countries, while the last two decades in many groupings exports increased investment. The most dynamic growth of this indicator is characteristic of the Southern African Development Community, the Union of the Arab Maghreb and UEMOA. In 2011 almost all groups of regional integration reached an early stage of economic integration, free trade areas have become totally or partially. It is important to clarify that the geographical structure of foreign trade of African countries is dominated by developed countries, especially the European Union countries, the share of which in total African trade is 40 %. Overall, Africa's trade with the EU is greater than the volume of trade between the five largest countries of the continent (South Africa, Algeria, Nigeria, Morocco and Egypt).

In recent years there has been a desire of some integration groups to coordinate their domestic economic activities. Thus, ECOWAS and UEMOA have developed a common program of trade liberalization and implementation of macroeconomic policy, the development of common rules of origin, customs procedures and harmonization of the compensation mechanism (for that ECOWAS decided to use the system UEMOA) African countries.

**References:**

- ADETULA, Victor A. regional integration in Africa: prospect for closer cooperation between West, East and Southern Africa. IDASA/FREDSKORPSET Research Exchange Program Governance and Democracy. Johannesburg; May, 2004.
- ARYEETAY, Ernest. Regional Integration in West Africa. Research programme on: Integration and Co-operation in Sub-Saharan Africa. OECD Development Center. Working Paper No. 170, March, 2001,
- BELASSA, Bela. Teoria de Integração Econômica. Lisboa: Livraria Clássica, 1961.
- ECA/AFRICAN UNION. Assessing regional integration in Africa II. Rationalizing Regional Economic Communities. Economic Commission for Africa. Addis Ababa, 2006.
- GILPIN, Robert. Global Political Economy-Understanding the International Economic Order. Princeton: Princeton University Press, 200.
- WAMI. Annual report for the year ended 31st December 2008. West African Monetary Institute. Accra, 2009.
- WAMI/IMAO. Macroeconomic development and convergence report for the first half of 2003. West African Monetary Institute. Accra, August, 2003.

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

---

[Redacted text block]



[Redacted text block]

[Redacted text block]

[Redacted text block]

---

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

---

[Redacted text block]



[Redacted text block]

[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]

[Redacted text block]

[Redacted text block]

---

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

---

[Redacted text block]



[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

---

[Redacted text block]



[Redacted text block]

[Redacted text block]

[Redacted text block]

---

[Redacted text block]

[Redacted text block]

---

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

---

[Redacted text block]



## **MIGRATION IN CAPE VERDE ISLANDS LEGAL AND POLICY FRAMEWORK<sup>368</sup>**

*Varela, Odair Barros* (PhD.)

Institute of Law and Social Sciences and University of Cape Verde (Cape Verde)

*Barbosa, Carlos Elias* (MA)

Center of Social Studies of Coimbra University (Portugal)

---

### **Abstract**

This article, in the first place, presents a brief overview of the Cape Verdean emigration, highlighting their route to the West African region. After that it opens the discussion on immigration in Cape Verde, essentially, presenting some data from *National Institute of Statistics* (NIS), *Direction of Foreign and Borders* (DBF) and *Interministerial Commission for the Study of the Bases and Proposition Immigration Policy* (CIMI). It also launches a brief discussion on the challenges of immigration for an insular state like Cape Verde. In the third place, the paper presents the legal framework and the weaknesses in the management of immigration in this country.

---

**Keywords:** Transit migration; labour migration; readmission agreement; legal migration policy; migration paradigm.

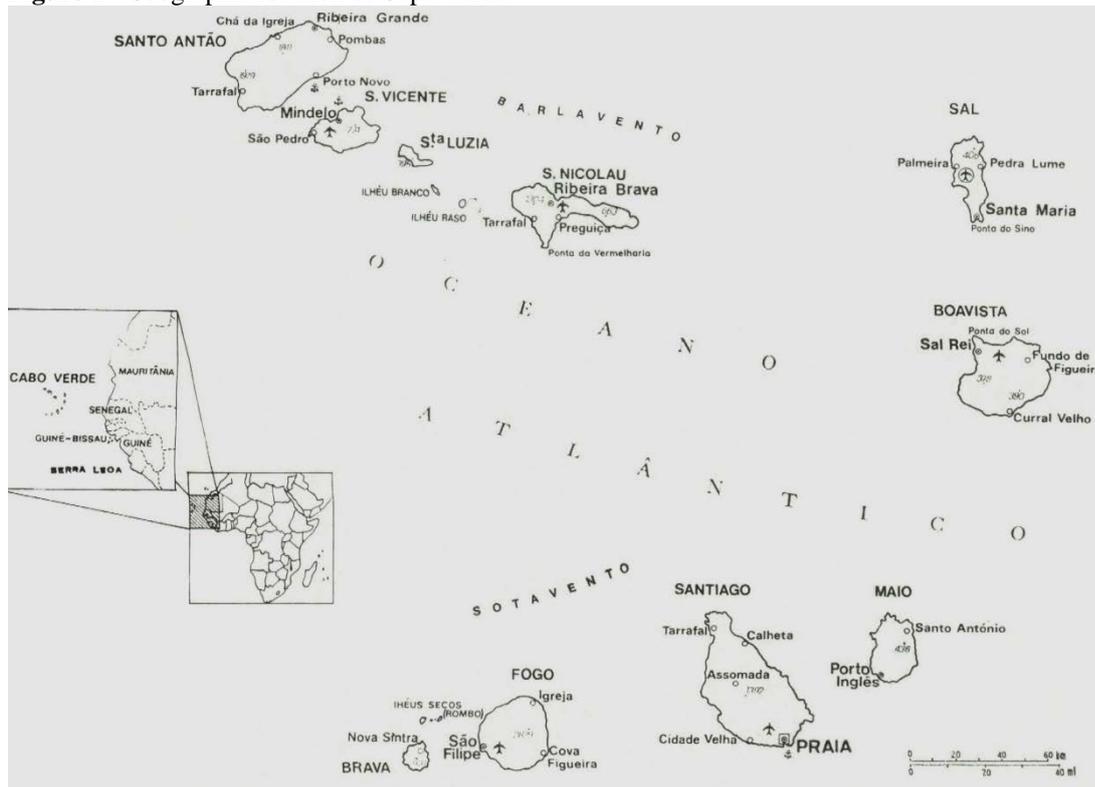
### **Introduction**

#### **Geographic, socio-economic and political overview**

Alongside the African continental shelf, in the Atlantic Ocean lies the archipelago of Cape Verde islands, composed of ten small islands, of which only nine are inhabited, and five islets, forming a total land mass of 4,033 square km. Situated approximately 500 km off the Cape Verde peninsula in Senegal, the archipelago is divided in two groups: the windward islands (Santo Antão, São Vicente, Santa Luzia, São Nicolau, Sal and Boavista); and the leeward islands (Brava, Fogo, Santiago and Maio). Let us say that the archipelago is devoid of natural resources, and it is subject to the semi-arid climate, with a dominant dry northeastern wind and a too short and irregular rainy season from August to October. However, the islands can count on the sun most of the year, which has attracted some tourism and more recently aroused the potential of renewable energy. Moreover, as a result of their condition of insularity, Cape Verde has a long coastline, thus, the Exclusive Economic Zone of Cape Verde is around 700.000 km<sup>2</sup>, which constitutes a major challenge in terms of its control and economic exploitation for a small country with a population approaching half a million.

---

<sup>368</sup> This article is based on research project entitled «Facilitation of intra-regional labor migration in the ECOWAS region - the case of Cape Verde», conducted by the ACP Observatory on Migration (African, Caribbean and Pacific) in partnership with the University of Ghana. The research team was led by Odair Barros Varela, integrating Carlos Elias Barbosa (Assistant Researcher) and João Pina Cardoso (Statistical Consultant).

**Figure 1** - Geographic location of Cape Verde

Source: (Amaral, 2001: 3)

However, the country is carrying a secular experience rooted in emigration which is spread over several countries in Africa, Europe and the Americas. The reasons for emigration from Cape Verde are as a result of several reasons, but two of the most mentioned have always been the fact that natural conditions are scarce and country is insular; these two give strength to the tradition and history of migration linking Cape Verdeans to the four corners of the world.

From the discovery in the fifteenth century (1460-1462) until 1975 Cape Verde was one of the five Portuguese colonies in Africa. With independence on July 5, 1975 a one party system of government was installed which was replaced by multiparty system in 1990. It is often said that Cape Verde has a population living abroad which far exceeds the number of those residing in the country. However, in recent years there has been a steady growth of immigration to the islands, enriching the demographic profile in Cape Verde.

Its relative proximity to the African promontory may be regarded as an important factor in reducing costs of transport and communication, or even the difficulties of movement. Moreover, its geostrategic position can be seen as another element of human contribution to the circulation in the region. By this we mean that migration appear to be far more complex than the idea centred on the final destination in Europe or North America. Eventually, they may represent, in the regional West African coast, a dynamic level of major corridors and transit of "South-South". However, Cape Verde as a nation-state in a globalizing world cannot escape the asymmetries of the dominant occidental modernity (Ferguson, 2006; Escobar, 1995; Thomas, 2002; Bordonaro e Pussetti, 2006). Consequently, the challenge that the processes of globalization have imposed in the contemporary world does not fail to raise the risk problem in human beings. For example, hundreds of people arriving by sea in overcrowded boats have been one of the problems that the Cape Verdean authorities have been facing in recent decades. So the country has experienced numerous weaknesses in terms of mastery of this situation, accumulating a set of challenges for the country.

### **Cape Verde and the migration in Western Africa**

Over the years, African migration has become a hot topic for debate and research, especially in Europe, but also in Africa. However, it is interesting to understand the fact that most African migrations are not directed towards the global North, but towards other African countries, while there is also substantial African migration to other world regions, such as the Gulf countries and the Americas (Bakewell and de Haas, 2007). Hence the relevance of this paper to strengthen the level of knowledge and understanding of contexts and migration experiences in the region.

Historically, emigration is a landmark in the Cape Verdean society. The country's history is unfailingly linked to the dynamics of emigration. The arrival of European navigators to the islands of Cape Verde in the second half of the fifteenth century recorded the first (factual) migrations to the islands. After the founding (“discoveries”) there was an aim to settlement, and in this process we identify generally two different groups: a) European settlers, particularly the Portuguese and some Genovese, Spanish and some Flemish; b) and slaves of the West African coast regions moved to the islands of Cape Verde. In addition, as we see with other authors (Carreira, 2000; Andrade, 1996), there were some banished Europeans, and free Africans accompanying spontaneously traders, mercenaries and masters of vessels.

The records until the late nineteenth century point to a limited number of Europeans (free immigrants) and an important contingent of forced migrants (“the damned”) and still a considerable body of slaves brought from the West African coast (Carreira, 2000). The Portuguese constituted the vast majority of Europeans and were mainly from southern Portugal, the Azores and Madeira, with a significant number of deportees to the islands (Andrade, 1996: 43). In addition, there were a residual number of Northern Europeans and Japanese (Simão Barros, s/d: 39 *apud* Andrade, 1996: 44). The persecution of Jews in the XVI century in which an entire colony settles in Cape Verde should also be highlighted. Later, in the XIX century a contingent of Jewish from Morocco reaches the archipelago (Andrade, 1996: 44).

It should be noted that (also if we talk in “transit migration”) there is nothing new in this situation: in previous eras, the emigration of many Cape Verdeans to Dakar had exactly the same purpose; Dakar was a transit point of accumulation of resources and opportunities for new projects of migration, particularly for the United States of America and Europe (Andrade, 1996: 184). However, at this time, we can find new situations. For example, Pedro Marcelino’s in *The New Migration Paradigm of Transitional African Spaces* (2011) examines the role of the Cape Verdean archipelago as a stopping point for continental Africans route to Europe. Marcelino, a Toronto-based expert in international development, believes that the increasingly rigid EU immigration policies have succeeded in “directing” potential Europe-bound immigrants to countries such as Morocco and Cape Verde. Due to these new restrictions, as well as the tourism investment growth in the islands, a growing number of migrants from the continent have remained in Cape Verde, a country typically known for its long history of emigration. Some of these migrants have stayed in the islands simply waiting for the right opportunity to migrate to Europe. However, the country has become an imposed, involuntary “final” destination in their migratory journeys. Today in a context marked by the existence of several thousands of immigrants, so the migration to Cape Verde Islands could be understood also by a relatively permanent nature (Barbosa 2011a; 2011b). We argue that the realization of migration towards this country has become significantly complex in the last two decades. There have been continuous migrations flows, possibly with an initial purpose of continuing the migratory journey in search of accomplishments, but for the most part the achievement of transit fails to materialize (*idem*).

### **Current trends of Cape Verdean emigration in Western Africa**

According to Antonio Carreira (1983: 182), the earliest records of flows of Cape Verdean migration takes place in the late seventeenth century and early eighteenth century, especially to the United States of America. Emigration in Cape Verde starts presenting its orientation towards the industrialized countries as a result of the conditions from deprivation and lack of land (Andrade 1996: 182) and, eventually, to find a livelihood there.

It is possible to describe the historical connection of the migratory processes of Cape Verde established with the interior of the African continent by colonial penetration (Andrade, 1996). Naturally, the flow between the islands and coastal areas of the continent are recorded before this period of Cape Verdean migration in the early decades of the nineteenth century, or the early statistical records of the colonial era. To this historical relationship to the African context we find the factors of the processes of colonization which advocates a pre-social and economic infrastructure that enabled the occurrence of large-scale migration, as the specific actions of manpower forced recruiting (Haas, 2005: 21, Trindade, 2000: 201; Andrade, 1996: 182).

New forms of emigration had its expression in the late nineteenth and early twentieth century, particularly for the region of Dakar, Senegal. This could provide a setting or character of traffic then. Indeed, many Cape Verdeans, especially young people, because they could not pay the travel ticket to Europe or the United States of America, journeyed to Dakar where they worked toward the time required in order to fund the migration plan to the United States of America or Europe. Others were employed as seamen in ships (Andrade, 1996: 184). Still others ended up settling. After the Berlin Conference (1885), Cape Verdeans were encouraged to emigrate to Guinea-Bissau to occupy posts at various levels, so that between 1920 and 1940 over 70% of government jobs in Guinea-Bissau were occupied by Cape Verdeans or their descendants. As we can see, the Cape Verdean migration to Senegal occurs at the same time as that for Guinea-Bissau and subsists in its ancient form until the second half of the twentieth century with the “Luso-African”<sup>369</sup> who moved particularly in the sphere of trade (idem:183-184).

Today we witness a new scenario with a contingent of immigrants entering Cape Verde, especially from the ECOWAS (Economic Community of West Africa States) region. This new phenomenon constitutes a set of challenges for an insular state.

About emigration, there is still a large gap relative to national studies on the extent of the Cape Verdean diaspora, especially with regard to Cape Verdean emigration in Africa. Also, there is a great difficulty in obtaining data capable of giving a more accurate view of the dynamics of emigration to African countries, which adds to the level of ignorance about the Cape Verdean diaspora in the continent.

The Cape Verdean emigration to Dakar had a strong impact and was mostly permanent. But this country was also a transit point to other host lands. In this context, some departed from Dakar to Europe, especially to France, or other African countries, including Côte d'Ivoire, Gabon, and Benin... According to the Institute of Communities (IC) Report (Santos-Rocha, 2012), Cape Verdean emigration to Senegal is relatively old, since the beginning of establishing in this country began at the inception of the last century, through the maritime career, first to the Gambia and later to Senegal. The similarity of immigrants from ECOWAS, who live and work in public works in Cape Verde, Cape Verdeans in Senegal worked in public works and left marks on the construction of the Port of Dakar, the palace of the Presidency and the National Assembly, building roads and many other works. Today Cape Verdeans are one of the better integrated foreign communities in Senegal (idem).

---

<sup>369</sup> The term “Luso-African”, according to Andrade E. (1996: 184) indicates slavers and launched Portuguese and Cape Verdeans, mestizos and later freed slave or free, who joined them and then settled in Senegambia and on the coast. They were known as “Luso-African” because they were consider of Portuguese origin, even when they were blacks or mestizos.

**Table 1 – Estimated number of Cape Verdean emigrants in some West African Countries**

	Data from Cape Verdean Consulates and associations	Estimated data from other institutions
Guinea Bissau	---	3000
Ivory Coast	350	---
Ghana	---	9900
Senegal	8516	12600

Source: Cape Verdean Consulate in Dakar; DRC; IC; ACVOS; ACCI

Statistical data regarding the Cape Verdean emigration in Africa are very uncertain, and we can only count on some estimates. According to the Cape Verdean Consulate in Dakar there are 8,516 Cape Verdeans registered (Santos-Rocha, 2012). However, the *Development Research Centre on Migration, Globalization and Poverty* (DRC) estimated in 2000 about 12600 of Cape Verdeans living in Senegal (Carvalho, 2009: 48). Although, the *Association des Capverdiens d'origine au Sénégal* (ACVOS), the oldest Cape Verdean association founded in Dakar, presents an estimate of around 50 thousand Cape Verdeans living in Senegal (Santos-Rocha, 2012). This association was created by a group of friends in 1985. Today, Cape Verde receives the fruits for the integration of Cape Verdean that emigrated to Senegal, since many descendants of Cape Verdean returned to the country of origin of their parents to give their contribution to the development of the country.

Also, we can present other Western African countries as destination of Cape Verdean emigration. According to the estimate by DRC on the 2000 census, another country which has Cape Verdean immigrants is Ghana, about 9900 people (Carvalho, 2009: 48). The report of IC considers the number presented by “*L'Amicale des Capverdiens en Côte D'Ivoire*” (A.C.C.I.), located in Abidjan. This association refers to a small group of 350 people who have their origins from Cape Verde in Ivory Coast, although, stating that this number should represent 95 per cent of Cape Verdeans in that country. Though, the Cape Verdean Consulate in Abidjan presents only 300 Cape Verdeans enrolled, of which one part (about 100) hold Cape Verdean nationality, and the other part have dual or triple nationality (Cape Verdean, Senegalese and Ivorian) (Alfama, 2012).

Also according to the IC, it is estimated that Cape Verdeans residing in Guinea-Bissau are around 3000, including the children (Gomes, 2009). The Cape Verdean community residing in Guinea-Bissau is very peculiar and relatively old, so they are not considered as migrants, particularly because they moved to Guinea-Bissau since the nineteenth century to work during the colonial regime. In relation to other ECOWAS countries, there is no record of Cape Verdean residents.

### **Immigration to Cape Verde and its challenges**

The early 1990 has seen a new environment that mirrors the increasing number of migrants to Cape Verde Islands. This new phenomenon, tendentially, has been awakening more and more attention, either by their size, as new challenges the Cape Verdean society face. New possibilities of transport, communication and information undoubtedly favour a closer relationship between places and facilitate the movement of people. However, we cannot leave aside the colonial factors that brought new features and new migratory dynamics in the sub-region of the West African coast. But we must, likewise, emphasize the other side in technological advances that has provided nation-states tightening controls at its borders. Thus, there is an aspect in adversarial dynamic imposed on international migration. This is because before a certain anxiety on the part of States with regard to immigration and the control and selection of migrants has led to many people using informal routes in crossing borders. Indeed, this has intensified the political and social challenges in recipient countries.

In a brief characterization of migrants to this archipelago, groups have been identified from various origins, as we see in **Table 2** which, with the demonstration of the five big areas of the world, presents a generalized form of migrant populations resident in Cape Verde.

**Table 2 - Foreign people on the Cape Verde Islands by nationality**

	Total	%
<b>TOTAL</b>	14373	100
<b>ECOWAS</b>	8782	61,10
<b>PALOP (S/ GB)<sup>370</sup></b>	1209	8,41
<b>Other African Countries</b>	320	2,23
<b>America (N/C&amp;S)<sup>371</sup></b>	1104	7,68
<b>Asia</b>	498	3,46
<b>Europe</b>	2445	17,01
<b>Oceania</b>	18	0,13

Source: National Institute of Statistics (NIS) - Cape Verde, 2010 Census

As we see, according to data presented by the National Institute of Statistics – 2010 Census, there are 14,373 people residing in Cape Verde representing other nationalities. This figure is about 3% of the total population<sup>372</sup>. This data shows that the largest group, about 72 per cent, represent the entire immigrants from Africa. It is clear that ECOWAS countries represented in 2010 the largest group of African migration to the Cape Verde Islands totalling 8782 foreign nationals, approximately 61 per cent of the total immigrants, and only 8 per cent are from PALOP (excluding Guinea Bissau)<sup>373</sup>. Others countries from the African continent show an almost 2 per cent of the total number.

Looking at **Figure 2** Africa clearly has predominance of continental immigration to Cape Verde Islands with 72 per cent. The second group with 17 per cent is Europe. It is also interesting to note that although the differences at percentage level, there is the presence of multiple origin of migrants to the Cape Verdean archipelago. These increasing aspects of immigration reveal the multiple challenges to understand the attachment of the archipelago to the international market and the influence of the processes of globalization. However, as we see in the preceding paragraphs, the trends of immigration to Cape Verde highlight the regional movement of people.

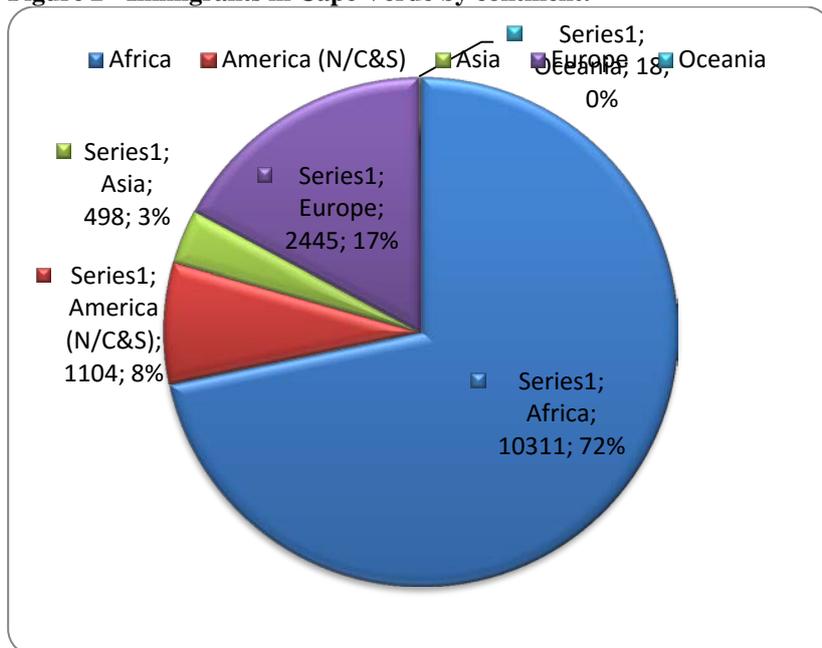
<sup>370</sup> African Countries of Portuguese Official Language (excluding Guinea Bissau).

<sup>371</sup> America (North, Centre and South).

<sup>372</sup> According to data from the 2010 Census (NIS), the resident population in Cape Verde was 491,875.

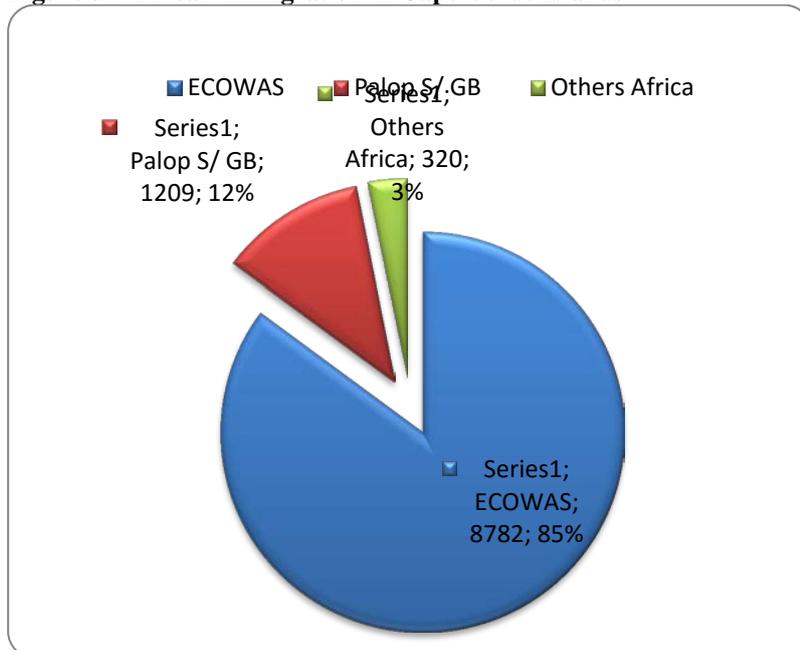
<sup>373</sup> PALOP – African Portuguese Speaking Countries.

**Figure 2 - Immigrants in Cape Verde by continent:**



Source: NIS -Cape Verde, 2010 Census

**Figure 3 - African immigration in Cape Verde Islands**



Source: NIS -Cape Verde, 2010 Census

In **Figure 3**, looking specifically to the total number of African migration to Cape Verde Islands (10311 people) we see that the large majority, about 85 per cent of immigrants, are from ECOWAS countries. Excluding Guinea Bissau from PALOP, this group of countries represents about 12 per cent of African immigrants in Cape Verde, and 3 per cent represents the other African countries.

If we highlight the ECOWAS region, it is interesting to note the values at a more differentiated level, attending to each nationality. Clearly as we see on **Table 3**, a total of 5544 nationals from Guinea-Bissau, as the predominant group of migrants, represent about 63 per cent of African migration to Cape Verde Islands. The second more representative group is

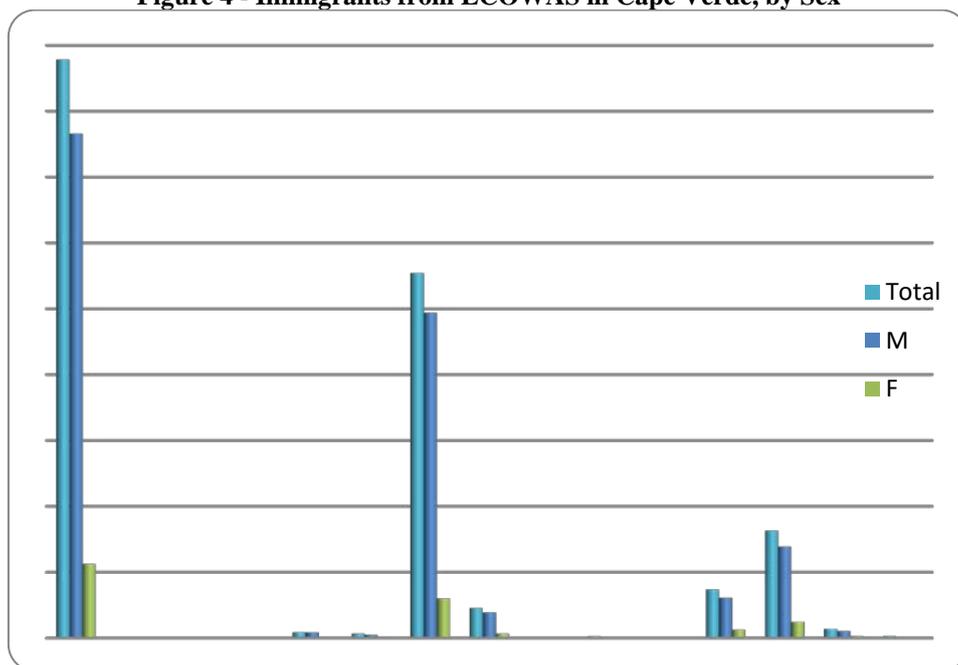
the Senegalese, with approximately 19 per cent of total foreign people, and then the Nigerian people with about 8 per cent.

**Table 3 - Immigration in Cape Verde from ECOWAS by sex**

	<b>M</b>	<b>%</b>	<b>F</b>	<b>%</b>	<b>Total</b>	<b>%</b>
<b>ECOWAS</b>	<b>7658</b>	<b>87,20</b>	<b>1124</b>	<b>12,80</b>	<b>8782</b>	<b>100</b>
<b>Benin</b>	13	0,15	2	0,02	15	0,17
<b>Burkina Faso</b>	6	0,07	3	0,03	9	0,10
<b>Ivory Coast</b>	19	0,22	5	0,06	24	0,27
<b>Gambia</b>	84	0,96	7	0,08	91	1,04
<b>Ghana</b>	53	0,60	14	0,16	67	0,76
<b>Guinea Bissau</b>	4940	56,25	603	6,87	5543	63,12
<b>Guinea Conakry</b>	390	4,44	66	0,75	456	5,19
<b>Liberia</b>	2	0,02	1	0,01	3	0,03
<b>Mali</b>	22	0,25	4	0,05	26	0,30
<b>Niger</b>	1	0,01	1	0,01	2	0,02
<b>Nigeria</b>	609	6,93	131	1,49	740	8,43
<b>Senegal</b>	1386	15,78	248	2,82	1634	18,61
<b>Sierra Leone</b>	111	1,26	30	0,34	141	1,61
<b>Togo</b>	22	0,25	9	0,10	31	0,35

Source: NIS - Cape Verde, 2010 Census

The general percentage of migrant men is considerably high in relation to the number of women, as we see in **Figure 4**, and considering that the pattern is common to all nationalities of ECOWAS represented. But it is possible to establish some consideration. First, it is an impacting sign of the especial need of workforce to construction and development of great structures considering the investments on tourism. Second, it is related to a young migration, normally considering that young boys migrates to look for a new way of life or to help their families. And third, although the general superiority number of men, the presence of about 13 per cent of women from the others countries of ECOWAS in Cape Verde may indicate a certain pattern of stabilization immigration of that region in the country, without neglecting other individual or group purposes in the framework of migration within the region.

**Figure 4 - Immigrants from ECOWAS in Cape Verde, by Sex**

Source: NIS - Cape Verde, 2010 Census

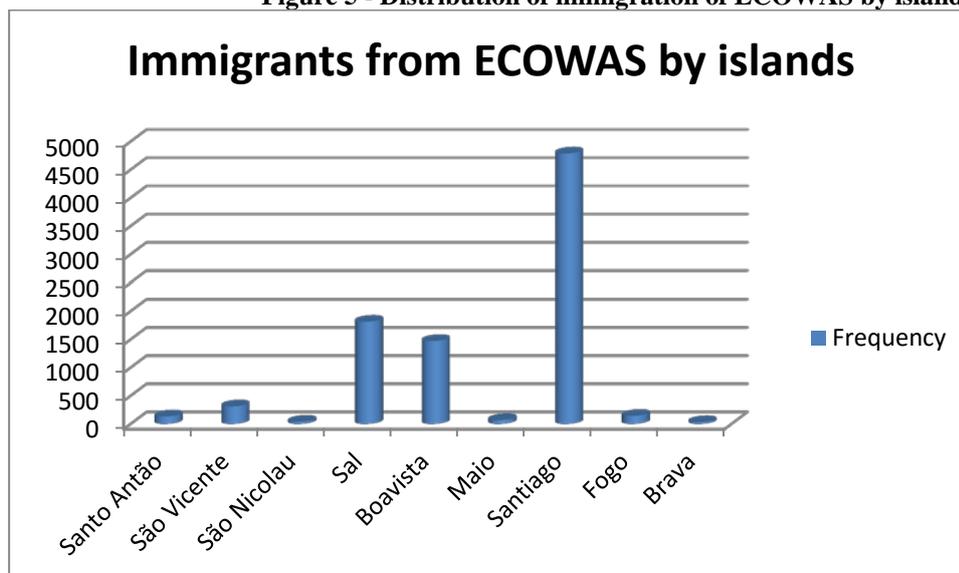
It is, also, interesting to understand the distribution of immigrants by the islands in Cape Verde. Attending to the geographical distribution of immigration in the country, the data from NIS reveals that it are somewhat scattered throughout the islands, but the higher expression is in the island of Santiago, more precisely in the capital of the country, the city of Praia.

**Table 4 - Immigrants from ECOWAS in Cape Verde by islands**

Islands	Frequency	%
Santo Antão	131	1,49
São Vicente	309	3,52
São Nicolau	38	0,43
Sal	1812	20,63
Boavista	1469	16,73
Maio	67	0,76
Santiago	4785	54,49
Fogo	141	1,61
Brava	30	0,34
Total	8782	100

Source: NIS - Cape Verde, 2010 Census

Like we see on **Table 4** is outstanding that the great majority of migrant from ECOWAS are in Santiago with about 54 per cent. The islands of Sal and Boavista appear hereafter with approximately 21 and 17 per cent consecutively, and fourthly is the island of São Vicente only with 4 per cent approximately. So, it expresses the relevant presence of immigration on the biggest and most populous island, than the relevance of the island with the larges structures to development of tourism. The **Figure 5** represents more clearly the different presence of immigrants in the islands. And according to data from NIS the large majority of immigrants are residing in the urban area, about 90 per cent, and the remainder 10 per cent lives in rural areas.

**Figure 5 - Distribution of immigration of ECOWAS by islands**

Source: NIS -Cape Verde, 2010 Census

### Legal and Policy Framework

Trying to understand the complexity of migration to Cape Verde Island, it should also highlight the historical importance of links on the mobility of people, which played a key role in disseminating information and contacts between the pre-colonial societies. It should also refer to the implications of European colonial process in migration dynamics in the African continent, with the delineation of borders, through the recruitment of work force, or by using strategies for planning political and administrative control of the populations (Andrade, 1996; Amaral, 2001; Carreira, 1983, 2000; Varela, 2013). At the level of migration of the West Coast for the African archipelago of Cape Verde two examples presented here may be expressing a very clear historical connection.

First it is pertinent to consider the colonial relationship as reflected in the settlement of the islands and the establishment of historical, political and very strong cultural administrative, especially in regions of Guinea-Bissau (Carreira, 1983, 2000).

Second, we cannot forget the flows of Cape Verdean migration to several neighboring countries on the African continent, already since the last century. This has contributed to the formation of bridges and migratory networks as supports for deciding to migrate and in the process of fixation. For example, Cape Verdeans constituted family in emigration countries (Senegal, Guinea-Bissau, etc.), and returned after some time later. Once started this process, therefore, will most likely attend the constitution of “cumulative causation” (Massey *et al.* 1998: 45-46).

These aspects favour the argument that led the current government to establish a special procedure for legal permission to stay for the nationals of Guinea Bissau, through Decree-Law n° 13/2010. Another bilateral agreement is established between the State of Cape Verde and the State of Senegal, in a resolution n. 151/V/99 of December 28, side or even approving, for purposes of ratification, the *Convention on Freedom of Movement and fixation of People and Goods*, signed between the Government of the Republic of Cape Verde and the Republic of Senegal. Both the first and second case, we consider the bonds of friendship between Cape Verde and these countries, consistent secular ties, geographical and cultural determination in achieving the fundamental objectives of the Organization of African Unity (OAU) and ECOWAS, as well as the desire to ensure the respective national destination within a special status under the ties of brotherhood existing basis of reciprocity, equality and mutual interest.

The relevant level is the political and economic relations between States. It also stressed that in the 1990s, there is a greater perception of migration to the islands of Cape Verde in conjunction with the entry into force of the *Protocol of Free Movement of Persons and the Right of Residence and Establishment*, within the framework of ECOWAS, signed in Dakar in 1979, and validated by the law n° 18/II/82 in Cape Verde. In the specific context of the member states of ECOWAS, the migration has been characterized by the density of mobilities, also largely facilitated by the agreement of free movement. More concrete examples that can be presented here go against two important aspects:

- a) The Legal and economic links (such as Resolution n° 151/V/99 of December 28);
- b) The connections based on common language serving as one of the channels in facilitating decision-making plan migrants (as in the case of Cape Verde and Guinea-Bissau). However, the Cape Verdean State has been debating for some limits on freedom of movement within ECOWAS. One of the key criteria set out is in keeping with internal security measures and access control to the foreign country, being the evidence of economic means of subsistence one of the requirements for entry into the country. The Legislative Decree n° 6/97 of May 5 - regulates the legal situation of the alien in national territory; and the Regulatory Decree n° 10/99 of August 9 - defines the nature and quantity of sufficient financial resources for entry and temporary stay of the foreigner in the country, cases of exemption and the manner of proof of ownership;
- c) Cape Verde ratified in June 2003, the *International Convention on the Protection of the Rights of All Migrant Workers and Members of their Families*. In 2008 the new Labour Code entered into force and has since introduced a law that only foreigners in legal status have the right to work. Although in reality this is not what happens, theoretically this contradicts the spirit of the protocol.

The perception of increased immigration in Cape Verde has generated a set of measures that become part of the legislative body in order to regulate and monitor migration flows to the archipelago. However, immediately following the independence of Cape Verde in 1975, Decree-Law n° 17/76, in Official Bulletin No 9/76 of February 28, noted the regulations granting foreigners, visas for entry into the national territory. On the same year was created Decree-Law No 46/76 and 47/76, establishing, respectively, the laws concerning foreigners residing in the country and regulate the entry and stay of foreigners in the country.

In 1990 it signed the Decree-Law n.º 93/III/90 of October 27 to regulate the legal status of foreigners in the country and revoking Decrees n° 17/76 of February 28, n° 47/76, and Decree n° 46/76 of April 24. In 1991 Additional Protocols were ratified: A/SP1/6/89, (Law No. 34/IV/91), modifying the provisions of Article 7 of the Protocol A/A1/5/79 on the free movement of persons, right of residence and establishment of ECOWAS and A/SP2/5/90, (law No. 35/IV/91, December 30) on the implementation of the third stage (right of establishment) of that Protocol A/A1/5/79.

It is in this way that after seven years, May 5 of 1997, enters into force the Legislative Decree n. 6/97 to regulate the legal status of foreigners in Cape Verde, in order discipline and the legal processes to give greater speed relating to non-resident aliens who entered the country illegally. This decree comes as purposely proposed update, conformation and suitability of the text of the law in force until the height (Law no. 93/III/90, 27 October) to constitutional provisions and international conventions relating to foreigners. Indeed, that decree is entered in the proposal to make the formal refinement of some of its provisions, clarify doubts arising from the law enforcement and regular new aspects imposed by the movement of people and effective border management and access to the national territory.

Two aspects must be highlighted this legislative decree:

- a) The possibility of political rights to foreigners, including active and passive electoral capacity for municipalities

b) The fact that Cape Verde belong to ECOWAS, which has specific provisions on the movement of persons, right of residence and establishment. However, each Member State is left with the responsibility or option for regulating fundamental aspects regarding the arrangements for entry and stay and the granting of the right of residence of foreign nationals of Member States, on the assumption that there are issues of sovereignty and reasons of state community to prevent the return of the power to regulate this matter exhaustively. Thus, measures to strengthen internal security and access control to the foreign country is considered to be imperative to review the grant of the visa and residence permit and measures to facilitate the process of refusal of entry and expulsion from entering or staying illegally in the country.

Though, it is relevant to analyse data from the *Direction of Foreign and Borders* (DFB), for foreign holders of *Residence Permit* (RP). Indeed, we are talking about a part of the total immigrant population in Cape Verde. On **Tables 5 and 6** is presented the cumulative number of foreign nationals with RP since 1976 to 2008.

**Table 5 - Residence Permit in Cape Verde Islands in 2008 by nationality**

Nationality	N° immigrants	%
Total RP	6193	100.00
<b>Guinea Bissau</b>	<b>1229</b>	<b>19.84</b>
Portugal	856	13.82
China	850	13.73
<b>Nigeria</b>	<b>710</b>	<b>11.46</b>
<b>Senegal</b>	<b>701</b>	<b>11.32</b>
Others	1847	29.82

Source: Data from the *Direction of Foreign and Borders* worked by IOM, 2010

**Table 6: Distribution of residence permit, according to economic sectors, 1976-2008**

Economic sector	Frequency	%
<b>Commerce, restaurants and hotels</b>	2.617	46,57
<b>Activities not defined</b>	1.320	23,49
<b>Public services, personal and social</b>	783	13,93
<b>Construction</b>	331	5,89
<b>Manufacturing industry</b>	323	5,75
<b>Transport and communications</b>	106	1,89
<b>Energy</b>	91	1,62
<b>Agriculture and fisheries</b>	39	0,69
<b>Banking and insurance</b>	9	0,16
<b>Total</b>	5.619	100

Source: Calculations from the DFB database, presented by the IOM (Carvalho, 2009)

Considering the information on the RP (table 5) in 2008 had a total of 6193 people residing in Cape Verde Islands, sum equivalent to the period from 1976 to 2008.<sup>374</sup> Of this total prevalence is 74% male, 26% female (Carvalho, 2009). The same institution (DFB) presents values considering the main nationalities represented. In this case, the community from Guinea Bissau is the biggest one with approximately 20 per cent, and the second large community, the Portuguese with about 14 per cent, followed by the Chinese community residing in Cape Verde, near 14 per cent. The Nigerian and the Senegalese people represent simultaneously about 11 per cent. However, these five countries accounted nearly 70 per cent of RP allocated over the period under review.

<sup>374</sup> See also Table 5.

As we see, these data are generally distinct from NIS's data. According to information obtained in Official Bulletin<sup>375</sup>, the number of foreign nationals residing in Cape Verde is in good standing of 6688. Of these, 49.5% are of Bissau Guinean nationality. These three official data presented here indicate the problem that we have in hands working with the phenomenon of migration, and this case particularly of migration from and to the Cape Verde is not an exception. Consequently, the data that we present here shows a clearly discrepancy between the RP and the size of the immigrants who do not fit to the formal level in the Cape-Verdean State.

Therefore, it is estimated a considerable national presence of "illegal" foreign (national immigrants of most West African coast countries) living and working in the country. Migration flows originating in the countries of West Africa, particularly in Guinea-Bissau and Senegal or Nigeria - which have more nationalities represented among migrant groups in the archipelago, are at the bottom of the socio-professional categories, as manual workers, especially in construction. We find many other immigrants as street vendors and some have already built their businesses and small businesses. This constitutes more strongly the visibility and the association of African migrant groups evolved on informal economy.

As a country considered of "transit" (Duvell, 2006; Ratha and Shaw 2007; Marcelino, 2011; Barbosa, 2011a, 2011b), Cape Verde has already had some experience of emergency reception of migrants seeking to reach the European continent. Examples include cases like "Djondad", "Awaide II", "Kabofumo" and "Case of 130" that have challenged the government of Cape Verde, as shown by the obstacles to the resolution of situations despite international treaties ratified by the country and a set of laws nationwide. These experiences of transit have been explored in the context of the African continent, especially in studies of movement of people from the Sub-Saharan Africa for the Maghreb region (Duvell, 2008; Haas, 2006). Authors such as Frank Duvell (2008) and Dilip Ratha and William Shaw (2007: 3) refers to Cape Verde as one of the transit points for the migration from West Africa, trying to obtain false documents as a means of reaching Europe. The archipelago has also been mentioned as a starting point skirting the migratory routes of the centre of the Sahara towards the Canary Islands (Haas, 2006: 4). However, is this purely a problem of illegal immigration? What have been their reflexes more broadly on social and political boundaries in Cape Verde?

It should be emphasized, nevertheless, that the country is far from a reversal of the index as a country of emigration, but the novelty is that the intensification of immigration to the islands and the importance that has received by the public authorities. In a study we considers some main hypotheses that facilitate de understood of an increasing migratory linkage of Cape Verde to the West Africa region (Barbosa, 2011a; 2011b).

Again, if we try to use the quantitative aspects on the regulation of migration flows to the Cape Verde archipelago, we find a certain absence of statistical data in the field and sufficiently reliable. However, using the report produced by the *Interministerial Commission for the Study and Proposition for the Bases of Immigration Policy* (CIMI), "Immigration in Cape Verde: Grants for National Immigration Policy", we make a brief analysis of the data collected from the DFB – see **Table 5 and 6**.

**Table 7 - Emission and backorders of residence permits (RP) from 2000 to 2010, by nationalities**

Nationalities	Emission of Residence Permit		Backorders		Total	
	N	%	N	%	N	%
<b>Africa</b>	3876	53,2	2005	87,3	5881	61,4
<b>ECOWAS</b>	3663	50,3	1984	86,4	5647	58,9
<b>Benin</b>	8	0,1	0	0,0	8	0,1

<sup>375</sup> No. 16, I SERIES April 26, 2010.

<b>Burkina Faso</b>	5	0,1	0	0,0	5	0,1
<b>Ivory Coast</b>	15	0,2	3	0,1	18	0,2
<b>Gambia</b>	38	0,5	12	0,5	50	0,5
<b>Ghana</b>	124	1,7	20	0,9	144	1,5
<b>Guinea Bissau</b>	1485	20,4	723	31,5	2208	23,0
<b>Guinea Conakry</b>	99	1,4	95	4,1	194	2,0
<b>Liberia</b>	1	0,0	2	0,1	3	0,0
<b>Mali</b>	23	0,3	6	0,3	29	0,3
<b>Niger</b>		0,0		0,0		0,0
<b>Nigeria</b>	844	11,6	534	23,2	1378	14,4
<b>Senegal</b>	890	12,2	555	24,2	1445	15,1
<b>Sierra Leone</b>	112	1,5	32	1,4	144	1,5
<b>Togo</b>	19	0,3	2	0,1	21	0,2
<b>Total</b>	7287	100	2297	100	9584	100

Source: CIMI

According to this data there are about 7287 RP that was conceived a total of 9584 applications and ECOWAS represent about 50 per cent of residence permits issued. However, looking for the data provided by NIS (see Table 2) we found a considerable difference in terms of presence in Cape Verde of people of other nationalities. The comparison of the data with the data from NIS and DFB shows that more than 50 percent of the immigrant population is not in proper legal conditions for residing in Cape Verde. Admittedly before the legal Cape-Verdean framework (Decree n. 6/97 of May 5), the requirement that foreigners show proof of ownership of the means of subsistence and economic. We find evidence of an event that has most blocked or inhibited the settlement of most people who go beyond the 90 days allowed to stay. This is the contradiction and void in law between the Aliens Act and the Labour Code. To get the permit you need a work contract and need a RP in order to work (and having an employment contract). Therefore, one enters a vicious circle that has dictated the legal insecurity for a large proportion of immigrants in Cape Verde and hence limited their integration into the formal labour market, as well as a proper integration in the country.

Moreover, this mismatch data confirms the fact that in Cape Verde there is still no statistical field due to migration. It shows that there is a lack of knowledge, not only of the actual number of people who come from other countries, but also its distribution among the different islands and cities.

Indeed, the last two decades, Cape Verde “has become an attractive country not only as a route for migratory groups more easily reach Europe and North America, but also as a destination because it is a democratic country, economically promising and without conflict.”<sup>376</sup> Besides the rapidly growing economic, social and political stability that permits the country to and graduate to the level of middle-income countries (reaching levels of developing country average), with GDP per capita exceeding all ECOWAS Member States (3400 in 2009), there is also the existence of a Special Partnership with the European Union (EU) since 2008. This partnership with the EU is estimated that the source of many people coming to Cape Verde in the hope of securing a visa to enter Europe after legalized. So, it is also seen as a hub aiming towards other alternative destinations: Western Europe and North America (facilitated by its geostrategic position at the crossroads Africa-Europe-America).

In conclusion, the country begins to face with the arrival of migrants from various backgrounds and with a diverse range of goals. Most of these migrants do not materialize the initial idea of transit. They eventually settle permanently in the country, going to be counted

<sup>376</sup> National Commission for Human Rights and Citizenship - “The issue of illegal migration or Irregular: Recommendations” (CNDHC/Rec/GTPMR/01/2006:2).  
<http://www.indexmundi.com/g/g.aspx?v=67&c=cv&l=pt>.

in the number of immigrants illegal or not. There is a progressive and steely barrier control in Schengen Space and strengthening national borders, in partnership with the EU. In December 2007, the European Union chose Cape Verde and Moldova as pilot countries for a new approach to issues of immigration, facilitating the entry of Cape Verdeans in Europe and Europeans in the archipelago.

Since early 2008, Cape Verde has been negotiating the terms of mobility with the European Commission and with Portugal, Spain, France and Luxembourg. The Government of Cape Verde and the European Union signed in April 24 of this year, in Brussels, two agreements within the partnership for mobility: a facilitation of issuance of short-stay visas to citizens of Cape Verde and the EU and another for the readmission of illegal residents. Cape Verde is committed to working to strengthen the control of illegal migration from Africa to Europe.

To us, the signature of the readmission agreement with the UE on 18 April 2013<sup>377</sup>, despite not being official the outlines of such agreement, requires that one has to rethink the issue of repatriation of third-country nationals (Varela, 2014). According to Fortes and Lima (2012), due the agreements it has with countries like Portugal, Spain, France and the United States, Cape Verde carries the readmission of nationals expelled from those countries (although the very international law - despite the disputes, exceptions and failures - “force” states to readmit their citizens expelled from other countries). With the exception of the U.S., these agreements extend to criminal judicial cooperation, on the one hand serve as a tool for removing difficult immigrants (who have committed crimes or are suspected) and, secondly, as a means of access to national and expatriate immigrants who commit crimes and flee to the states of origin (Delgado, 2011).

With respect to foreign citizens, international law does not require that a state readmits or receive returnees from other countries. However, as there is no international law on migration in the true sense of the term, it makes room for the readmission agreements that may go to “compel” a state to receive returnees (reinstated) from other states. The Cotonou Agreement in its Article 13<sup>o</sup> acknowledges this possibility by setting the opening of negotiations for bilateral readmission of nationals and others. The bilateral treaties that Cape Verde has with the European countries mentioned above have predict that too.

Knowing that Cape Verde integrates ECOWAS, and that the citizens of this area have the right of residence and establishment in any member state, the possibility of Cape Verde signing a readmission agreements with the EU in the manner as has traditionally been done with other States (eg, incorporating the ability to expel undocumented immigrants to the country where they were last before reaching the territory of the EU), runs the serious risk of facing some unusual situations:

- 1) Given that, in light of the protocol on free movement of ECOWAS, Cape Verde cannot, in normal situations, expel citizens of this area, it may experience an increased flow of migrants this space that were repatriated from EU but which in Cape Verde enjoy the citizens status. Cape Verde shall be facing the real possibility of an overall increase of returnees / readmitted in Cape Verde and abroad;
- 2) Faced with the possibility and intention, in turn, of re-repatriate these foreign nationals it may face the opposition from neighbors and origin a political-diplomatic conflict of undefined proportions and may even endanger the process of integration of Cape Verde in the sub region despite the rhetoric of one of the pillars of the partnership to argue otherwise;
- 3) Instead, with the readmission agreement, Cape Verde seek to increase its policy for managing migration flows and security of its exclusive economic zone before the various international trafficking, Cape Verde might become, as the Global South, the labor “reserve

<sup>377</sup> See [http://www.portalangop.co.ao/motix/pt\\_pt/noticias/afrika/2013/3/16/governo-cabo-verdiano-assinam-acordo-para-readmissao-migrantes-ilegais.746a586e-57d3-4251-9fae-7efac368374b.html](http://www.portalangop.co.ao/motix/pt_pt/noticias/afrika/2013/3/16/governo-cabo-verdiano-assinam-acordo-para-readmissao-migrantes-ilegais.746a586e-57d3-4251-9fae-7efac368374b.html) (accessed 18 April 2013).

army” in the Global North (particularly the EU) and, as Libya in Kaddafi time, the foreman of Europe or the bodyguard of Europe, like an “gendarme”.

## Conclusion

In this study some notes are possible pointing. It is well known that the migration in the West Africa Region is historically a complex phenomenon. Furthermore, it should be analyzed in its complexity of experiences. The case of Cape Verde Islands, it is possible to speak in cases of expectancy to get in Europe. The archipelago began to have its prominence as a possibility for transit from the 90s. But it is likewise true that the geopolitical reality around the Mediterranean and Maghreb has served as justification for the resilience of European borders. This is in fact their control has extended along the Atlantic, reaching the Cape Verde islands as a way of retaining unwanted or illegal immigration. Thus, since the 90's and the turn of the new millennium have seen an intensification and increasing the retention of a greater number of nationals of ECOWAS member states. But it should also be noted that the experiences of sedentarization has been happening for decades, especially after the period of independence of Cape Verde in 1975.

The region is strongly marked by lifestyles around the trade. Thus, it is quite possible that some, having a greater possibility, known avail the facilities around the context of free movement in the region to develop or expand their business to a transnational scale. This is how the islands of Cape Verde, in the context of expansion of tourism investment and greater international openness, are becoming as a desirable target for small businesses in the region. This may justify or strengthen the expression of a long process of dynamic intra-regional migration, the West African context, intensifies covering the Cape Verde archipelago.

In accordance with data that we present in this paper, appears to be a large discrepancy between the numbers of people with foreign nationality residing in Cape Verde. It is also true that the lack of statistical control may contribute to a relative institutional discomfort when faced with the phenomenon of “irregular migration” (this refers especially those that go beyond the 90 days allowed to stay without obtaining the residence permit). Since then, particularly for immigration in the context of ECOWAS, it must be said that the origin of this phenomenon has become a political concern in Cape Verde, and may have developed a widespread notion that migrants generally are in “transit” (to Europe or to North America), so they will not be inclined to devote much attention to issues that may be of interest to them in Cape Verde. All these concerns largely have disturbed a migrants fixation in Cape Verde, given the migration being unable to contribute to the creation of improved living conditions in Cape Verde and hence creating economic, cultural, political and social gains either locally or nationally.

The problems and the potential offered by the complexities of migration flows in generally – particularly the migration to and from Cape Verde in the ECOWAS region - push us to rethink structurally the international system itself and its estate centric and Eurocentric character, to the extent that this feature has traditionally conditioned the policies implemented to manage these flows. When, for example, the main international institutions dominated by the major world powers, do not take into account the existence of other forms of governance that are situated out of the Western nation-state canon, it makes the measures taken (often top-down) in the field of migration completely inadequate - not to mention its neo-colonial nature.

Our strong recommendation is that - before prescribing policies or produce future studies - we must pay attention to the fact that on the African continent, particularly in the Economic Community of West African States (ECOWAS) region, there is, in our view, a clear collision between different forms of economic, political and social organization (Varela, 2008: 11). Using the term “contact zone” we can say that “governance” constitutes an “epistemological zone” where we face the confrontation between the cannibal and annihilating state centric model of governance and alternative models of political, economic

and social organization presents, for example, in many realities in the Africa region and in other latitudes such as the indigenous and black communities in Latin America. The confrontation and constructive resistance of these actors to the dominance of state model and its exclusive nature is one example, among many others, that occur in this world, that the “disciplinary power”, centred in the sciences, according Boaventura de Sousa Santos (2002: 12), “(...) is increasingly, no disciplinary power in point of the sciences are losing their epistemological confidence and see themselves obliged to share the field of knowledge with knowledge rivals (...)” as are the knowledge of several distinct groups, companies or people from sub-Saharan region struggling to not dilute in the hegemonic model of governance (Varela, 2008: 18).

### References:

- Alfama, R. Comunidade Cabo-verdiana em Abidjan. Instituto das Comunidades, 2012.
- Amaral, I. Cabo Verde: Introdução Geográfica. In: *História Geral de Cabo Verde (I)* (L. de Albuquerque and M. E. M. Santos, eds.). Lisboa: Instituto de Investigação Científica Tropical & Praia: Instituto Nacional de Investigação Cultural, 2001 .
- Andrade, E. As Ilhas de Cabo Verde da “Descoberta” à Independência Nacional (1460-1975). Paris: Edições L’Harmattan, 1996.
- Bakewell, O. and Haas, Hein de. African Migrations: continuities, discontinuities and recent transformations. In: *African Alternatives* (P. Chabal, U. Engel and L. de Haan, eds.). Leiden: Brill, pp. 95-118, 2007.
- Barbosa, C. E. “Transits ‘in’ Cape Verde Islands: a look about migrations from West Africa”, paper presented at the panel (096) “*Transnationalism and Illegal immigration from Africa to Southern Europe: a gender perspective*”. 4th European Conference on African Studies, Uppsala, 15-18 de Junho, 2011a. Available from <http://www.nai.uu.se/ecas-4/panels/81-100/panel-96/Carlos-Elias-Barbosa-Full-paper.pdf> (accessed 08 April 2013).
- Barbosa, C. E. Arquipélago de Cabo Verde do Colonial ao Pós-Colonial: um Ponto no Tráfego Migratório Regional. In: *O Pós-colonialismo na África lusófona. O caso de Cabo Verde* (L. Bussotti and S. Ngoenha, eds.), Udine: Aviani & Aviani, pp. 183-201, 2011b.
- Bordonaro, L. and Pussetti, C. Da utopia da migração à nostalgia dos migrantes: percursos migrantes entre Bubaque (Guiné Bissau) e Lisboa. In: *Territórios Metropolitanos: ensaios sobre produção etnográfica* (A. P. Lima and R. Sarro, eds.). Lisboa: Imprensa de Ciências Sociais, pp. 125-153, 2006.
- Carreira, A. Migrações nas ilhas de Cabo Verde. Praia: CEE/Instituto Cabo-verdiano do Livro, 1983.
- Carreira, A. Formação e Extinção de uma Sociedade Escravocrata (1460-1878), Praia: IPC – Estudos e Ensaio, [3.ª ed.], 2000
- Carvalho, F. Migração em Cabo Verde: perfil nacional 2009. Genebra: IOM, 2009.
- Delgado, J. P. La regulación internacional de los flujos migratorios entre Cabo Verde y la Unión Europea (en especial hacia España), *Revista de Derecho migratorio y extranjería*, 28: 121-152. 2011.
- Duvell, F. Crossing the fringes of Europe: Transit migration in the EU’s neighbourhood. *Centre on Migration, Policy and Society*, Working Paper n° 33, University of Oxford, 2006. Available from [http://www.compas.ox.ac.uk/fileadmin/files/Publications/working\\_papers/WP\\_2006/WP0633-Duvell.pdf](http://www.compas.ox.ac.uk/fileadmin/files/Publications/working_papers/WP_2006/WP0633-Duvell.pdf) (accessed 8 April 2013).
- Duvell, F. Transit, migration and politics: Trends and constructions on the fringes of Europe. *IMISCOE*, n° 12, 2008. Available from <http://www.compas.ox.ac.uk/fileadmin/files/Publications/Reports/Duvell%20transit%20IMISCOE%20report.pdf> (accessed 8 April 2013).

- Escobar, A. *Encountering Development: the Making and Unmaking of the Third World*. Princeton: Princeton University Press, 1995.
- Ferguson, J. *Global Shadows: Africa in the Neoliberal World Order*. Durham: Duke University Press, 2006.
- Gomes, J. *A Inserção de Cabo Verde na CEDEAO. O Comércio e as Migrações*. Porto: Centro de Estudos Africanos da Universidade do Porto, 2009.
- Haas, H. Morocco's migration transition: trends, determinants and future scenarios. *Global Migration Perspectives*, nº 28, Global Commission on International Migration (GCIM), 2005. Available from <http://www.refworld.org/docid/42ce528d4.html> (accessed 8 April 2013).
- Haas, H. Transit-Saharan Migration to North Africa and EU: Historical Roots and Current Trends. *Migration Information Source*, Migration Policy Institute, 2006. Available from <http://www.migrationinformation.org/feature/display.cfm?id=484> (accessed 8 April 2013).
- Lima, R. and Fortes, C. Emigrantes e deportados em Cabo Verde. In: *"Para além das remessas". A consolidação da sociedade cabo-verdiana da diáspora e as transformações socioculturais e políticas em Cabo Verde*. Dakar: CODESRIA (*forthcoming*), 2014.
- Marcelino, P.F. *The New Migration Paradigm of Transitional African Spaces: Inclusion, Exclusion, Liminality and Economic Competition in Transit Countries: A Case Study on the Cape Verde Islands*. Saarbrücken, Germany, Lambert Academic. Also available in portuguese: *O Novo Paradigma Migratório dos Espaços de Trânsito Africanos. Inclusão, Exclusão, Vidas Precárias e Competição por Recursos Escassos em Países Tampão: O caso de Cabo Verde*. Praia: Edição do Autor/ISCJS, 2011.
- Massey, D. *et al.* *Worlds in Motion*. Oxford: Clarendon Press, 1998.
- Ratha, D. and Shaw, W. Causes of South-South Migration and its Socioeconomic Effects. *Migration Information Source*, Migration Policy Institute, 2007. Available from <http://www.migrationinformation.org/Feature/display.cfm?ID=647> (accessed 8 April 2013).
- Santos, B. S. Para uma sociologia das ausências e uma sociologia das emergências. *Revista Crítica de Ciências Sociais*, 63: 237-280, 2002.
- Santos-Rocha, J. *Comunidades de origem Caboverdeana no Senegal: aspectos de caracterização*. Praia: Ministério das Comunidades, 2012.
- Thomas, P. The river, the road, and the rural-urban device: a post-colonial moral geography from southeast Madagascar. *American Ethnologist*, 29 (2): 366-391, 2002.
- Trindade, A. *O Fenómeno Urbano na África Subsahariana: O caso de Luanda*. Lisboa: Instituto Superior de Ciências Sociais e Políticas, 2000.
- Varela, O. B. A. Governação Global Neoliberal e a Emergência de Formas Alternativas de Governação Política, Económica e Social na África Subsariana. *12th General Assembly 'Governing the African Public Sphere'*, CODESRIA, 2008. Available from [http://www.codesria.org/IMG/pdf/Odair\\_B- Varela.pdf](http://www.codesria.org/IMG/pdf/Odair_B- Varela.pdf) (accessed 8 April 2013).
- Varela, O. B. Cabo Verde: A Máquina Burocrática Estatal da Modernidade (1614-1990). In: *Entre África e Europa. Nação, Estado e Democracia em Cabo Verde* (S. Costa and C. M. Sarmiento, eds.). Coimbra: Almedina, pp. 173-208, 2013.
- Varela, O. B. Readmitidos e/ou Repatriados? Uma Re-leitura do Acordo de Readmissão de Cabo Verde com a União Europeia. In: *Faces da Diáspora Cabo-verdiana* (I. Évora, ed.). Lisboa: CEsA (*forthcoming*), 2014.

# **THE CAPE VERDEAN SLUM AREAS IN PORTUGAL, INTEGRATION OR SEGREGATION? HOW DOES THE SCHOOL PREPARE THE YOUNG CAPE VERDEAN IMMIGRANT GENERATION TO INTEGRATION IN THE PORTUGUESE SOCIETY?**

*Martha Lea*

University of Stavanger, Norway

---

## **Abstract**

Children do not ask for immigration. Tests show that immigrant students do less well than native students at school. Have their future possibilities become worse, while their parents wanted to get better conditions? How does school enhance their capacity to be equalised with native co-students?

According to a Canadian professor, Jim Cummins, the way to go is to respect their mother tongue, their cultural identity and values and build upon this as a fundament for further education in cooperation with their parents and in an open communication between teachers and students. Is this the way to go to give the immigrant Cape Verde youth in the slum areas in Lisbon a starting point for a better future?

---

**Keywords:** Cape Verde students as immigrants. Challenges for migrant students. Language support in school. Migrant children in school

## **Introduction**

In my study period in Lisbon 2008 I visited some slum areas in Amadora with Cape Verdean inhabitants in majority. I was also introduced to the ACIDI centre for immigrants in Lisbon (The High Commission for immigrants and Ethnic Minorities). Then I was struck by the seemingly wide difference between ACIDI's ideal goals for immigrants and the living situation presented in the shacks. The Council of Ministers has presented a plan for the immigrant integration (Resolution no 63-A-2007, May 3<sup>rd</sup>, (later called "Integration Plan"), including all aspects that have to be taken into account from work, housing health, education to citizenship etc. It is a wide and important area to develop. In this limited work, I want to concentrate about the school situation to see how the schooling seems to give next Cape Verde generation in the slum areas a good platform for integration. I choose the Cape Verde group because the history of the people interests me. They have served the Portuguese country first in Cape Verde, thereafter in Portugal, and now they are defined as immigrants or "ethnic minority" (Horta,2002:161). In that aspect they are not the only ones, so in this field an analyse might be relevant to similar immigrant groups of students.

The children of immigrants have not asked to move, the motivation for parents is generally to get better possibilities for their life. It is difficult to see if life has improved for the immigrants living in slum areas. From other studies one knows there is always a wish from immigrant parents that their children will do well at school. The International Student Assessment (PISA, 2006) shows, however, that students of immigrant parents and those with low socioeconomic background generally do less well than native students. One may therefore ask if the immigrant children are the losers. By now integration between inhabitants living in the Lisbon or Amadora areas of shacks seems to be a remote aim. As the children represent the future there are vital reasons to have a look at the school situation.

In addition to receiving the immigrants Portugal acknowledged 1990 the UN Convention on the Rights of the Child (later “Child Convention”), and thereby accepted to try to fulfil the intentions. A central right underlined in the Convention is the right for the child to his or her own identity, (art.8). In the short edition it is related to the nationality, name and family relations. In article 29, however, the obligation is widened to a formulation that

“ ---education of the child shall be directed to the development of respect for the child’s parents, his or her own cultural identity, language and values—, for the national values of the country in which the child is living; the country from which he or she may originate, and for civilizations different from his or her own.”

This is based on the idea of developing mutual, cultural respect. Migrants’ rights are even more directly expressed in article 30 where it is said that a child belonging to a minority shall not be denied the right “--- to enjoy his or her own culture, to profess and practice his or her own religion, or to use his or her own language.”

To get a perspective on the teaching of immigrant students in Portugal it is relevant to look for experiences and theories in the literature. One source I find as most interesting. A Canadian professor, Jim Cummins, wrote an article in 1986 in *Harvard Educational Review* (HER) with the title “*Empowering Minority Students: A Framework for Intervention*. Fifteen years later, in 2001, the article was republished in HER. As immigrant students are from “dominated” societal groups, the interaction with educators will either “empower” or “disable” the students he maintains (2001:659). Using the concept “empower” he wants to “signify the collaborative and reciprocal nature of the ways educators, communities and students negotiate identity and power (ibid:649). His theories are apparently still relevant. Main elements in his “empowering” program are the impact of language and accept of cultural identity, the school’s cooperation with the parents and power relations between the students and teachers. In my opinion Cummins points at the same elements of importance as the Child Convention, article 29 above, adding the power element. Following the aim of the Child Convention to develop mutual respect, the dominated or he immigrant, group, has to be empowered.

The responsibility of the school is to develop the children’s possibilities to “the fullest potential” according to the Child Convention (1989, art.29, part 1a); the same is in the interest of the immigrant population and the host society as well. What is “the fullest potential” for children in a socioeconomic deprived area with or without raising the living standard is difficult to define, so this discussion is left out here. Immigrant integration is, however, the main aim of the Integration plan from the Portuguese Council of Ministers (2007). This includes equal opportunities in education, work, health, housing etc. and “participation and joint responsibility in all areas of society,--“ (ibid:6). About education it is more specifically said (ibid:16): “To develop diverse strategies to help the integration of student children of immigrants into schools, namely by taking into account the age levels of students, language ability and length of stay in Portugal”. To compare with the Norwegian *Report No. 49 “Diversity through inclusion and participation- responsibility and freedom”* from the *Ministry of Local Government and Regional Development to the Storting (2003-2004)*, one find similar formulations, but also following goals for migrant children growing up in Norway: “(to-) cope with school and education on a par with others” and “(to-) experience belonging and acceptance of what they are”. The ideas of what integration means, are seemingly quite similar in both countries, including the importance of education. However, the PISA results have already showed that the migrant children in both countries do seldom “cope with school and education on a par with others”. One might perhaps ask if the PISA test is constructed to show the capacity of students in a multicultural school, which is the situation in most of the participating countries. A perspective of “empowering” the Cape Verde students might shed a light on important future challenges, some special for the group,, and others more general for migrant students.

### **The Research process**

It was time-consuming to find relevant literature in English about the Portuguese school situation. One article by Ferreira and Cardoso (2004) caught my interest. It clarified the students' reasons to drop out of school and thereby gave a picture about how they experienced school situation. Education is a relevant, general topic, but the impact on the children as future citizens when families migrate, ought to be of great interest. The impression I got of the school situation is built upon a combination of analysing literature, some interviews with teachers and student teachers in Norway and Portugal, and my own former experience from teaching. It also seemed important to have a look at the history of the Cape Verde population in the hundreds of years of colonialism. Iben Jensen says in an article about intercultural communication that we can not communicate outside history or outside the social or global systems we are part of Jensen,(2006; 91). With my Nordic or European eyes I find it difficult to really understand which impact the turbulent historical background together with the dynamics with other factors have had for the Cape Verde inhabitants in the slum areas. In the connection of being integrated, the development of language and culture, included the way of living, seems to be of most importance. Then the Portuguese policy to give the Cape Verdeans the open areas together with the historic luggage they had brought might be decisive to their future.

The research questions are concentrated around three aspects:

How are the language situation and the cultural identity of the immigrant students mirrored in school?

In which way are parents included in the education of their children?

How might the power relation be between the migrant students and teachers?

The background for the main research questions lies in Cummins' theories and in the obligations the Child Convention prescribes about developing "respect for the child's parents, cultural identity, language and values—". However, it is possible to find these elements in parts of other literature as well, being important both for children and adults. I want to find out which importance the accept of language and cultural identity might have for the students from a general goal of "empowering" them, which place this has in the Portuguese school policy and the Council of Ministers policy in the Integration plan, how the real and also challenging situation in school seems to be. The inclusion of and cooperation with parents in school is not obvious in all cultures. This is more and more included in the policy of immigrants in western countries. Apparently Cummins underlined the importance already more than twenty years ago. How this can be taken care of in the Cape Verdean slum areas is important to discuss in the aspect of their culture and the wanted future of more integration.

Cummins defines awareness of "power relation" as a most decisive feature in the empowerment process. In a more everyday language one might preliminarily characterise it as accepting attitude teacher of the that permeate the whole teaching activities. Cummins defines the teacher as the one who has the power to strengthen the immigrant students belief in own capacity. For the Cape Verde students this might be an impetus to development. As a summary it is interesting to discuss the situation as a totality of power relation to interrelated possibilities and challenges in the areas of language, cultural identities and cooperation with parents. Looking at what is happening just these years in different countries, I realise that the situation for immigrants and the political consciousness of the important immigration policy is developing. This will also mark some of the documents or research work presented in this connection, if we, for example, compare the Portuguese National Curriculum of Basic Education, from 2001 (later Portuguese Curriculum), with the Integration Plan from 2007. Some situations that were correctly described yesterday might be changed today.

### **A historical background for the immigrant Cape Verde population.**

The aspect of more general interest could be the Cape Verdean history from being colonised to becoming immigrants seen from their own point of view, but we have to rely on the available history. The African population of Cape Verde was in the earliest part “imported” as slaves from different part of Africa. . It seems to be a bloody start of the colonisation history (Lobban jr, 1995:10 fvd.). But throughout the colonisation history, the slaves from being a majority became a minority of the Cape Verde dark population (ibid:67 fvd.). Though being colonised they developed their own Creole language and culture which Lobban calls “The Crioulo Cultural Synthesis”. The official language was Portuguese, and the Creole language had a similar structure, but with sounds and words from African languages infiltrated. This became their “mother tongue”, the everyday communication language (ibid:70 fvd.).

This part of the population also developed their own cultural expressions in for example, music or literature, though as being colonised they had to be careful of what was expressed. “Generally”, Lobban says “- the Portuguese made little or no effort to preserve African culture” (ibid:55). Cape Verde was dominated for centuries by the coloniser, especially is the situation of the women to be mentioned. They could easily be sexually abused, got less schooling, had often heavy work and lower wages. The males could emigrate and did so, to different parts of the world and left the women to care for themselves and children (ibid:83). Mapril and Araújo summarise the period like this (2002:204): “During the colonial rule, Cape Verde remained largely neglected by Portuguese authorities.” Most probably this could be said about other colonisers in other parts of the world as well. Mishra and Hodge have described the relation between a coloniser and the colonised like this: “The colonised never know when the colonisers consider them for what they are, humans in full possession of a self or merely objects” (1992:278). Today we know something about the effect to one’s self-esteem of being suppressed, anonymised or abused. One may “learn” dependence, perhaps self-contempt or have to raise one’s back in one or another way. Both attitudes seem to have existed. No wonder that there arouse movements like the *African Party for Independence of Guinea and Cape Verde* which was supported by the *Democratic Union of Women* (1961).

The other side to remember is the development the last 30-40 years: The democratisation of Portugal 1974 (Texeira et al.(2005:7), Cape Verde becoming independent 1975, and the wave of family reunification. This meant that the earlier imported workers from Cape Verde could live with the family. One would believe that these events would change the attitude to the former colonised people. Nevertheless, Rocha-Trinidad et al. tell that African immigrants got the lowest position (1993:59-60). Portugal got EU membership 1986 and consequently had to face European influence on the policy. The EU Human Rights (1988 and following) supported the democratisation and as said, Portugal ratified the UN Child Convention 1990. The new immigration policies did not start until the adherence of the Schengen agreement in 1991 with a “Coordinating Secretariat for Multicultural Education Programmes/Among Cultures”, (Texeira et al.2005:9). Some of the Secretariat program had to (in short version):

articulate and ensure communication among the various intercultural education projects  
encourage an intercultural dialogue in the schools and in the community which can enhance the diversity in the schools --in conjunction with parents, students and local governmental authorities.

deal with the problem of academic failure

launch literacy programmes for adults

promote school campaigns dealing with children’s rights

acquire more in-dept knowledge of the areas and schools affected by violence or racial conflicts and to take preventive measures

encourage activities with Human Rights, solidarity and respect for others. (Rocha-Trindade et Sobral, 1993:63)

Here one finds both schooling for children, intercultural dialogue to enhance the diversity in schools, cooperating with parents, programmes for children's rights etc. The next step in the general policy for immigrants was taken in 1995 as the High Commissioner for Immigration and Ethnic Minorities was presented (Mapril and Araújo, 2002:198). The plan already mentioned, the Integration Plan, is dated May 3<sup>rd</sup>, 2007. This shows a development in the Portuguese policy as to immigrants. The question is always how the intentions are operationalised as to the target group.

How are the language situation and the cultural identity of the Cape Verdean immigrant students mirrored in school?

In this part I will present the language and the cultural identity question separately. I want to point to aspects of language competence in different theories, which status the language education for immigrant children has in Curriculum Plans and other official documents, and discuss which possibilities Cape Verdean students from impoverished areas seems to have at school. Thereafter I will present the importance of cultural identity from the same aspects, generally, the place in plan documents and in reality.

### **Aspects of the language situation**

Culture is a concept that is defined in different ways. Language is part of the culture and expressing different sides of the culture like music, dance or painting. It is also a tool for communication, for understanding and problem-solving. The language often tells about a person's nationality, or place of living in one's childhood, and may be evaluated as a sign of a person's or group's status. It might tell about the cultural and personal identity. It is easy to find examples. Norway has one official language, but in two editions, near related. The one, nynorsk (New Norwegian), constructed 1851 on rural dialects after the country in 1814 became independent from Danish supremacy, the other, bokmål, (Language of Books) the more urban one, marked by the official Danish language, and continued to be used after the Danish period. Even being officially equalised, the quarrels and competitive discussions even now, between the groups the more rural one "defending" what they called the "right" language, show how near language, the mother tongue is associated to one's identity or social ranking. The language from a minority group might have less status than the language in the majority group.

There has been a general policy in many countries until the late 60s (Cummins, 1986/2001: 658) to give all education in the language of the host country. Tove Skutnabb-Kangas (1997:219) gives examples from a period when Finnish children in Sweden were taught completely in Swedish by Swedish teachers with no knowledge of Finnish. She refers to different research work, and says: "Finnish children often reacted with silence, extreme shyness, being mute, (Takač, 1974) or with physical violence or playing truant (Toukomaa, 1973). They were highly overrepresented in special classes (Kuusela, 1973)". The idea at this time was that the more the children were exposed to the language in the new country, the earlier they learned the language used in school. It seems to be self-evident that it is difficult for children to learn in a language they do not understand. It also shows that understanding and being understood have an impact on the whole personality.

Then the question for countries with immigrants is to know how to develop the necessary language competence in the country's language to give children the equal possibility to education or later work. The first language competence we often think of is the ability to understand oral language and to express oneself in a manner that can be understood. The social aspect of the language is important, the will and ability to communicate in everyday situations. To master the language as a tool includes an understandable grammar proficiency and use of adequate words. In education this competence is developed to reading

and writing, abilities from the simplest form to the capability to understand information and to present understandable solutions in different subject questions. As to relevant understanding of the content of words or concepts, it is important in all communication, not least in the acquisition of more complicated theoretical questions. This understanding develops through experiences, explanations and communication. Anne Høigård (2006:190) writes:

In understanding minority children's language development, it is useful to discern between two kinds of language competency. The one is to be able to use the language in fluent everyday speaking, the other consists of being competent to use the language as a tool for thoughts.

Cummins (1986/2001: 671) gives examples from a school in California where Spanish speaking children with a Spanish pre-school program performed later on better at school in both English and Spanish than the Spanish children who started with English. This is still a big question of debate. Høigård (2006, p.191) refers to a Swedish language researcher, Kenneth Hyltenstam, who has summed up agreements from research work. Research shows that it takes 5-7 years to develop the second language as a language for thinking and learning, and the children need support for the language development in this period, even if their oral language is fluent.

With this in mind it is of interest to see which aspects seems to be taken into account in the Portuguese official documents for migrant children to develop the bi-lingual capacity.. Language as a part of and supporting the identity and cultural development, besides being a tool for communication and further on a means of understanding the world around combined with experience and education.

In the English version (2003) of the Portuguese Curriculum of Basic Education (Portuguese edition 2001), I find some rather general formulations that might give the possibility to include immigrant children's need for language support. The introduction p.11 reminds about the situation with more children and young people whose first language is not Portuguese. It is implied that there has to be developed guidelines for specific curriculum activities in this connection. As to develop Portuguese competence besides being competent to use it varied and correctly, following aim is presented: "To value and appreciate the Portuguese language either as the native language or host language" (ibid:19). One of the goals of general competences for foreign languages expresses this (ibid:15): "At the end of the basic education, the student should be able to use foreign languages in order to communicate in a suitable manner and to structure his/her own thinking." Under the heading "Foreign Languages" (ibid:39) I can not find if this relates to certain predefined language possibilities or not. It is referred to a European Framework of References for Languages that gives this definition:

Pluri-lingual and pluri-cultural competence refers to the ability to use languages for the purpose of communication and to take part in intercultural interaction, where a social agent has proficiency of varying degrees, in several languages and experience of several cultures.

Under "Some guiding principles" (ibid:45) it is said:

Learning foreign languages in the 1<sup>st</sup> cycle ought to promote the awareness of linguistic and cultural diversity. The opening up of the school that plurality will result in the creation of receptiveness to other languages and cultures – potentially present in the surrounding environment – the establishment of relationship between those and the mother tongue and the sharing of experiences with other ways of being and living.

If I were a teacher in the Portuguese school without any more knowledge of the school's goal or practice, I would see a possibility to give immigrant children special support inside the class, if I managed to differentiate, but not necessarily being obliged to do so without further regulations.. So far I interpret the intentions of the curriculum plan to prescribe an open but not precise attitude to the multicultural situation in schools. It seems to be a national, not multicultural school that is described in the Portuguese Curriculum of 2001.

There is, however, a Law no.6 from the Minister of Education 2001 which says in article 8 that schools must (my underlining) “provide specific activities for the learning of Portuguese as second language for pupils whose mother tongue is not Portuguese (ref. Ferreira et al., 2004:83). The Integration Plan (2007:21) has an article 52 with the aim of developing Portuguese as a second language, and refers to what is called “guiding documents”: “Portuguese language as a second language in the Portuguese Curriculum, The National guidelines and the availability of diagnostic assessment tools for defining the linguistic competence and school profiles of students and their correction”. It seems as there are obligations of enhancing the language education in Portuguese as a second language for immigrant children. It is not said anything about how, if the education has to go through supporting their mother tongue in a phase. Nevertheless, the ACIME centre and also the private association for Teachers APEDI develop material to support the teachers in their education of immigrant children.

The Norwegian Curriculum Plan for the elementary school gives a picture of the wanted Norwegian school. As to the situation for immigrant children you have to search in general formulations like “all pupils shall have equal possibilities regardless of gender, social, cultural or linguistic background”. The first foreign language is English, the second varies, according to the school’s capacity. In addition, however, there are special defined measures and goals restrictions in ministerial documents, a strategic plan for “Equal Education in Practice” and two small curriculum plans, the one securing migrant children support in their mother tongue when needed and the second about later possible tuition in the Norwegian language in different subjects.

To compare, it seems as if both countries in the general Curriculum plans mainly present a mono-cultural plan which immigrant children have to follow, though with the aspect of developing the pupils’ capacity to get an international understanding more generally, not really in the aspect of migrants. Thereafter it might look as if Norway has chosen to go through supporting the mother tongue education to competence in the National Language. The question for the Cape Verdean children is then if the Creole language is regarded as their mother tongue or it is Portuguese, since the official language of Cape Verde is Portuguese. Esteves and Caldeira refer to Ferreira (1997:27) and maintain that this is possible since the bilingualism of Cape Verde was formally accepted by the Parliament of Cape Verde. (2001:103).

Already in 1985 the Portuguese Institute of Distance Learning made a national survey about the effect of return migration on school population (Rocha-Trindade et. al. (1993:60 fvd.). This was a group having Portuguese citizenship, but having lived abroad with their children for some time. Students did for example not manage the Portuguese language, did not understand the teachers, their class-mates, could not express their knowledge in writing or use the Portuguese language in different disciplines. Some of the Cape Verde population had Portuguese citizenship at this time and some had lost it in the independence of the country. Nowadays the situation may be even more complex for Cape Verdeans, including illegal ones.

As the Ministry of Education already in 1991 presented intercultural education projects to enhance intercultural dialogue and ethnic diversity in schools, one might expect that the situation ten - fifteen years later was quite another. The mentioned Law no 6 (2001), shows that the language question is still relevant for immigrants. So in 2004, Ferreira et al. presented why Cape Verdean students do not succeed compared with other minority groups. Even if the school is compulsory, many students drop out and give different reasons for that. Summing up reasons like missing classes, difficulties in school, failed a year, language problems and difficulties with teachers, 54% mentions these reasons. Teachers say that the linguistic reasons are the main explanation of failure (Ferreira et al., 2004:81 fvd.). For most of the Cape Verdean children Creole is their mother tongue, whether Portuguese is the official language of Cape Verde or not. Creole is used in the families in the slum area. Teachers

regard Creole as a Portuguese dialect Ferreira et al. maintain, and therefore they do not regard themselves obliged to consider which lingual support they could give the students. The linguistic differences in words and pronunciation Lobban jr. (1995:70fvd.) described as characteristic traits between the Creole and Portuguese language, is more than enough to disturb the concentration in children. Furthermore the Portuguese language built upon at that time would now be characterised as archaic (Esteves and Caldeira, 2001:102).

If it is correct that formalities do not hinder accept of Creole as the children's mother tongue and at the same time teachers overlook this aspect and explain school failure with language problems, it could have been interesting to know which measures they prescribe to avoid that.

As one knows that it takes time to learn a second language to a higher competence than using it orally, a following-up policy could also be relevant.

### **The importance of Cultural Identity**

*In the history of different emigrant groups it is easy to see how important symbols of the cultural identity have been, have strengthened the feeling of being someone, of belonging to a group.* The National symbols, the flag, even the colours of it is important, speaking the language, singing and dancing, having the possibility to worship, sharing national dishes, activities or ceremonies like these we can still find among the Norwegians or Slovenes in USA even if they emigrated more than a hundred years ago; and we find some of the same among the Cape Verdeans in Lisbon ( Esteves and Caldeira, 2001:102 fvd.). They may present their music in Rossio Square, show their dances or sell their dishes or other products. This supports their living and feeling of cohesion and by presenting themselves they enhance their self-esteem. Cultural identity is, however, something more. It can be defined as their whole way of living, social structure, gender attitudes, values of importance etc. As one wonders why this group of Cape Verdeans have ended in slum areas for a rather long time, it is perhaps of importance to have a look at other elements than food or music as the aim is to at least integrate next generation in the Portuguese society as these are accepted. Without repeating the whole story or trying to give complicated explanations, I want to put forth some questions. Living in a socioeconomic poor area has an influence on the children's possibilities. Being colonised for a long time their parents might develop an attitude of dependency, what Cummins calls "learned helplessness" (1986/2003:666). It is said that Cape Verdeans arrived in Portugal at a time when Portugal was not prepared to deal with immigrants (Mapril and Araújo, 2000:200). It seems as if this group somehow has stopped after caring for housing in the initial phase. Is this because of the general bad working conditions, health or housing in shacks? One might ask if it is a post-colonial culture, an attitude that the children possibly take over. The other question I want to present is about the importance of gender roles. Lobban jr. told, in the Cape Verde history (1995:83) about women being responsible for the family's situation when men emigrated, women being hardworking and also exposed to sexual abuse. In an interview with a professor in Lisbon, she said that there were many mono-parental families in the slum areas, that is, single mothers. They were responsible, cared for their children and had a paid work. Men, husbands were changing partners. It is difficult to say if this family structure has become part of the culture as a result of the circumstances in the colonial time.

The general policy for the Council of Ministers is "Immigrant Integration" as the title of the plan from ACIDI tells. There are used phrases as "culturally enriching the country (ibid:5) or to recognise the immigrants' "economic, social and cultural contribution--" (ibid:6). One of the principles includes "--accepting the cultural and social specifics", but also sets the limits by adding: "supporting mutual respect and obeying the laws of the host country". Active participation by immigrants and joint responsibility in all areas of society is wanted according to the plan (ibid:6). Equal opportunities are important and discrimination is

rejected either it be ethnic, or related to language, religion, or gender (ibid:6). Measures 113-118 (pp.37/38) are describing detailed precautions to take care of the gender equality aspect, giving information about and involvement in securing women's rights, support working possibilities, education and professional training etc.

Equality and non-discrimination are main values underlined in the Integration Plan. To operationalise this in school for example it is wanted to "motivate teaching staff to understand the specific socio-cultural backgrounds of the students"; and to establish "appropriate pedagogical strategies for diverse situations", and finally to "develop a firm relationship within the family context of the students" (ibid:17). There is also a wish to promote and support education projects about independent cultural aspects to support teaching sciences positively as a factor of social integration. Some of the integration aspects are actualities for the education in schools, some of more general character for different parts of society. Measure 102, p. 34 is directed to media, saying that media ought to "give space to programming/information that demonstrates the existence of cultural diversity in Portuguese society, placing importance upon the cultural and linguistic expression in the resident migrant communities in Portugal." This might have an impact also for the education.

As mentioned the Portuguese Curriculum reminds of the growing numbers of immigrant children in the introduction. This does not seem to have any consequences for the teaching in other subjects than language. The Curriculum says (p.11): "However, it is equally important to emphasise that the educational experiences provided to these students should aim to develop the competences contained in this publication." Minority students are not mentioned in the rest of the text as far as I see. On the other hand there is a "warning" in the framework of historical competence for all levels that students should be able to: "show respect for other peoples and cultures". (ibid:90). There are many possibilities to enlighten the situation for Cape Verde children as well as other immigrants. In "Learning experiences" (ibid:94) it is suggested that students should participate in "Surveying the countries where students' relatives are immigrants", not the other way round. A good teacher should be able to handle this in the perspective of "countries where relatives come from", even it is not said explicitly. Other mentioned themes are: "Portugal from authoritarian to democratic" (ibid:99) or "other cultures in the students' community"(ibid:96). A cultural aspect could be integrated in music or physical education as well.

Also the Norwegian Curriculum has a general formulation (p.5): "The education has to impart knowledge about other cultures and exploit the possibilities to enrichment what groups of minorities or Norwegians with other cultural background give." The school's responsibility to equality is emphasised by saying that the teaching has to be adapted to everyone, independent of age, gender, cultural or linguistic background (ibid:34) and even more discussed in the Action plan: "Equal Education in Practice (2004-2009). Even with good intentions, the dilemma for both the Norwegian and Portuguese school is that immigrant children have to learn a new language besides all other subjects. In Norway they are secured an introduction course and supplement of mother tongue education, but nevertheless, in the next run, when regarded sufficient language-qualified, they have to follow their age group in the ordinary school, however, still with some possibility to extra support. A presentation of the immigrant children's culture is not specified.

In an interview with two experienced Norwegian teachers at a school for immigrant children arriving country without language competence. This school had all nationalities presented at the walls so the children and parents could see they were thought of. I asked the teachers to give priority to some challenges in their education task. The first four they ranged like this: 1) Language. 2) Social competence. 3) Mathematics, 4) Being general oriented. This represents the two main subjects in school, language and maths, and the general ability to fall in and be able to handle a new school situation in a new country. It was hinted that children from one special country had a tendency to try to solve disagreements physically. In the

mentioned survey over school drop-outs of Cape Verde students ( Ferreira et.al: 2004:81), 5.1% of the respondents mention “disruptive behaviour” as a reason. Apparently it is not only a verbal language that has to be learnt, but also the way of behaving in social settings according to the country’s practice. Then the mutual cultural acceptance is tested. “Ambivalent behaviour” Ferreira et al. call it as school norms differ from the norm in migrant families or among their friends. One might also be wrong in assuming underlying reasons of for example bullying. Fandrem et. al. (2008: 23) has made a comparison about reasons of bullying among native Norwegian and immigrant boys. The main motive in native Norwegian boys is power and the main motive in immigrant boys is affiliation, wanting to get friends. Neither did the researcher find differences in the level of aggressiveness between the two groups, which was unexpected. Behaviour and non-verbal communication is also a sort of language, telling about cultural background and way of living, wishes, open for interpretation or misinterpretations and social evaluation.

Even if the women are presented with a capacity beyond expectance (Lobban, 1995, Marques et al, 2001, Perista et Fernando, 1997) it seems like the family structure is problematic different between the Portuguese families and the Cape Verdean families. This culture together with the general living conditions in the shacks seems to be a hindrance for the Cape Verdean youngsters to get integrated with Portuguese children or youngsters outside school. This may also be a hindrance to develop a bicultural identity if there are not taken special precautions at school. As the Portuguese Curriculum is more National than Multicultural this has to be taken care of by the teachers. The drop-out results showed that 10,7% of the respondents did not find that the school prepared them for the future or they were not interested. Ferreira et al. (2004:84), concluded that the school is not interested in the Cape Verde children. They don’t see them as “personal, social, cultural and curricular richness”. The dilemma is to start where they are, and at the same time prepare them to a Portuguese future. The reasons given for drop-outs might tell that the content possibilities in the Portuguese Curriculum is not utilised in an immigrant including manner.

Interviewing students in teacher training colleges in Norway and Portugal, with the speciality of migration give other signs. I found a rather including attitude to integration. They believed in a common interest of living peacefully together, but saw some problems in gender or possibly also religious questions. One respondent, however, seems to be a bit inconsistent in the answers. She wanted to transfer values like friendship, love, help, gratitude and she thought these are common values in both groups. In religion there were no problems, she thought there are the same values. Nevertheless she also says that she wants them grow up with the same values that her parents, grandparents and teacher taught her, they were correct, and she grew up in a correct way. On my question if the children or parents did not agree, she would say to the children that the parents were wrong. “If the parents don’t agree with me, then I talk with the children and say I am right, you are wrong, and you have to choose what you want to do.” This respondent makes me wonder how many thinks like her: we all want peace and love, but in reality “my values are the right ones”. Music, dance and food are exotic elements outside my house, but culture expressed through the way of living, social attitude, special values are difficult elements in the integrating process.

### **In which way are immigrant parents included in the education of their children?**

Cummins (1986/2003:665) gives many reasons for cooperation with the parents of immigrant children. “In reality” he says, “most parents of minority students have high aspirations for their children and want to be involved in promoting their academic progress.” He refers to a two years research project from 1982 in London in a multiethnic area, where parents of two groups of children in one school were asked to let the children read for them, while two groups in another school got extra instruction of an experienced teacher. In addition there was a control group without any special program. The result was that the group who was

reading for their parents made significantly greater progress than any of the other groups, even the ones with extra instruction. Another result was that the children showed better behaving and became more interested in school learning. In an interview with 2 teachers in Norwegian schools with approximately 20% immigrant children widen this perspective. A bilingual Turkish/Norwegian teacher with 13 years of experience says “If the students are followed up by the parents, they will do much better.” The other pointed at the importance of the parents’ greater understanding of the students’ or pupil’s situation for both parts. To prolong this perspective, most likely this understanding will ease intergenerational challenges as students move against becoming bicultural.

In Portuguese policy the cooperation with parents has an important place. In the Integration plan (2007:16) the involvement and welcome of immigrant families is a goal to clarify the parents’ role in Portuguese schools. This is also emphasised for the teachers (in measure 36:19). It underlines the importance of the teacher, their understanding of the specific socio-cultural backgrounds of students. Included in this it is significant “to develop a firm relationship within the family context of those students.” Intentions for the family situation, work employment, housing and health are more detailed described, also to the best for children at all age levels. The Portuguese Curriculum plan is not specific in questions of cooperation.

To compare with Norway this cooperation is an obligation for all parents and teachers, formalised in the Act of Education and the Regulations to this law. The Norwegian Curriculum plan also describes the reasons for and the mutual obligation of the cooperation about the children’s cognitive and social development and general well-fare. This is the formal side of it. On the one hand both parts also in Norway are dependent on mutual will to understanding, and even the most idealistic teacher may say: “There is always something more ---“, signalling the feeling of shortcoming.

The school’s possibility to cooperate with the Cape Verde parents seems to be rather meagre according to Ferreira et al. (2004). The family situation with divorce and single parents, unemployment or working mothers with little time to participate in the children’s life makes both the general, daily life situation troublesome, and even more the possibilities to look forward to a better future for the children, even if they had the wish. With a reputation of dysfunctional families, bad socioeconomic status and a housing situation where children have no space for school work it is easy to imagine that teachers “reinforce the stereotype about these families” as Ferreira says ( “and have low expectations about these children and reduce their chances of being successful at school “(ibid:82).

Then it was inspiring to talk with the two Portuguese students and the teachers in Nov. 2007, about cooperating with parents generally. They wanted to cooperate with the immigrant parents. “We have to talk with the family to know how the family lives, their labour” one says. “It is important for the children to feel that the parents like the schools and to be occupied with the schools” one teacher says, and another stress that it must be wanted to include the parents. There are ideas like inviting them to the school to participate in the classroom. It is not quite clear to me how far it is practiced, but these students were quite confident that this they would manage. The recipe was knowledge about the families, their way of living and religion, information and dialogue in important questions and inviting them to tell the students about their culture. I have, in Cape Verdean areas, seen the pride of some grandmothers as they discovered the technique of reading, a result of voluntary, unpaid work by teachers, and I have met a young student who had constructed his own computer, also with voluntary assistance. I got the information that people became old in the shack area. If the system still fails for a long time ahead, grandmothers and voluntary work shows possibilities to support the next generation so far. However, the Integration plan, and possible consequences in a following-up policy, the belief and idealism of the young student teachers and the voluntary supporters point at future possibilities.

## **How might the power relation be between the migrant students and teachers?**

### **A summative discussion.**

The word of “power” is well known from politics. Then it is a question of domination, the ability to operationalise and implement a political program, and this dominating power is evaluated differently if one agrees in the program or not. Ichak Adizes (1991) analyses the power relation more generally out from a wish to make changes in a relationship. In this connection I find it clarifying to present his description of four elements:

1. Responsibility, your obligations in your work,
2. Authority, the right you have to define how to implement actions or choose teaching policy
- 3) Power, the possibility to punish or reward and
- 4) Influence, without deciding for others, but try to move them in this or that direction.

To use these concepts to the teachers’ situation, it is easy to say that the responsibility of the teacher is to develop the students’ possibilities according to the plans or regulations given by the society or the nation’s commitment to the Child Convention. He has the authority within given regulations to define teaching methods or activities that may give the wanted development for the students and the power to punish or reward, to hinder or support, say “yes” or “no” as to the registered signs of development. Lastly he has a possibility to influence more indirectly, in the way he organises the teaching situation, communicates with the students, inspires, supports etc. To choose his teaching style is also part of his given authority, so the concepts might be interrelated. The student is the object of the activities and the development or “empowerment” of the student is the aim.

In Cummin’s presentation (1986/2003) it is a question of the dynamics, the power relation between two parts, and in this case is the influential arena the school or the society and the partners the immigrant students in relation to the teachers or to native students. The difference of dynamics in a machine and dynamics between people is that the last one never stands still and constantly receives other influences as well. What disturbed Cummins was the under- achievements he found among immigrant students, and which we find today. He wanted to put a light on the importance of the human relationship in the education (1986/93:650).

As we know the goals of the development for immigrants in the new Integration plan from the Council of Ministers and experiences in school, it is relevant to see if Cummins’ theories may put an adding light to the situation in the fields of language, cultural identity and cooperation with parents. He says: “–students from “dominated” societal groups are “empowered” or “disabled” as a direct result of their interactions with educators at schools (ibid:659).

The conditions to empower the students’ language competence are:

To incorporate minority students’ language and culture into the school’s program.

To encourage minority community participation as an integral part of children’s education.

To motivate students to use language actively to generate their own knowledge

To be advocates for minority students rather than legitimising the location of the “problem” in the students.

The teachers’ obligation is to develop proficiency in Portuguese is crucial for individual development according to the Portuguese curriculum (2001:31). An aim is also to develop mutual respect in accordance with the Child Convention (art.29).

Teachers say, as mentioned, that the main reason for Cape Verdean children failure are linguistic problems. It seems as if the teachers have not taken their responsibility seriously, used their authority by choosing wrong teaching methods and been ignorant of the importance of the Cape Verdean students’ native language. Neither the Cape Verdean language or culture is directly incorporated in the school’s program (cfr. a) above). As they define the result being

a consequence of the students' deficit, they use their power and place the responsibility outside themselves (cfr. d) above). If the situation in school today is like the drop-out situation signalised in 2001/2002 according to Ferreira et al.(2004), it is obvious that the Cape Verde students are not empowered. How can they and the native students develop a mutual respect for the language and cultural identity if they do not know anything about it or it is discussed in school?

It seems as if it is necessary to fight against stereotypic images for all cultures. The Integration plan presents measures against spatial segregation, social exclusion, discrimination and racism (2007:28-31). Horta (2002:160) says that the Cape Verdean is "a priori illiterate, hungry, exotic, powerless and in need of state's assistance.2". In Media, she says (p.167), the "black youths" are presented as "criminal gangs living in ghettos" where there is a connection between "race, crime, poverty and crime". On the other hand Cape Verdean associations point at the valuable part of their culture to prevent criminal behaviour and quarrels between the immigrants and the host society (Mapril et Araújo, 2002:218). They cite a former president of the Cape Verde Association in Lisbon "A rootless person is nothing". It is said to be a fundamental task of the Cape Verde country's new constitution (1994) to preserve and develop the Cape Verdean culture in communities abroad (Carling, 1997:6). Other Cape Verdean associations underline that the youngsters have to know they have two roots, The Cape Verdean and the Portuguese (ibid:219). The teachers might and might not be influenced by stereotypes of the culture or the immigrants' own perspective.

Cummins is clear in the responsibility he ascribes to the teachers (1986/2003:653): "Educators are capable in determining for themselves the social and educational goals they want to achieve with their students because they are responsible for their role definitions they adopt in relation to culturally diverse students and communities." He also points at the process of the students defining their identities "in interaction with their teachers, peers and parents" and he says: "However, this process of negotiating identities can never be fully controlled by forces outside of the teacher-student relationship itself." It is the same processes that have to be developed between the school and parents who represent the minority community (ref.c) even if their roles in the communication process are different. Also in this question it is necessary with mutual respect. According to my interview with the student teachers there are possibilities ahead and a will to have a dialogue.

To develop the relationship of communication between teacher and student it is obvious that the teacher has to acknowledge that the Cape Verdean students have a language and cultural identity to build upon in the development. Mutual communication implies mutual respect and understanding and gives possibilities to Adizes' element of influence (1991:58), which equalises them as human beings and give power to both parts,. This is in accord with the general policy of Portugal, The general intentions of the Portuguese Curriculum opens for this, even if the different plans give more possibilities than direct support, perhaps presented in later material. . What Cummins makes quite clear is the teachers' professional responsibility to give the students possibilities to develop, and how crucial it is to communicate with students, accepting their linguistic and cultural background as a valuable fundament for the development. In a summative article about which resource the cooperation between teachers and migrant parents can be, it is said :to have a triple effect, for the parents, the teacher and the student. (Lea, 2012) .

If the schools both in Portugal and Norway manage to move in the direction of the ideal, then hopefully, the Child Conventions aim of developing respect for parents, language, cultural identities and values is attended, the PISA results for Cape Verdean students improved and the stereotypic image changed in both countries.

### Loose ends

It has to be pointed at some aspects and dilemmas that are not discussed, but touched in this connection. If one considers the country's future to become a multicultural country, how has this to be mirrored in the content of the school? Imagine a school class consists of children from 15 nationalities, half or two thirds of the children are Portuguese. Where has the balance be between the national elements of knowledge and the intercultural elements?

Another dilemma is the balance between respect for the values and culture of different immigrant groups, not that much for artistic expressions which may be defined as exotic, as for way of living and social codes. Is it by the legislation like now? Interpretations of Democratic ideals, Human Rights or Children's Rights might be just as diverse as interpretations of religious values, even inside one religion. Will the future teachers say, like the student teacher: "My values are the right ones"?

To go back to the Cape Verdean shackle towns and its children, who are the future of Portugal. The consequence of the status of these areas is a challenge even if one finds a "social capital" (Porta et al, 2006) in the Cape Verdean associations. So far it seems as if NGOs might be the bandage of a wounded environment, and then the balance between

Cummins' prescription with a dynamic process of dialogue for mutual understanding, shared responsibility and thereby empowerment, seems worth to be transformed to and used in many challenges, even if it is time-consuming.

### References:

- 'ACIDI, The Council of Ministers Organisation for Immigrant Interaction, 2007: *Plan for Immigrant Integration*, Resolution no 63.A-2007, May 3<sup>rd</sup>, Lisbon, Portugal.
- ACIME, High Commission for Immigration and Ethnic Minorities, 2007 *Welcoming and Integrating*  
Lisbon, Portugal
- Carling, Jorgen : 1997: *Figuring out the Cape Verdean Diaspora*, Cimboa, Boston Vol. 4
- Cummins, Jim: 1986/2001: *Empowering Minority Students: A Framework for Intervention* .  
Harvard Educational Review no.4 2001/1986.
- 'Esteves, Alina, Caldeira Maria José, 2001: *Reinventing cultures : the contribution of the Cape Verdean community to the cultural dynamics of Lisbon*. In Russel King (ed): "The Mediterranean Passage. Migration and New Cultural Encounters in Southern Europe."
- Fandrem, H. Strohmeier, D. and Roland, E. (submitted), 2008: *Bullying and Victimization Among Norwegian and Immigrant Adolescents in Norway: The Role of Proactive and Reactive Aggressiveness*. Journal of Early Adolescence.
- 'Ferreira, Manuela Malheiro, Cardoso, Ana Josefa, 2004: *Second Generation Cape Verdean Immigrants in Portugal: Problems of School Integration*. AEMI
- Ferreira, L., 1997: Cabo Verde. Lisbon , CEMRI, Universidade Aberta.
- Fonseca, Maria Lucinda, Malheiros, Jorge et al. 2002 : *Immigrants in Lisbon. Routes of integration.*, Universidade de Lisboa.
- '1. Horta, Ana Paula Beja, 2002 : *Multiculturalism in Abeyance : Immigrations and Local Politics in the Periphery of Lisbon*, in "Migration and place Mediterranean Metropolis", USO-American Foundation, Lisbon
- Horta, Ana Paula Beja & Malheiros, Jorge, 2006: *Social capital and Migrants' Integration: The Case Study of Cape Verdean Associations in the Greater Lisbon Area*. Finisterra 81.
- Høigård, Anne, 2006: *Barns språkutvikling* (Children's Language Development), Oslo, Universitetsforlaget.
- Jensen, Iben, 2006: *The Aspect of Power in Intercultural Communication Practice* in "Bridges of Understanding. Perspectives on Intercultural Communication" Ed: Øyvind Dahl et al., Oslo, Academic Press.

- Lea, Martha: *Cooperation between Migrant Parents and Teachers in school: A resource?* In C E P S Journal, Slovenia. Vol 2 No 1 Year 2012, p: 105.
- Lobban jr., Richard A., 1995: *Cape Verde. Crioulo Colony to Independent Nation* Westview Press. Oxford.
- Mapril, José, Araújo, Fernanda, 2002: *Between two Worlds: Chinese and Cape Verdean Voluntary Sectors in a Changing Context*. In "Migration and Place Mediterranean Metropolis", Luso-American Foundation, Metropolis, Portugal.
- Marques, Margarida, Santos, Rui, Araújo, Fernanda : 2001 : *Ariadnes thread : Cape Verdean women in transnational webs* in Global Networks 1, 3.
- Misra, Vijay, Hodge, Bob, 1992?: *What is Post-Colonialism?*
- Portuguese National Curriculum of Basic Education 2001, English version 2003.
- Norwegian Ministry of Local Government and regional Development, 2003-2004 : *Report (White Paper) No 49 to the Norwegian Storting*.
- Norwegian Curriculum Plan for Primary and Secondary Education, 2006.
- 'Perista, Heloise e Machado, Fernando Lul, 1997 : *Femmes immigré s au Portugal : Identites et differences* in Migrations Societe
- Skutnabb-Kangas, Tove, 1997 : *Bi-lingual Education for Finnish Minority Students in Sweden*. In Corson, David and Cummins, Jim (eds), encyclopedia of Language and Education : volume 5 Bilingual Education . Dordrecht : Kluwer Academic <publishers.
- Teixeira, Ana and Albuquerque, Rosana, 2005 : *Active Civic Participation of Immigrants in Portugal* . Country Report prepared for the European Research projects POLITIS, Oldenburg, 2005 ([www.uni-oldenburg.de/politis-europe](http://www.uni-oldenburg.de/politis-europe))
- The Norwegian Ministry of Education and Research : *Equal Education in Practice, Stratgic plan, Strategy for better learning and greater participation by language minorities un Day-Care centres, Schools and Education, 2004-2009*.
- The Programme for International Student Assessment (PISA), 2006 : Executive Summary OECD, 2007.
- The United Nations Convention on the Rights of the Child, Nov. 1989.

# CHINESE MIGRATION IN KAZAKHSTAN: IMPLICATIONS FOR NATIONAL SECURITY

*Svetlana Kozhirova (Doctor of Political Science, Professor)*

*Bakyt Ospanova (PhD candidate)*

L.N.Gumilyov Eurasian National University, Kazakhstan

---

## Abstract

This paper intensively discusses Chinese migration to Kazakhstan as possible threat to national security. Authors argue that Chinese demographic expansion is regarded as threat in public discourse of the country. This could be explained by several factors: general influx of foreigners into country since independence; incoming Chinese labor as a part of Chinese FDI into Kazakh economy; and general trend of export of Chinese labor force surplus, which Central Asian countries expect to receive at least partially. However, the analysis of empirics reveals that the number of Chinese migrants in Kazakhstan is marginal. Moreover, they do not intent to stay in Kazakhstan for long or acquire citizenship.

---

**Keywords:** Chinese migration, security threat, Kazakhstan

## Introduction

The modernization and economic growth in China led to the changing status of Chinese state in world politics affecting the whole structure of international relations. The Chinese rise has impact on interests of many countries, however it has greater influence on bordering countries. In this regard China becomes significant actor influencing relations in Central Asia generally, and in Kazakhstan in particular. Chinese rise is usually regarded as potential security threat to Central Asian countries, both in terms of economic and political development of the states. In this regard the Chinese demographic expansion to Central Asia is evaluated as potential threat to the national security and sovereignty of regional states.

This paper traces situation in Kazakhstan in order to analyse the potential of Chinese demographic threat to the national security of the state. Paper uses migration statistics and interviews with Chinese migrants as empirics of the research.

## Chinese Migration as a Problem

The Chinese demographic expansion is present in public discourse of Kazakhstan for last ten years and it is usually perceived as a threat to national security and sovereignty. This position is explained by several factors. First, the opening of borders after Kazakhstan became independent state led to influx of foreigners, including Chinese, into the country. According to the national statistics, in 1997 forty thousand foreigners entered Kazakhstan, in 2004 their number increased up to eight hundred forty thousand people, and after three years in 2007 number of foreigners reached one million people [1]. Second, the economic expansion of China into Kazakhstan through growing volume of investments brought Chinese labour to the country as part of FDI. And last, but not least, the labour market situation in China itself with high number of unemployed people creates situation when labour is exported, and Central Asian countries expect to receive this export, at least partially.

The Chinese economists calculate that the population growth maximum of China will be achieved in 2035-2040 and will reach 1,6 billion people. Then, the population growth will be decreased provided that birth rate continues to be controlled. This population growth naturally affects labour supply, which expected to increase up to 50 million people in 2010-2030. This

situation leads to over-supply of labour and unemployment; the estimated unemployment in China in 2005 was around 150-200 million people [2].

Chinese government employs two strategies to fight unemployment. The first one is to encourage internal migration to the depressed regions, and the second one is to employ “surplus labour force” outside China in the framework of legal or illegal labour migration. During last years Chinese government supports internal migration to the Northern and Northwest regions of the country through development of infrastructure and support of business. The internal migration in 2005 was recorded at one hundred forty seven thousand people [3].

Chinese government also supports the second solution of unemployment problem through allowing labour force export. Thus, the official export of labour force from China between 1978 and 2001 was recorded at 2,4 million people. According to International Organization of Migration estimations, in 2001 alone four hundred sixty thousand Chinese citizens officially worked outside the country [4]. The analysis of official records shows the steady growth of labour export from China; thus in 1993 one hundred fifty seven thousand Chinese citizens worked abroad in the framework of official contracts, and after ten years, in 2003 this number reached seven hundred thousand people [5].

The combination of both strategies – support of internal migration and labour force export – brings Chinese labour migration closer to Kazakhstan borders. The Chinese program of development of Western land foresees investments in Xinjiang Uygur Autonomous Region, which borders East and Southeast Kazakhstan.

### Chinese Migration to Kazakhstan: Empirical Analysis

Kazakhstan experiences the growing number of Chinese migrants; according to the data of Department of Migration Police of the Internal Affairs Ministry of Kazakhstan in 2005 thirty four thousand one hundred and eight Chinese citizens was registered as temporary residents in Kazakhstan. In 2006 this number was recorded at twenty nine thousand one hundred and eighty three people, and in 2007 at thirty three thousand one hundred and seventy four persons [6].

The empirics of this paper is based on statistics of Departments of Migration Police of Almaty and Astana and the survey of Chinese citizens residing in these two cities.

According to the data of Department of Migration Police of Almaty in 2004 around seven thousand Chinese citizens was registered as temporary residents of Almaty, and half of them were ethnic Kazakhs from China, so-called ‘oralmans’ (repatriate). In 2005 Chinese citizens concluded 4 marriages in Almaty, and 5 persons got permanent residence permit. In the same year 703 Chinese citizens were brought to administrative responsibility and 120 persons were expelled from the country for violation of migration legislation [6].

The following table\* summarizes the data on Chinese migrants in Almaty:

Years	Registered, total	On business purposes	To work	On private purposes	Tourism	Expelled
2004	8796 (among them Kazakhs - 7359)	622	815	7359	0	56
2005	9437 (among them Kazakhs - 8305)	461	631	8305	40	260
2006	8841 (among them Kazakhs - 7679)	750	409	7670	12	520
10 months of 2007	9139 (among them Kazakhs - 7956)	678	503	7956	2	143

\*table is created by S. Kozhirova based on data of Department of Migration Police of Almaty

The survey hold by authors in Almaty in November and December in 2006 determines the characteristics of Chinese migrants. According to the results of this survey, Chinese

migrants in Almaty are well educated and wealthy; they own private houses (26%) or rent it (39%). More than half of them (57%) had been living in financially sustainable situation in China, and 46% of the respondents continue to have average or high income in Kazakhstan.

Around half of the respondents in Almaty have higher or incomplete higher education (41%) and 33% of the Chinese migrants in the city have at least secondary education. Only 3% of the respondents are illiterate and 11% have only primary education. Most of the Chinese migrants work for Chinese companies operating in various areas of economy, including petroleum and trade companies, banks, restaurants and café; some of them teach Chinese or work as doctors. Most of Chinese citizens have leaved in Kazakhstan from 1 to 4 years (47%), and 22% of them reside in Almaty for less than a year. Marginal number of migrants (17%) knows Russian.

The Chinese migrants are concentrated in trade, and 36% of the respondents, including doctors and teachers of Chinese, indicate that they have own business in Kazakhstan. Around one fifth of the migrants (21%) point out that their income in Kazakhstan is higher than in China and it is easier to find a job in Kazakhstan than in their home country [7].

Astana attracts less Chinese migrants in comparison with Almaty. According to the Department of Migration Police of Astana only 120 Chinese citizens were registered as temporary residents in Astana in 2004.

The following table\* summarises the data on temporary visitors from China to Astana:

Years	Registered, total	On business purposes	To work	On private purposes	Tourism	Expelled
2004	361 (among them Kazakhs - 155)	189	21	151	0	-
2005	607 (among them Kazakhs - 299)	267	70	269	1	-
2006	1392 (among them Kazakhs - 354)	465	536	388	3	-
9 months of 2007	1858 (among them Kazakhs - 656)	358	873	626	1	-

\*table is created by S. Kozhirova based on data of Department of Migration Police of Astana

The survey of Chinese migrants in Astana hold by authors in December 2006 reveals that their educational level is lower than those residing in Almaty: only 6% of them have higher education and 4% have incomplete higher education. 9% of the Chinese migrants residing in Astana are illiterate and 27% of them have primary education, and only 22% of the migrants have secondary education.

Most of the Chinese migrants coming to Astana work for construction industry. They also work in trade (usually in construction markets) and as employees of Chinese companies. According to the survey results main goal of the Chinese migrants in Astana is to accumulate the capital in order to start own business in China (78%), some of the respondents aim to obtain commercial visa in Kazakhstan (14%) and only 8% of the Chinese migrants consider Astana as intermediate place in their way to third countries (8%) [8].

Generally, Chinese migrants coming to Kazakhstan are single males, staying in the country for more than 4 years. Most of them have close ties with their compatriots, keep their identity and plan to return to China. Respondents do not plan to acquire citizenship of Kazakhstan or apply for permanent residence permit [7,8]. This survey results is supported by statistics of the Department of Migration Police of the Internal Affairs Ministry of Kazakhstan; according to Department's data 21 012 people obtained Kazakhstan's citizenship between 1992 and 2007; among these people 20 968 were ethnic Kazakhs, 5 were Chinese, 35 were Uyghur, 2 were Russian and 2 were Dungan.

Most of the Chinese migrants surveyed in Almaty and Astana note that the idea of coming to Kazakhstan was originated from their business partners. They also point out that

the number of Chinese residing in Almaty and Astana is insignificant and it decreased in comparison with 2000.

The Chinese migrants working in Kazakhstan tend to settle close to each other and keep their national identity. During the twenty years of Kazakhstan's independence the Chinese migrants became culturally and educationally diverse. In the framework of active Chinese business expansion Kazakhstan experienced the changes in the structure of Chinese migrants; the number of managers and qualified workers of oil and gas industry has grown recently. Their close relation to Chinese investments characterizes the migration processes from China to Kazakhstan; most of the Chinese migrants in Kazakhstan work for Chinese business or operate as intermediates between Chinese and Kazakhstani business communities.

The involvement of Kazakhstan into processes of globalization and participation in global economy will lead to the growing number of migration and immigration. This increase in general migration might lead to the increase of Chinese migration to Kazakhstan and to the acceleration of fears of Chinese demographic expansion to the country. However, the empirical research and analysis of migration statistics indicate that ethnic Kazakhs, who have decided to move to the country from China, mainly represent the Chinese migration to Kazakhstan. The ethnic Chinese residing in Kazakhstan does not plan to obtain citizenship or permanent residence permit, and considers Kazakhstan as a place favourable for business and capital accumulation. Moreover, they tend to keep their identity and settle close to each other.

Therefore, the consideration of Chinese demographic expansion as a threat to national security represents rather myth than the reflection of reality.

## Conclusion

The permanent existence of Chinese demographic expansion as a threat to national security in public discourse of Kazakhstan could be explained by different factors. Obviously, the general perception of neighboring big country like China as a threat frames Chinese migration in negative terms. The awareness of labor force surplus in China adds another argument for those who frame Chinese migration as a threat. Nevertheless, the empirical survey of available statistical data and results of interviews hold with Chinese migrants in two biggest cities of Kazakhstan - Almaty and Astana – reveals that the number of Chinese coming to Kazakhstan is marginal. Moreover, they do not perceive Kazakhstan as their final destination. They also do not intend to stay for long-term in Kazakhstan or acquire citizenship. Rather Chinese migrants consider Kazakhstan as a temporary workplace. Additionally, statistics reveals that the great number Chinese migrants are actually ethnic Kazakhs, who either come to visit their relatives or seek the citizenship under repatriation program.

## References:

- Kazakhstan in Numbers: 1991-2008. The Statistical Digest, Astana, 2009 [original in Russian: Казахстан в цифрах 1991-2008 Статистический сборник Астана, 2009]
- Mikheyev, Vasilyi (ed.) China: Threats, Risks and Challenges to Development: Moscow: Carnegie Center, 2005 [Original in Russian: Китай: угрозы, риски, вызовы развитию (под ред. В.Михеева). М.: Центр Карнеги, 2005]
- World Migration Report 2003: Managing Migration - Challenges and Responses for People on the Move. IOM Publication, 2003, available online [http://publications.iom.int/bookstore/free/WMR\\_2003.pdf](http://publications.iom.int/bookstore/free/WMR_2003.pdf) (last access February 25, 2014)
- Krasinets, Ye.S. "Wan Goes to Ivan. Chinese Migrants are in Focus of Migration Policy". *Migration and Citizenship*, 2003, no2, pp. 8-11 [original in Russian: Красинец Е.С. Ван едет к Ивану. В фокусе миграционной политики — пришельцы из Китая//Миграция и гражданство, 2003, № 2(5), с. 8-11]

Ma Yongtang. Recent Trends and Data of Economy, Labor Market and Migration in China for 2004 - A Country paper for the Workshop on International Migration and Labor Market in Asia. Feb.5-6, 2004

Bulletin of Department of Migration Police of the Ministry of Internal Affairs of the Republic of Kazakhstan, 2008

Interview with Chinese migrants in Almaty, November-December 2006

Interview with Chinese migrants in Astana, December 2006

# THE STRATEGIC MANAGEMENT OF CREATION PROCESS AND OF CHANGE: A THEORETICAL CONTRIBUTE FROM THE PERSPECTIVE OF TOURISM

**Bruno Sousa**

Invited Lecturer (ESG - IPCA) - Portugal  
PhD Student (Universities of Minho / Aveiro / Beira Interior)

---

## Abstract

The entrepreneurship and innovation have been gradually gaining ground in the academic community as a field of study. However, the interpretations surrounding fragmented, without a univocal definition. In last decades, tourism has received greater attention from researchers in various sciences, varying only by the different emphases considered: economic, social, cultural and environmental. As other emerging sectors in a modern economy, tourism is a dynamic and ever-changing industry.

The study has as purpose to provide a better understanding regarding the essence of entrepreneurship: theoretical and practical implications from the perspective of tourism. Regarding the methodology used here, this is a conceptual paper with a literature review that brings together the major components of entrepreneurship and its implications tourist perspective and conceptual model of the dynamic nature of the Triggering Process and innovation (e.g. iTravey, Interactive Stores, Tourist Transportable Tower).

---

**Keywords:** Change, creation, innovation, management, tourism context

## Introduction

Entrepreneurship is increasingly popular in academic works (Heilman & Chen, 2003). According to Gartner (1985), the entrepreneurship literature review suggests that differences among entrepreneurs and among their ventures are as great as the variation between entrepreneurs and nonentrepreneurs and between new firms and established firms. So, entrepreneurship can be the purposeful activity of an individual or group of associated individuals, undertaken to initiate, maintain or aggrandise a profit-orientated business unit for the production or distribution of economic goods and services (Cole, 1959).

According to Ma and Tan (2006, p.705), *“there has been an increasingly popular trend of cross-fertilization among strategic management research and entrepreneurship research, two fields deeply concerned with wealth creation and heavily influenced by Schumpeter’s seminal work on innovation and creative destruction”*. With regard to its proximity to the concept of innovation, Schumpeter (1934) argues that innovation can be seen as a phenomenon, including technical, non-technical aspects as well as innovations in product and process innovations. The creation process contributes to business success and increased competitive advantage (Sousa & Lopes, 2012), which is a theme that has clearly captured the attention of researchers in the field of management. The dynamic nature of this process, coupled with the constant need to invest in a highly distinctive and differentiating offering new studies have provided in order to score market position and achieve consumer satisfaction, including the level of emerging realities confirmed by new trends and desires (Costa, 2001; Buhalis & Costa, 2006).

Innovation is the adoption of a change that results in something new to the organization and relevance to the environment, and the creative idea and its development is the seed germinated by innovative, effective for the market economy (Dosi, 1988). In this

sense, innovation has attracted the attention of several scholars and entrepreneurs together with entrepreneurship. This makes it possible to open new doors and open new markets, enabling greater efficiency in business, economic growth and new ways of targeting an increasingly competitive market (Kastenholz, Davis & Paul 1999). Porter (1990) notes that innovation is used in literature to describe the process of using new knowledge, technologies and processes to generate new products as well as improvements in their use.

### **Innovation as a source of competitive advantage**

Innovation can be seen as a specific tool of entrepreneurs, the means with which exploit change as an opportunity for a different business or service, being able to be understood and, as such, to be practiced, leading to a common distinction between invention and innovation (Drucker, 1993). Almost all the innovations reflect existing knowledge, combined with new uses, suffering the concept of innovation as a shift towards emphasis on the interaction between institutions, focus on interactive for the creation, dissemination and sharing of knowledge and relevance of the role of government processes as an important actor in an innovative environment.

It is important to clarify the difference between two concepts that, for different times, tend to be confused: *Process Innovation* and the *Innovation Process*. Innovation Process is essentially related to the set of steps that tend to incorporate both the market and technology. Companies have the ability to go seizing, building your knowledge base and thus make the continuous improvement of process management (Tidd, Bessant & Pavitt, 2003). Monitor the internal and external environment and analyze the relevant signals will be the starting point. After this, we have the decision about how to respond. Finally, we will implement the project with the development of technology and the domestic and foreign market.

The *Process Innovation*, by the way, combines the adoption of a process view of the organization's business with the application of innovation to key processes. This is the big difference, compared with the *Innovation Process*, but it allows us to understand its complexity. Process Innovation encompasses the prediction of new work strategies, the actual process activity and the implementation of change in their complex human, technological and organizational dimensions (Davenport, 1993).

Thus, and an example, a Portuguese innovation in Shanghai 2010 (figure 1) Tourist Transportable Tower (TTT) proved a bet Portuguese company DST at the World Expo, taking as a multifunctional design of sustainable architecture, with 9 meters tall, 3 wide and 3 deep, assuming an autonomous space minimalist design oriented to nature tourism. According DST Group, the TTT “*is an industrialised project and a multifunctional sustainable architecture. It is, simultaneously, an urban modularity and evolutionary procedure, of environmental integration and touristic mobility, in an innovative mixture that represents a new concept in habitability*”. With a minimal design and a strong revealing image, bold at the level of the structural solution, TTT combines natural lighting and energetic potential through active and passive solar systems. Its physical dimension and inner space is optimised with resort to the prevalence of a harmonious and integrated relation with the outer surroundings.

The present technology establishes an innovative timber-glass composite constructive system in which the combination of these materials simultaneously assumes energetic, structural, functional and aesthetic character. The system materialises through a multipurpose modular panel, able to be applied horizontally – as slab – or vertically – as sustaining wall. It integrates passive solar systems and bioclimatic functions, which results in energetic efficiency, thus constituting a clear innovation in terms of prefabricated structural elements (DST, 2013).

Figure 1 – Tourist Transportable Tower



Fonte: <http://www.tttower.com>

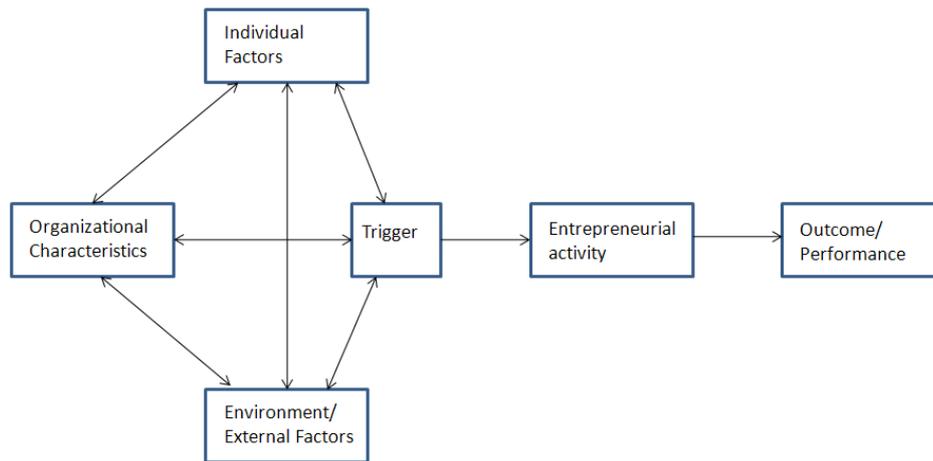
The iTravey platform, for instance, allows to submit dream vacations. Like “*where you would like to stay, how would you like to travel and what would you like to do when you get there. Sit back and wait for the offers that will roll in directly from travel agencies, hotels and tour operators made especially for you!*” For tourism operators iTravey offers easy access to their real target allowing them to fight for clients that otherwise would go to their competitors.

Therefore, seeking a systematization, the Organization for Economic Cooperation and Development (OECD, 2007) provides for four types of sensitive measuring innovation: product innovation, process innovation, marketing innovation and organizational innovation. We conclude, therefore, that innovation and research evidence implies an interrelationship between the new product and market performance (Luchs, 1990) strong. It is necessary to look at innovation as an imperative, reflecting the contributions and several studies presented here in this section.

### **The dynamic nature of triggering and entrepreneurial process**

Entrepreneurial activity is seen as a process: includes a set of steps, is subject to management, continuous and applicable in many contexts (Stevenson & Jarillo 1990). This process becomes a source of competitive advantage on a global scale. This entrepreneurial process is, as a rule, inextricably linked to certain factors that allow initial “take the leap” (circumstances, *triggering events*). Shindehutte et al. (2000) present a conceptual model (figure 2) that summarizes the dynamic nature of the triggering process in an attempt to summarize the various contributions on this topic.

The entrepreneurial process is conceptualized as a response to the awakening of the event. However, the nature of the trigger, relevance and impact depends on the dynamic interaction between the characteristics of managers / employees (eg, personal life), firm characteristics (eg, size, culture) and external developments of the environment (eg, competitiveness). The different types of entrepreneurial activities are probably the result of different types of triggers.

Figure 2 – The dynamic nature of *Triggering Process*

Source: Shindehutte et al. (2000)

Shindehutte et al. (2000) present a summary which reflect the main differences between conventional marketing and entrepreneurial marketing. The entrepreneurial process results in corporate contexts, rather than individual traits of an increasingly conscious need to provide the organization with innovative behavior and can, according to Sharma and Chrisman (1999), take many forms. The prospect of Schollhammer (1982) is the most cited and identifies five types of corporate entrepreneurship: administrative, opportunistic, acquisitive; incubative; imitative. Traditionally, innovation management and entrepreneurship tends to be excluded from the domain of conventional marketing department (Shindehutte et al, 2000).

### The cration process in tourism context

Tourism is a phenomenon that moves millions of people around the world, taking as a major driver of the global economy. Every year, much due to the frequent changes in the tourism environment, fosters competition between and within tourist destinations (Bigné & Andreu, 2004; Farhangmehr & Simões, 1999). It is multifaceted and geographically complex activity, where different services are ordered and delivered in different stages, from origin to destination (Pearce, 1991). Moreover, tourism is a sector of great importance to the economy, responsible for creating a large number of jobs. For instance, female entrepreneurship in the tourism sector has been rather neglected as a field of study and women's employment opportunities and the segregation of occupations are the major focus of research on women's situation in the tourism context (Costa, Carvalho & Breda, 2011).

As a psychological phenomenon, a tourist trip is preceded by a specific need that generates a reason to travel and sets a goal for the trip, which follows the search for information (Gursoy & McCleary, 2004; Pearce & String, 1984). Like other emerging sectors in a modern economy, tourism is a dynamic and ever-changing industry. This time, entrepreneurship is assumed as a critical factor in its development, both globally and regionally (Russell & Faulkner, 2004).

As such, comes an increasing need to understand the consumer behavior of tourist destinations itself. It is a sector of activity marked by strong growth in recent years and gradually assumed a bet as to develop for several countries. (Sousa & Simões, 2010, 2012). According to Lordkipanidze et al (2005), the growth of the tourism sector and increasing demand with regard to new types of tourism, makes it even more visible and required its connection with the emerging trends in entrepreneurship. Since tourism is composed of many of small firms, they are constantly called upon to respond quickly to new trends and market

demands (assuming as a source of innovation). The role of each actor in the distribution channel, within the operational management of tourism, will be critical to appreciate the range and nature of the emerging changes. The use of technology has profound implications to satisfy tourist demand as it enables the interconnection between consumers, intermediaries and producers, providing at the same time, tools for strategic marketing development (Buhalis, 2003; Kim, Lee & Hiemstra, 2004). According to Ramos et al. (2008), the eTourism presents the strategic implications for future customers: customers will have more knowledge / information about products / services and destinations that allows consumers to have a much greater involvement in planning their trips and to build their own itineraries. This allows the consumer to purchase at lower prices, with transaction security and quality of both services, promoting trust and, consequently, customer satisfaction and brand loyalty (Kim, Chung & Lee, 2011).

The new digital technologies currently represent one of multiple expressions in relation to access to information and communication. The online tourism presents itself as a contemporary reality, marked by a paradigm shift in the more classic styles of operation of tourism. For example, interactive tourist stores (eg at the airport) have the function of promoting the attractions of Porto and Northern Portugal (figure 3), through a set of technological and interactive valences.

Figure 3 –Porto e Northern Portugal Interactive Stores



Source: <http://www.portoenorte.pt/>

Also in the context of tourism, the process of creation and innovation have been increasingly used to describe business behavior, the destinations, the tourism sector as well as all their planning (Dredge, 2009). However, tourism is going through significant changes, facing new challenges that require new perspectives and implementing ideas (Stamboulis & Skayannis, 2003).

### Conclusion and next steps

In an increasingly global world, which tends to predominate competitiveness and change, the difference is, so often, the ability to create discontinuities in the external environment. We saw in this reflection, that many times the success is the ultimate goal, which focuses on searching for new products, new markets, new organizational forms and new sources of customer value. In this field it inevitably highlights the eTourism and applicability of cyberspace as some of the examples mentioned in this paper, as vehicles of innovation, and that may prove suitable choices of context for the operationalization of the proposed study. For instance, the creation process associated with for hotel reservation systems, mechanisms and information sharing as a form of competitive advantage over other tourist destinations (social networks), the marketing of tourism products and services as well as other related activities that can leverage the increased business synergies.

It should be noted generators entrepreneurship factors that may trigger an entrepreneurial activity (particularly in tourist contexts) and whose origin may be associated with internal, external factors and characteristics of the organization. The external factors are more difficult to control: political, economic, social, technological, environmental factors or legal issues. However, the combination of those factors with the intrinsic nature will form the basis of an innovative event, along with the organizational characteristics (eg culture, values and business traditions). Finally, and this work is primarily theoretical and reflection, is expected to arise in the future some work of a practical nature that bring greater robustness to support and perspectives presented here.

### References:

- Bigné, J. & Andreu, L. (2004). Emotions in segmentation – an empirical study, *Annals of Tourism Research*, 31(3), 682–696.
- Buhalis, D. (2003) *eTourism: Information Technology for strategic management*, London, Prentice Hall.
- Buhalis D. & Costa, C. (2006), *Tourism Management Dynamics, Trends, Management and Tools*, Elsevier Butterworth Heinemann, Oxford, United Kingdom, International Edition.
- Cole, A. (1959). Business Enterprise in its Social Setting, Harvard University, Press, Boston.
- Costa, C. (2001). An emerging tourism planning paradigm? A comparative analysis between town and tourism planning, *International Journal of Tourism Research*, 3 (6),425–441.
- Costa, C., Carvalho, I. & Breda, Z. (2011). Gender inequalities in tourism employment: The Portuguese case. *Revista Turismo & Desenvolvimento*, 15, 37–52.
- Davenport, T. (1993). *Process innovation, reengineering work through information technology*. Harvard Business School Press.
- Dosi, G. (1988). Sources, Procedures, and Microeconomic Effects of Innovation. *Journal of Economic Literature*, 26, 1120-1171.
- Dredge, D. (1999). Destination Place Planning and Design. *Annals of Tourism Research*, 26(4), 772-791.
- Drucker, P. (1993). Innovation and Entrepreneurship, Collins, 1<sup>a</sup> ed.
- Kastenholz, E., Davis, D., & Paul, G. (1999). Segmenting tourists in rural areas: The case of North and Central Portugal. *Journal of Travel Research*, 37,3 53–363.
- Farhangmehr, M. & Simões, C. (1999). Factors Affecting Hotel Industry Development in Portugal. *Journal of Hospitality Marketing & Management*, 6(1), 23-46.
- Gartner, W. (1985). A conceptual framework for describing the phenomenon of new venture creation. *Academy of management review*, 10(4), 696-706.
- Gursoy, D. & McCleary, K. (2004). An Integrative Model of Tourists' Information Search Behavior, *Annals of Tourism Research*, 31, 353-373.
- Heilman, M. & Chen, J. (2003). Entrepreneurship as a solution: the allure of self-employment for women and minorities. *Human Resource Management Review*, 13(2), 347-364.
- Kim, M.; Chung, N. & Lee, C. (2011). The effect of perceived trust on electronic commerce: Shopping online for tourism products and services in South Korea. *Tourism Management*, 32(2), 256–265.
- Kim, W., Lee, C. & Hiemstra, S. (2004). Effects of an online virtual community on customer loyalty and travel product purchases. *Tourism Management*, 25 (3), 343–355.
- Lordkipanidze, M.; Brezet, H. & Backman, M. (2005). The entrepreneurship factor in sustainable tourism development. *Journal of Cleaner Production* , 13, 787-798
- Luchs, B. (1990). Quality as a strategic weapon. *European Business Journal*, 2(4), 34-47.
- Ma, H. & Tan, J. (2006). Key components and implications of entrepreneurship: a 4-P framework. *Journal of Business Venturing*, 21, 704-725.
- Pearce, D. (1991). *Tourist Development*. Longman Scientific & Technical, London.

- Pearce, P. L.; Stringer, F. P. (1984), "Toward a symbiosis of social psychology and tourism studies", *Annals of Tourism Research*, New York;
- Porter, M. (1990). *The Competitive Advantage of Nations*. Macmillan, New York.
- Ramos, C.; Rodrigues, P. & Perna, F. (2008). Turismo Electrónico, X Seminario Hispano-Luso de Economía Empresarial.
- Russell, R. & Faulkner, B. (2004). Entrepreneurship, chaos and the tourism area lifecycle. *Annals of Tourism Research*, 31(3), 556–579.
- Schollhammer, H. (1982). *Internal Corporate Entrepreneurship*, in Encyclopedia of Entrepreneurship, Englewood Cliffs, NJ: Prentice Hall, Inc.
- Schumpeter, J. (1934). *The Theory of Economic Development*. Harvard University Press, Cambridge, Ma.
- Schumpeter, J. (1975). *Capitalism, Socialism, and Democracy*. Harper and Row, New York. Originally published in 1942.
- Sharma, P. & Chrisman, J. (1999). Toward a Reconciliation of the Definitional Issues in the Field of Corporate Entrepreneurship. *Entrepreneurship Theory and Practice*, 23(3), 11-27.
- Sousa, B. & Lopes, S. (2012). A Inovação de Processos: diferenciação nos Serviços Turísticos, *Estudios y Perspectivas en Turismo*, volume 21, – número 4 (Julho), 963-976.
- Sousa, B. & Simões, C. (2012). Uma abordagem na ótica do consumidor: Regiões turísticas transfronteiriças. *Journal of Tourism and Development [Revista Turismo & Desenvolvimento]*, n.º 17/18 – Volume 4, electronic edition, ISSN: 2182-1453.
- Sousa, B. & Simões, C. (2010). Comportamento e perfil do consumidor de turismo de nichos: o caso de euro-regiões. *Revista Tékhne*, vol. VIII, n.º 14.
- Stamboulis, Y. & Skayannis, P. (2003). Innovation strategies and technology for experience-based tourism. *Tourism management*, 24, 35-43.
- Stevenson, H. & Jarillo, J. (1990). A paradigm of entrepreneurship: entrepreneurial management. *Strategic Management Journal*, 11, 17-27.
- Tidd, J; Bessant, J. & Pavitt, K. (2003). *Gestão da Inovação: Integração das Mudanças Tecnológicas, de Mercado e Organizacionais*. Monitor, Lisboa.

## TEENAGERS` PERSONALITY FEATURES IN RELATION WITH AGE, GENDER AND BODY MASS INDEX

*Cristina Petrescu, PhD, MD, Ass. Prof.*

*Brigitha Vlaicu, PhD, MD Prof.*

“Victor Babes” University of Medicine and Pharmacy Timisoara , Romania

---

### Abstract

The aim of our performed study was to identify if the age, gender and Body Mass Index (BMI) can modify the personality profiles established by applying Freiburg Personality Inventory in a teenager’s population to a specific age group (15-18 years). As material we used a sample of 2908 teenagers, homogenous and statistical representative. The Freiburg questionnaire was administered individually and anonymously, during 30 minutes. We identified no differences in personality profiles depending on age, and depending on low and high levels of BMI. An easier increased nervousness was identified for girls, not significant statistically different in comparison with the boys. The criticism was also a little increased in girls, still included in the interval for standardized population (4 - 6). The teenagers with BMI between 17 and 25 presented an easier increased nervousness. **In conclusion**, we did not identified a significant statistically influence of the age, gender and BMI on the personality profiles. These results do not sustain the action of these variables as confounding factors on established profiles to a specific age group (teenage group), despite of the demonstrated action of the age and gender on certain FPI personality features separately.

---

**Keywords:** personality profiles, age, gender, body mass index

### Introduction

Teenagers` personality features presents variability and specificity to the gender and age, when we consider them separately. Genetic and environmental factors act together in the personality forming and its developing process (Spain, and Harms, 2014). Body Mass Index (BMI) is a valuable indicator of the teenagers` physical development. Physical and psychical development processes are parallel and interdependent (Lazarevich, Irigoyen-Camacho, and Velázquez-Alva, 2013). The aim of our study was to identify if the age, gender and BMI can modify the personality profiles in a teenager’s population to a specific age group.

### Material and Method

The material of our study was statistical representative and homogenous (2908 teenagers, 51.5% girls and 48.5% boys, with age between 15 and 18 years, all from urban areas and included in educational process).

This study was performed in a county from south-west Romania, and it was an observational one. We applied a Freiburg Personality Inventory (FPI) (Fahrenberg, Selg, and Hampel, 1970), standardized for Romanian population to exclude cultural differences (Matesanz and Hampel, 1978), and we informed us about the weight and height of the investigated students. FPI investigates bipolar personality features and consists in 212 items, distributed as follows: nervousseness (Nrv) - 34, aggressiveness (Agr) - 26, depression (D) - 8, excitability (Exc) - 20, sociability (Soc) - 28, calm (Clm) - 20, domination (Do) - 20, inhibition (Inh) - 20, sincerity (Snc) - 14, extraversion (Exv) - 24, emotional lability (Lbl) – 24 items. In this study we did not consider masculinity (M). The questionnaire was administered individually and anonymously. Work time was of 30 minutes. The answering proportion was

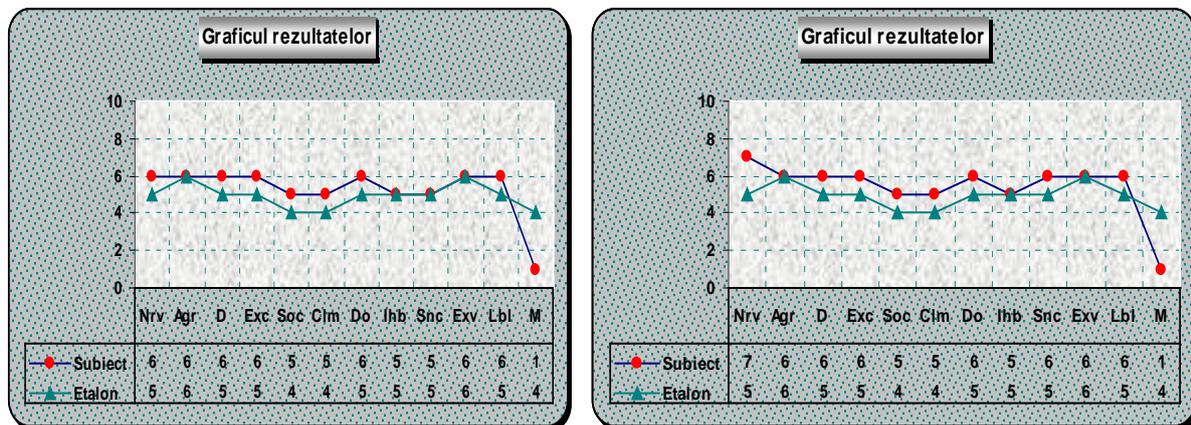
74.6%. Statistical work was performed with SPSS 16 Program. Body mass index was counted for each student using BMI formula (Keys et colab., 1972). We built personality profiles for each gender, each year of age 15-19 and for students with BMI under 17, BMI 17 -25, and BMI over 25. We considered the median value for each group of students when we built personality profiles. Personality features between 4 and 6 are specific for standardised population, between 1 and 3 are decreased, between 7 and 9 are increased as intensity of manifestation.

**Obtained results**

We identified diferent personality profiles depending on genders (masculin and feminin): the girls were more nervoussness (presented somatic symptoms) and had the level of sincerity ot the superior size of the interval for standardised population (they were more critical with themselves than boys) (Figure 1). The applied Chi square and Fisher tests did not confirmed these difference is statistically singnificant.

The personality profiles were the same for different ages of this investigated age group (15-18 years) (Figure 2).

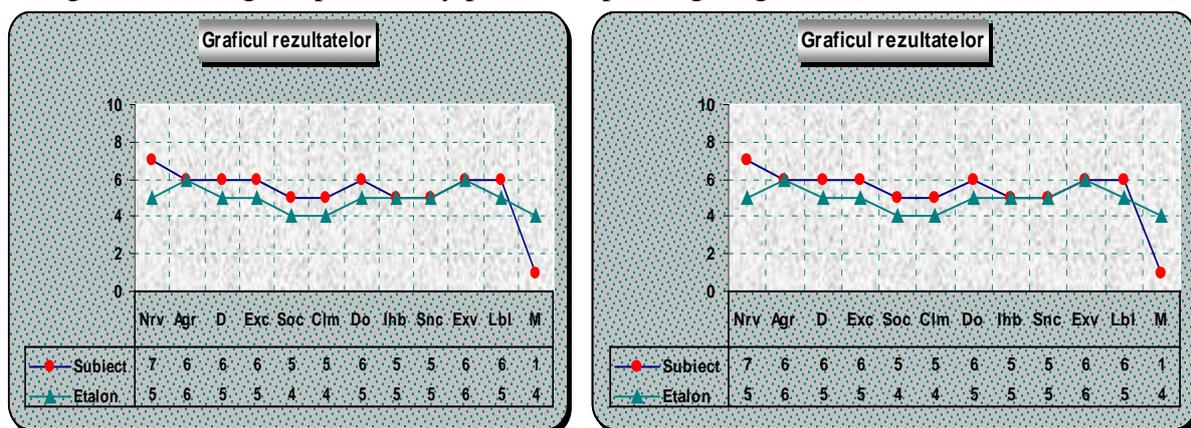
When we considered BMI lower than 17 and BMI greater than 25 we found the same personality profile (Figure 3). For teenagers with BMI between 17 and 25 the personality profile was similar with the entire sample (Figure 4).



Masculine

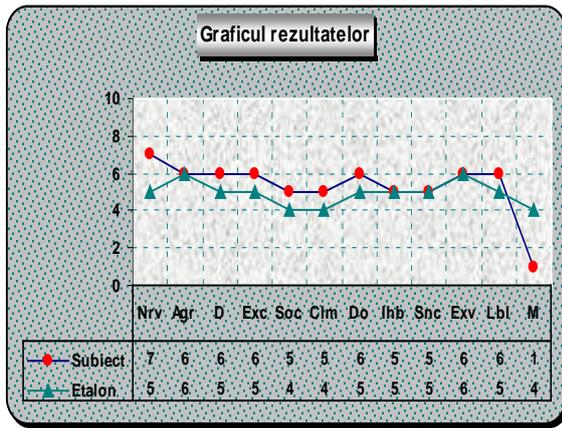
Feminine

Figure 1. Teenagers` personality profiles depending on gender (feminine and masculine)

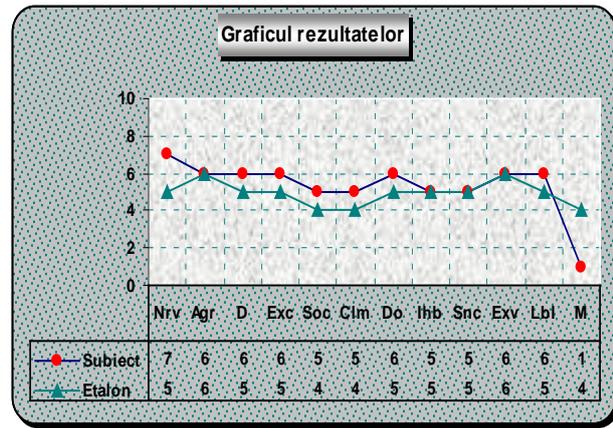


15 years

16 years

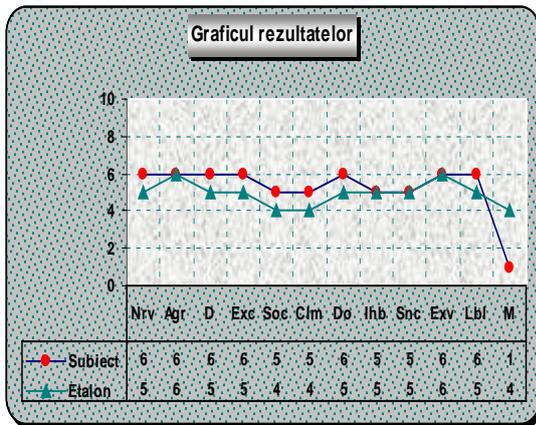


17 years

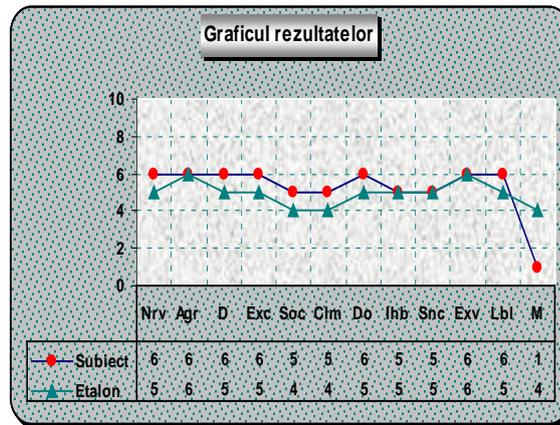


18 years

Figure 2. Teenagers` personality profiles depending on age (15, 16, 17, 18 years)



BMI < 17



BMI > 25

Figure 3. Teenagers` personality profiles depending on BMI (BMI < 17, BMI > 25)

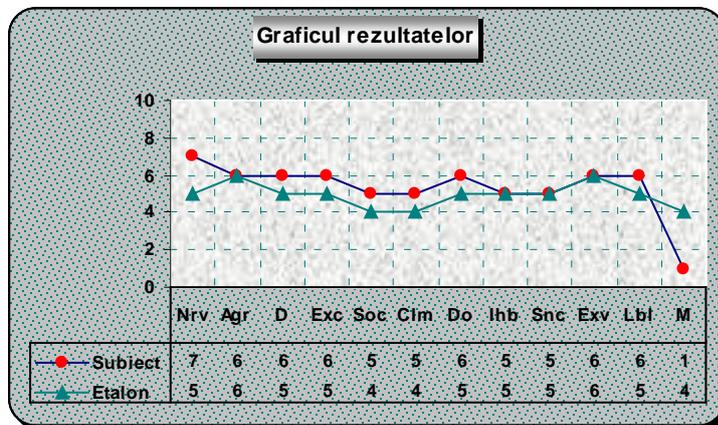


Figure 4. Teenagers` personality profiles depending on BMI (BMI = 17 - 25)

**Discussions**

Freiburg Personality Inventory is a questionnaire used in evaluation of bipolar personality features in healthy population and in clinique for diagnosis (Bergemann & Johann, 1987). The shorter forms are preferred in psychiatric hospitals (Fahrenberg, 2004). Nervousness resulted as being the feature that variates in our study and it was increased for entire investigated sample, for BMI between 17 and 25, and it was not changed with the advancing in age. Nervousness was modified by gender, the girls being more nervous (Jeffery et colab., 2014). This difference was not statistically significant (Chi square and Fisher tests). Despite the afirmed influence of age and gender on certain personality features measured

separately by FPI (Fahrenberg, Selg, and Hampel, 1970), for the personality profiles established at a specific age group (15-18 years) we found the same profiles for different ages and we did not find a statistically significant difference between genders. Personality profiles of the students with BMI values situated outside de interval 17-25 presented no statistical significant difference by the profiles of students with BMI situated inside the interval.

### **Conclusion**

We did not identify a significant statistically influence of the age, gender and BMI on the personality profiles investigated by Freiburg Personality Inventory in teenagers` population aged between 15 and 18 years.

### **References:**

- Spain, SM, and Harms, P.D. A sociogenomic perspective on neuroscience in organizational behavior. *Front Hum Neurosci* 2014; 25 (8):84.
- Lazarevich, I., Irigoyen-Camacho, M.E., and Velázquez-Alva, M.D. Obesity, eating behaviour and mental health among university students in Mexico city. *Nutr Hosp* 2013 (28(6):1892-99.
- Fahrenberg, J., Selg, H., and Hampel, R. *Das Freiburger Persönlichkeitsinventar (FPI)*. Göttingen: Hogrefe, 1970.
- Keys, A., Fidanza, F., Karvonen, M.J., Kimura, N., and Taylor, H.L. Indices of relative weight and obesity. *Journal of Chronic Diseases* 1972, **25** (6–7):329–43.
- Matesanz, A, and Hampel R.: Intercultural comparative study using the FPI (Freiburg Personality Inventory) of German and Spanish subjects. *Zeitschrift für experimentelle und angewandte Psychologie* 1978;25(2):218-29
- Bergemann, N, and Johann G.K.: Simultaneous analyses of the Freiburg Personality Inventory short form, the Eysenck Personality Inventory, the Giessen Test and Berger Scales--a contribution to the diagnostic value of the scales in assessing self acceptance and acceptance of others. *Z Klin Psychopathol Psychother* 1987;35(4):304-12
- Fahrenberg, J, Eds. *Psychiatric University Hospital Zurich, Division of Clinical Psychiatry: Freiburg Personality Inventory*. Zurich: Switzerland, 2004
- Jeffery, A.N., Hyland, M.E., Hosking, J., and Wilkin, T.J. Mood and its association with metabolic health in adolescents: a longitudinal study, *EarlyBird* 65. *Pediatr Diabetes* 2014, doi: 10.1111/pedi.12125.

# PHILOSOPHY OF EDUCATION, VALUES AND UTOPIA IN THE CRITICAL PEDAGOGY OF PAULO FREIRE

*Carlos Bellino Sacadura, PhD in Philosophy by the Portuguese Catholic  
University*

*Prof.* of Philosophy in the Cape Verde State University – Department of Human and Social  
Sciences

---

## Abstract

This paper deals with some main issues of Paulo Freire's philosophy of education, namely his relation with the history of education, theology, pedagogy, politics and science, and his perspectives of modernity and post-modernity. The framework of this study is the dialogue between pedagogy and philosophy, opening educational thought and practice to new humanistic and critical approaches. Another issue is the role of ethical values in education, and their relevance in a techno-scientific age.

---

**Keywords:** pedagogy, philosophy, post-modernity, ethics, utopia, values

## Historicity and actuality of Paulo Freire's pedagogical theory

Paulo Freire's pedagogy relates to actuality, to present times, and dialogues with the history of education, viewed with a critical perspective, and not in a passive way. From the Ancient Greece, Freire takes the concept of *Paideia*, a large notion that includes both culture and formation. Also from ancient Greece and Rome – the classical world -, he takes the role of *humanitas*, of humanistic studies (nowadays more often named as *human sciences*), in the formative process, refusing his limitation to the technoscientific field. From the Christian medieval philosophy, he took a vision of spirituality in education, for him related to the social movements that he integrated, related to the *liberation theology*, but also to the progressive Catholicism developed in the personalistic view of Emmanuel Mounier or Jean Lacroix.

The *contemporary humanism* of Paulo Freire reinvents the Renaissance values, and his view of intellectual's commitment, critical spirit, emancipation, and fight for human rights, relate him with the enlightenment movement. His Marxian references are critical, mainly related to the view of education as *praxis*, because he shared the choice for a open and pluralistic society as a political paradigm, according to the ideas of the philosopher Karl Popper. The concordance between Paulo Freire's ideas and the post-modern views is not programmatic, due to his enlightened vision, but is grounded in his awareness of the incompleteness of our knowledge and the moving apart from any totalizing or static view of educational thought or human being, which conducted him to the path of a opened anthropology and philosophical pedagogy.

Although he was attentive to the historical heritage of pedagogical thinking, that he took as a tool to rethink and reframe, according to the new horizons nowadays opened, Paulo Freire was mainly a pedagogue of the contemporary, focused in his time's problems and in projects to build the future. Temporality and historicity cross all the author's work, shaped by his personal history, by Brazil's history, and by world's history, in the crossing between the personal and the historical, the I and his situation, according to Ortega and Sartre views of the human being as rooted in a society but also as an unfinished project. From the opposition to the military dictatorship in Brazil to the commitment to the transition to democracy, and through travelling or building educational projects in Europe, Latin-America and Africa, were he accomplished many educational formations, being the most famous the alphabetization one

(which was not only a method or technical tool, but also a way of acquiring social and cultural self conscience), his path is today recognized as a builder of programs for implementation of human rights, understood not only as *political* ones, but also as *social, cultural* and *educational* rights.

### *Pedagogy and Philosophy*

Education, in its multiple dimensions, was viewed by Paulo Freire as the constant and main task of his life, both in theoretical and practical approaches, and its starting from this systemic perspective that we can understand his *pedagogy* as a *philosophic* one: not as a simple teaching methodology or technique, but as a *reflective, critical* and *open* pedagogy. This study intends to understand Paulo Freire as a philosopher of education, developing a philosophical pedagogy in which there is both a relation and an interaction between the two dimensions, although keeping their relative autonomy. Differently from being a philosopher in the first place, developing a system of ideas from which the education is viewed as a part, he is after all a pedagogue that starts from his pedagogical experience to reflect upon it and develop philosophical concepts, although sometimes it happens that he appeals to a philosophical frame to set a light upon his educational experience. For instance, Plato's pedagogical thinking rises from his theory of ideas, essences, or models, while in Paulo Freire there is no previous theoretical framework, but some scientific, philosophic, social and religious references that guide his path. Freire intends to think upon education through his practice or experience, although this kind of experience is not empirical, but reflective, rooted concepts, notions and theoretical frames issued and applied to pedagogical practices. This approach allows us to see him as an educator and pedagogue, although considering that reducing him to those competences is simplistic, because he is also a philosopher of the educational experience, in its epistemological, technical, ethical, ontological, aesthetical and social dimensions.

From this interaction between pedagogy and philosophy rises a mutual discovery of new paths: pedagogy acquires a systemic, wider view, including every aspects of personal, social, or ethical life, instead of being a mere teaching skill, while philosophy turns itself a *Paideia* or *Bildung*, rediscovering its formative potential. In Paulo Freire's thought, education includes in its reach all areas of philosophical thought, but they are not separated and organized in a systematic way, with no sharp divisions between methodological, epistemological or ethical dimensions. The freirian dialogue with nowadays philosophy and with its history is direct, with explicit reference to philosophical authors and trends, or indirect, with implicit reference although not direct mentions to philosophers. We will try to follow the paths of this dialogue, in order to understand the grounds of his educational theory and practice, in its multidimensionality and permanent transformation and process of reshaping, along with the growth of his reflective, historical and social experiences.

In his interpretation of freirian thought, Michael Peters develops a anti-essentialist stance, distant from a finished doctrine that could be definitive or closed (Cf. Peters, 2000: 99-108). Instead, Freire set a path of ongoing change, inviting us to follow him, not in a passive mood, but reconstructing his path in the light of our own experience and reflection. Education, such as life, is a work in progress, and our mind frames reconstruct themselves along the path of our life. There is no mind apart from the world trying to understand it – like the Cartesian *cogito* or the Kantian *transcendental mind* – but a person that understands the world from within his world's experience, from his relation to the historicity of a temporal and ever-changing world, with an unfinished meaning. The person is not at the center of history, of knowledge, or of education, but restructures himself in interaction with them, and it's by this network of relations that he understands himself or the world, and acts. The philosophical pedagogy of Paulo Freire isn't individualist nor collectivist, but relational or interpersonal. His no-centered and pluralistic view of the pedagogical rationality presents him with a post-modern sensibility, while his fight for social emancipation places him inside the enlightened

values of modernity. This tension and inter-relation between modern and post-modern views is a keynote of the evolution of his work.

*Education in the crossroads of modernity and post-modernity*

Becoming a tool for questioning and interrogate the educational concepts and practices, philosophy acquires a heuristic function in the process of building educational knowledge and values, a discovery path, like the Socratic maieutic. This philosophical dimension of pedagogy allow us to view it as a *pedagogy of meaning and values*, building sense(s) of education in an axiological perspective. Our age deals with a crisis that, more than economic, is a crisis of sense and values. The global narratives that ground and legitimate knowledge, culture and society faded, and gave place to a kind of void or fragmentation of meaning: science, reason, history or religion, that grounded the modern discourse and action, are being questioned, no longer being self-evident, and we are entering in an age of uncertainty, age Ilya Prigogine names it. Those narratives did also structure the educational theories, practices and values.

How can we think about the educational problematic, after this turning point or shift known as *post-modernity*, due to its questioning of modernity? Paulo Freire answered to this defy, without falling into a uncritical return to modernity nor into the post-modern relativism. He performed a kind of *inter-critics* of these two trends, accepting some modern and post-modern values, but also criticizing them. Modernity is linked to an idea of autonomy, rationality, emancipation and universality, that he valued, including the heritage of the modern enlightenment in his *pedagogy of autonomy and liberty*, viewing education as a social and cultural project that considers knowledge as a condition to the auto-liberation of the oppressed or excluded. Education is the main tool to acquire that kind of knowledge, which is not only a collection of skills, information, or know-how, but mainly a way of being, of knowing how to live and what values deserve to be developed.

Freire kept the modern trust in the *perfectibility* of the human being, that can change himself and society through the education, From the post-modern critical thinking, he took the refusal of all dogma, absolute system, closed doctrines or one-dimensional ways of thinking, theories or discourses – no matter they claim their roots in enlightened, neo-liberal, or Marxian doctrines. But, like the post-modern trend, he rejects the idea of a unifying or total theory, under the authority of the dialectic reason, foreseeing a end of history in a society without classes, or the same view of a end of history in a market society and reduction of the citizen's role in benefit of the consumer one, or also the idea of holding the key of the meaning or sense of history moving towards a final unity and a "new human being" previously foresee. He moved away from all totalitarian trends or absolute certainties: instead of certainty and unifying trends, we need to face uncertainty e keep plurality, difference and pluralism in education, cultural, political or social life.

Therefore, Paulo Freire's thought moves away from any authoritarian or dogmatic trends of the left wing political movements (even when they rise in the progressive social movements that could be seen as being near to his beliefs), by refusing their hegemonic intent to control the social movements, or to produce an enlightened leadership to hold the sense of history. He made a post-modern critic of Hegel and Marx, referential thinkers of the left, with their idea of a dialectic method to understand and change reality, viewing them as makers of global or total narratives and dogmatic certainties, and recommending that "(...) the Marxists must adopt a humble attitude in dealing with the people, and become, in a post-modern way, persons with less certainties."(Freire, 1994: 96)

This association between two usually opposite perspectives, arriving to an apparently paradox – a progressive post-modernism -, when the concept of progress is related to the modern enlightenment, while the post-modernity developed its deconstruction, reveals us a Freire that includes critically the contributions of the post-modern social theory in his emancipator discourse, a legacy from the enlightenment, developing a pluralistic theory and

practice of education to tolerance, socio-cultural diversity and political pluralism. He opposes all uniformity and homogeneity that are a landmark of some archaisms in leftwing trends “(...) in their authoritarian distortions, their repulsive totalitarianism, their sectarian blindness, (...) their lack of tolerance towards diversity and difference.” (Freire, 1994:96)

The same way that oppression can show itself in multiple forms and in many dimensions – from economic oppression to cultural or social ones -, the liberation discourses and practices may assume multiple orientations and develop in diverse spaces , from school to mass media , from non-governmental organizations to state structures, syndicates or political movements. Through his work in governmental education projects and in educational interventions in the civil society – the most famous was the project of alphabetization, still implemented nowadays in many countries -, Paulo Freire was a man of thought, such as a man of action. His intervention had a wider range than the academic sphere, reaching the state or civil society educational projects, and his fight was the one of ideas, but also political – in this he follows the enlightened idea of the intellectual’s social commitment: he fought against the military dictatorship and for democracy, and this path shows his work in the light of a *pedagogy of autonomy and liberty*.

In an age of crisis of great or global narratives or meta-discourses that legitimate knowledge, education, and culture, as the philosopher of the *post-modern condition*, Jean-François Lyotard, says (Cf. Lyotard, 1979), is it needed to give up the enlightened discourse and its emancipator project, or it’s suitable to reframe it according to the emergence of new socio-cultural and educational paradigms? Paulo Freire chose the last orientation, rethinking the philosophical-pedagogical discourse of modernity in the light our age spirit of time, while other progressive pedagogues kept their theory and practice unchanged, or renounced to any hope in a social or educational change, falling in conservative positions.

### **Towards an Inclusive pedagogy**

Occidental culture, in its Hellenic roots, was guided by a *totality* and *identity* ideal. The ancient Greeks understood the world and the knowledge as a whole, with limits. Greek cosmology was finite and closed, as Alexandre Koyré says in his work *From the Closed World to the Infinite Universe* (Cf. Koyré, 2007). The Universe of Parmenides was viewed as a sphere (Sphairos), being his logic and ontology characterized by the identity: Being is, non-Being isn’t. Negative, oppositional, and changing Heraclito’s logic, set apart from Parmenides identity and stability, and so, from Ancient Greek philosophical mainstream. Those opposite traditions joined in Hegel’s philosophy, which unites the Heraclitian change and negativity to the Parmenidian identity and permanence; the negative’s work doesn’t allow any stability, but changeability conducts to an Absolute Wisdom, with the end of any contradictions or transformations.

Instead of the classical *episteme* (*science*), which viewed knowledge as stability and unity, in opposition to the transformation and multiplicity of the *doxa* (*opinion*), modernity is thinker, which he joined to the modern view: he produced a philosophy of time, contradiction and change, that ended in the stability of the Absolute, in a synthesis between the ancients immutability and the historicity of the moderns. Paulo Freire noticed that this view, at first sight rejected by the theoreticians of modernity – positivists, Marxists or neoliberals – was in fact implicit in their explicit thought. Freire’s ideas mirrors so much the Critical Theory ones, with their statement that *The totality is the non-truth* (Cf. Horkheimer,1983) as the Emmanuel Lévinas philosophy of alterity (Cf. Lévinas,1984).

Positivism ended the classical philosophy and metaphysical Absolute, bounding its reach to the *facts*. However, the three levels of scientific and social development or progress lead to a “disguised Absolute” – the positive level, that closes history and sees in experimental science and reason a replacement of the old metaphysical or religious Absolute. Marx thought that human reality is historical and came from contradiction, such as Hegel, but his dialectics

is no longer idealistic and became materialistic, with contradictions showing themselves in economy and society. All history develops itself as classes fight, and State backs social classes interests; however, in the final level of historical evolution, social classes and State will disappear. And all the contradictions will cease. Liberalism is viewed by Francis Fukuyama as *the end of history* (Cf. Fukuyama,1992:13-35), through a new reading of Hegel, interpreted by Alexandre Kojève and comprehended by Fukuyama in the context of post-cold war. With the communism's implosion, the defeat of Nazism in the second world war, and the fall of military dictatorships that prevailed in Latin America, liberal democracy emerged as the final step in history of mankind, not because time or events cease to occur, but because there were no alternatives to liberalism, which would solve all problems or contradictions. In all those views, we arrive at an homogeneous society and thought, at a kingdom of identity.

Paulo Freire viewed himself as a heir of the dialectical vision of history as a historical process but without the closing stage that both Hegel and Marx saw as an end of history, with a deterministic vision of the future. For him, history is a *work in progress* – a path that is built as long as we walk, and not path already made by Divine Providence, Reason, or any other supreme dimension, and this goes to universal history as well as education history. The dialectics he shared and used as a tool to act and understand history, and to work in the pedagogical theory and practice, is near to the Merleau-Ponty's *hiperdialectics* (Cf. Merleau-Ponty,1979:75.141), a dialectics without an end or reconciliation that would abolish any alterity or contradiction, where the singularity or difference would be suppressed in favor of a totality identified with the truth.

*Totality* means to Hegel and Marx – although with different views – a rational order that obliges everyone and leaves no room to alterity, difference, plurality, exteriority. In the Ontology of totality there's no place to exteriority: or, such as in Hegel, Being includes in itself all the exteriority, suppressing it as difference, and bringing back the *other* to the *same*, or doesn't recognize it and intends to suppress alterity. This happens in totalitarian trends, as Nazism, that viewed Jews as the *other* and built the holocaust to eliminate them, or, like in former Soviet Union, the dissidents, as others, exterior to the system, where viewed as fools and placed in psychiatric hospitals because, being the system "perfect", unique and homogeneous, anyone who was different or exterior to it should be classified as fool. Any difference should be brought back to the identity, all divergence set back to the norm – this is the totalitarian belief.

Breaking with the ontology and ideology of totality, identity or homogeneity, the freirian pedagogy hosts the *other*, the *excluded* of the system – political, social, educational – the *oppressed*, the one who has no voice, no face in the system. Therefore, we may view it as an *inclusive pedagogy*, for which to include is to give voice, and not to normalize or reduce the other to the same. To a *normalized pedagogy*, Freire opposes a *dialogic pedagogy*, and an education to the respect of difference, autonomy or alterity.

### **Critical pedagogy and sense of utopia**

The enlightened, Hegelian, positivist, or Marxist, ground in trust in a pre-oriented *sense of history*, a inevitable future foreseen from the present, a movement towards a fair, rational and free society, according to the enlightenment, a modern state, which, according to Hegel in his work *Right and State Philosophical Principles* (Cf. Hegel, 1982: 258-341), or to the *positive stage* of Humanity, where all problems will be solved through reason, science or technique, according to Auguste Comte (Cf. Comte,1975), or to a society without classes, in Marx's view (Cf. Marx,1982). None of these philosophies viewed progress as a linear path or absolute necessity, although positivism is the one more closer to this linear vision of a historical necessity. Hegel recognized the possibility of unpredictable events in history; however, viewed from the large history's picture, even the unpredicted events should be

included in a general progressive history's necessary orientation (Cf. Hegel,1982:177-215), and Marx took this hegelian heritage.

Post-modernity represents the end of this historical optimism, or in the trust in the future, grounded in the sense of history. From these great narratives crisis results a disenchantment in face of a present and future without the hope's horizon given by these narratives – religious, scientific, technological, philosophical, or ideological. However he recognized this crisis, ignored by some other left wing pedagogues, that kept themselves tied to established trends, Paulo Freire always worked for a re-enchantment of the world and a renewal of hope.

This renewal can be implemented only through a re-affirmation of the *sense of utopia, dream and imagination*, opening the real to the possible, the being to the becoming, the actual to the virtual, the finite to the infinite, the immanence to the transcendence.

The post-modernity, by renouncing to the great narratives, settled us in the finite, in the immanence of a present or actuality that no longer opens to a future that would transcend them. Modernity kept something of the religious and metaphysical transcendence, while replacing the religious *eschatology* of the ultimate ends for a secularized version: those ultimate ends no longer are fulfilled in a *celestial city*, but in the *terrestrial city* of the utopias or social models shaped in a rational frame. The idea of *progress* lead to a present that should be surpassed, transcended, through the historical dynamics, in order to implement the ultimate ends of reason in the cognitive, social and educational order.

To Marx and Engels, socialism's maturity should only be reached through the transition from the *utopian* socialism to the *scientific* socialism. They viewed the utopia as an escape from reality and a refuge in the dream of a better world – or even a perfect one – without the tools to make it real, effective, rooted in the concrete history. According to the philosopher Karl Popper (Cf. Popper,1980:259-280), utopias are totalitarian models and enemies of the *open society*, because they build false rational models, that they intent to impose to the society, through a *social engineering*. Also, they lead to a closed society because they show themselves as *essences*, eternal structures developed in a previously known future.

Following another path than these Marxist or liberal rejection of utopian thought, Paulo Freire rethinks utopia as a tool for changing the world, path to an opened future, and hope horizon.. Utopias don't represent a history's closing, nor making a "new man" or perfect closed society. On the contrary, it's the conscience of imperfection and unfinished human condition (and of the institutions, systems or societies built by him) that results his *educability* and *perfectibility*. Conservatism establishes a conformity with historical tradition, that must be continued in the present, while progressivism denies past traditions but accepts a future pre-oriented. Both close themselves, emptying the critical, creative, or dreaming abilities, which are supposed to guide the educational and social projects, reopening an hope's horizon: "The decomplexification of the future in a mechanistic history's understanding, whether in right or left wing, leads to the death or authoritarian denial of dreaming, utopia, or hope." (Freire,2010:73)

Human history doesn't obey to laws alike the mechanistic Nature's laws, which dominate the scientific paradigms of the Galilean and Newtonian cosmologies as universal and necessary laws: the time that guides human history isn't mechanical, but creative, complex. Human time in education, history, and society, is understood by Paulo Freire as *interpretation, comprehension*, different from the scientific *explanation*, adequate to the natural sciences. *Pedagogical reason* isn't only a logical or technical one, but mainly a *hermeneutical reason*. Understanding and action need an *autonomous* pedagogical agent – teacher or student – structured by his historical-social situation, personality, experience, but also able to be a builder of his own history and driving force of social history, shaping his world and the social one. On the other hand, the pedagogical and social spaces have their relative autonomy, the education's reform isn't enough to reform society, nor social

transformation is enough to transform education, but they are complementary spaces and interact, because education acts also in public sphere, and the city, since Plato, is viewed as *educative city*.

Paulo Freire didn't want a reproductive pedagogy, simply adequate to the social, political or cultural order, nor did think that the social order was established by Nature. As a supporter of a *critical, emancipative, utopian* (not in the vulgar sense of something impossible, but in the sense of opening possibilities beyond the reality, and make dreams or imagination turn real), he recognizes himself as progressive theoretician and practical educator. The ideal of justice guided not only his pedagogy, but also his personal life and social action. His stance could be named as *hypercritical*, like the one Merleau-Ponty used to name his dialectics – *hyperdialectics* –, viewing dialectics as a process that didn't end in a final reconciliation or totality, like Hegel and Marx conceived it, but is a never ending and infinite opened process. Critical thought isn't just a tool to change present knowledge, education, or society, until a new society with justice replaces them, and critics would no longer be needed (or even would be repressed, as happens in authoritarian right or left systems). On the contrary, once democracy is implemented, freedom of expression and critical stance are required, not only in a transitory period, but permanently. Also, freedom must be enlarged, from the academic space to the public one.

As John Dewey, Karl Popper, Jurgen Habermas or Matthew Lipman said, although from different philosophical positions, freedom of critics and discussion characterize democracy and citizenship, as well as scientific research, and education.

In a world crossed by different kinds of determinisms - for instance, the market one, the technological determinism, that even intends to redefine human being – a *pedagogy of autonomy*, such as Paulo Freire's, reintroduces ethical responsibility, capability of choice according to values. For him, education is a utopian project. Education becomes a utopian project when it doesn't limit human being to the *topos*, the present place, what he is, but opens him to the possible, the becoming other than his present configuration. According to Freire, human being as an ontological vocation to grow, to be more, but this potential can only be accomplished through education, a formative process. Formation is not normalization nor homogenization, and the pedagogical formation, to Freire, is so much a scientific and technical matter as an *art*, and we must rely on education's *aesthetical* dimension. In an age were to have is more important than to be, the formation in aesthetical or ethical being is a way for making true a feasible utopia's education, turning the pedagogical dream of ours being growth into reality.

### References:

- COMTE, Auguste (1975). *Cours de philosophie positive*. Paris: Hermann.
- FREIRE, Paulo (1967). *Educação como prática da liberdade*. Rio de Janeiro: Paz e Terra.
- \_\_\_\_\_. (1970). *Pedagogia do oprimido*. Porto: Afrontamento.
- \_\_\_\_\_. (1992). *Pedagogia da esperança*. São Paulo: Paz e Terra.
- \_\_\_\_\_. (1993). *Política e educação: ensaios*. São Paulo: Cortez.
- \_\_\_\_\_. (2010). *Pedagogia da autonomia*. São Paulo: Paz e Terra.
- FUKUYAMA, Francis (1992). *O fim da História e o Último Homem*. Lisboa: Gradiva.
- HEGEL, G.W.F. (1982). *Principes de la Philosophie du Droit*. (trad.fr.). Paris. Vrin.
- HORKHEIMER, Max (1992). *Dialectique negative*. (trad. fr.). Paris. Payot.
- KOYRÉ, Alexandre (2007). *From the Closed World to the Infinite Universe*. Baltimore: John Hopkins university.
- LÉVINAS, Emmanuel (1984). *Totalité et Infini*. La Haye: Martinus Nijhoff.
- MARX, Karl (1963-1982). *Oeuvres Completes*. Paris: Gallimard.
- MERLEAU-PONTY, Maurice (1979). *Le Visible et l'Invisible*. Paris: Gallimard.

- PETERS, Michael (2000). “Paulo Freire e o Pós-Modernismo”. In Paulo Ghiraldeli (org.). *Estilos em Filosofia da Educação*. Rio de Janeiro: DP & A.
- POPPER, Karl (1980). *The Open Society and its Enemies*. London: Routledge.
- TAGUIEFF, Pierre-André (2004). *Le sens du progress – une approche historique et philosophique*. Pais : Flammarion.

# GLOBAL SEXUAL DEVIANCY: LEARNING FROM AMERICA'S MISTAKES

*Velasco Daniel, PhD*

The Chicago School of Professional Psychology, U.S.A.

---

## Abstract

Sexual Deviancy is a global issue, and efforts to standardize treatment have produced programs that do not support cultural understanding and sensitivity. With the rise of sexual offenses around the world, and the demand for public safety, sex offender treatment programs must be examined before countries without treatment and management programs adopt the ones currently being implemented. In order to gain a better understanding on a global scale, the perceived effectiveness of sex offender treatment programs in the United States and Japan was evaluated by administering a questionnaire to a sample of the general population and by interviewing mental health professionals in order to discover if treatment modalities exist that would provide cross-cultural utility. The results suggest a need for further research on and implementation of sex offender treatment approaches that would be more effective than current programs. Results also revealed continued beliefs in sex offender myths, and a perceived ineffectiveness of current sex offender management laws.

---

**Keywords:** Treatment effectiveness, sexual offender treatment, sex offender policy, registration, Megan's law

## Introduction

"I think men are universally perverted; it's just that in Japan, we do something about it."

-Mr. Taniguchi, a 65-year-old brothel customer (Sinclair, 2006, p. 29)

Sexual offending is a problem that is not unique to any one culture, but one that crosses all geographical and societal boundaries. Governmental efforts-- including policies and laws aimed at controlling perpetrators-- as well as psychotherapeutic efforts—geared toward education and remediation have been shown to be only partially effective.

It is both interesting and humorous to note that research conducted at the end of the 19<sup>th</sup> century led to this groundbreaking revelation in the quest to understand this new breed of criminal, the sexual offender:

It may be noted that Marro, in his careful anthropological study of criminals (*I Caratteri dei Delinquenti*) found no class of criminal with so large a proportion alike of anomalies of the nose and anomalies of the genital organs as sexual offenders. (Ellis, 1927, p. 52)

Research in sexual offending has no doubt evolved since the days of Marro and Ellis, and new dimensions of these crimes, along with global pervasiveness, brought forth new areas, including the typology of sex offenses.

Types of sexual offenses are relatively the same throughout the world—exhibitionism, frotage, child sexual abuse, rape, and sexually motivated murder, to name a few. Although the list of sexual crimes can be applied to perpetrators of sexual offenses throughout the world, some crimes are more prevalent in certain countries than others, as perpetrators are motivated and aroused by a variety of personal and sexual preferences and fetishes.

Treatment also varies from country to country, and many Western countries strive to set the standards of efficient and effective punishments and laws, psychological modalities,

and sexual offender treatment programs. While some praise these efforts, others are critical, and since the purpose of this study was to investigate the problem of sexual offending from a global perspective, the United States and Japan were chosen because they share similar statistics with respect to sexual offending behavior, yet present culturally distinct approaches to conceptualizing and treating the issue.

This study investigated the relative effectiveness of current therapeutic modalities and treatment programs for sexual offenders, and sought to discover the potential utility of incorporating Japanese and American treatment modalities cross-culturally by addressing the following research questions:

1. In what ways have traditional treatment approaches to sexual offending in the US and Japan been effective and ineffective?
2. Are there differing treatment modalities specific to each country that can provide cross-cultural utility?
3. Has the introduction of Megan's Law assisted with the treatment and reintegration process, as well as public safety, of sex offenders in the United States, and how could a similar law affect Japan?

It was hypothesized that both the general population and mental health professionals would perceive current sex offender treatment programs as insufficient for reducing new sexual offenses and recidivism rates, and that certain aspects of American and Japanese treatment approaches could provide cross-cultural utility.

### **Main Text**

An outsider perspective on a culture's beliefs and behaviors often provides amusement, as it is oftentimes misled by bias, misperception, and ignorance. A prime example of this skewed perspective is a study that aimed to answer the question, "Are some cultures more likely to be in love with others?": "Because of differences in the value dimension of individualism versus collectivism, Sprecher and colleagues (1994) proposed that Americans are most likely to be in love, Russians next most likely, and Japanese least likely" (Hill, 2008, p. 295).

In Japan, sexuality and sex crimes have a complex and nuanced relationship because there are so many genres of what many consider to be sexually deviant expression. Before exploring some of the types of deviant expressions, a brief history of the sex crime that launched the country into a frenzy should be of focus.

In 2004, Kaoru Kobayashi, a newspaper deliveryman in Nara, was arrested for kidnapping, raping, and murdering a 7-year-old girl, and once the crime was discovered, Kaoru's past was revealed: "In 1989, he was given a suspended sentence for molesting eight young people. In 1991, he was sentenced to three years in prison for the near strangulation of a 5-year-old girl" (Sasaki & Sumida, 2005, para. 3). The community was outraged that the public was not notified about a repeat sexual offender living and working in Nara, and more information was given that exposed a lack of communication and collaboration between law enforcement agencies.

While this specific sex crime brought sexual offenders to the forefront of criminal concern in Japan, other significant unconventional sexual behaviors were and still continue to be present, including coercive sexual behaviors, such as rape, sexual harassment, incest, prostitution, and sexually violent literature (Hatano & Shimazaki, 2004).

These sex crimes hide in the shadow of current sexually deviant behavior expressed in what some may view as "healthy" sexual expression. For example, Japanese animation, or *Anime* as it is known across the world, has been criticized for portraying women in negative ways: "These videos normally featured 'cute' heroines drawn in anime style, with childlike round faces and fully developed bodies" (Shiokawa, 1999, pp. 112-114). When one looks past popular Japanese animated cartoons, such as *Dragonball Z* and *Pokemon*, one finds that anime

is well known for being brutally violent and sexual, placing these childlike women “in increasingly explicit and usually violent sexual scenarios, including rape and bondage” (Shiokawa, 1999, p. 114).

While Americans fear pedophiles lurking in playgrounds, the Japanese are facing a threat that is far more a reality than it is paranoia: *lolicon*. Stemming from Vladimir Nabokov’s controversial 1955 novel, *Lolita*, *lolicon* is short for Lolita Complex, and refers to the “predilection of a middle-aged man to love and desire a young girl, who could be her father’s age” (Shigematsu, 1999, p. 129). *Lolicon manga*, or graphic comic books, are banned in many countries, and with the emergence of *toddlercon* (*manga* depicting toddler-aged children in sexual situations), there has been a push on the community and political levels to ban *lolicon* from comic book stores in Japan.

Because comics cater mostly to men, the image of women as mere sex objects needs to be addressed. This image is further depleted by Japan’s *shasei sangyoo*, or “Ejaculation Industry,” which consists of Soaplands, Telephone and Image Clubs, and Pink Salons that sell sex while finding creative ways to work around the law (Louis, 1992; Sinclair, 2006).

Similar to the United States, the percentage of Japanese female perpetrators is much lower than their male counterparts. According to Taguchi, Taira, Ikeda, and Kiryu (2010), it is not clear how many female sex criminals actually exist in society, but that number is most likely small. According to the Criminal Statistics Document of Japan (2007), from 1998 to 2007 240 female sex criminals were arrested (24 women per year, on average), making the ratio of female offenders to sex crimes 0.7% during those ten years.

While the United States offers many conflicting theories on sexual offending, Japan surprisingly is hesitant when considering the potential reasons behind sexual offending, and that is because careful consideration is being made to both define sex crimes and properly educate the public. Taguchi et al. (2010) offer insight into this hesitation:

When people hear the word “sex crime,” different people interpret the word differently – most are not too familiar with it. Some will be sensitive to the word “sex” itself. On the other hand, people with experiences with sex crimes may have a feeling of anger, fear, shame, and regret. However, the actual sex crimes that occur and how the general population perceives sex crimes are far different. You can even say many have false understandings. (p. 1)

Taguchi et al. (2010) believe that a better definition of “sex crime” that is not influenced by time, culture, and socially common ideas, is required, and that in order to prevent new sex crimes and re-offenses, it is necessary to get rid of the misunderstandings and understand the correct present state of sex crimes (p. 2). Only then are researchers able to move forward with theory and offender program implementation.

Despite this warning, sexual offender theories exist in Japan. Popular sex offender theories are based on foreign countries’ theories, namely Canada and England (although it should be noted that England models much of its sex offender programs on Canada’s model) (Fujimoto, 2008). Other theories are based on culture, societal influences, and human development (Oda, 1994).

Japan has laws in place to protect its citizens while appropriately punishing *seihanzai*, or sex criminals; however, there are no laws mandating lifetime registration for convicted sex criminals, such as the United States’ Megan’s Law. The Nara case inspired many politicians and law enforcement agents to call for the adoption of a similar requirement because even though Kobayashi did have prior convictions of sexual offenses against children, the address of where he was going to live after his release was not known by local police, as the information of the release itself and his address were not provided to the police by the Ministry of Justice, who is in charge of managing prisons and the prisoners who are released (Matsui, 2007). Moreover, during that time while he was in jail, there were very few treatments for sex offenses.

Since the Nara case, the Ministry of Justice conferred with the National Police Agency that the offenders' release information be shared between the two agencies beginning June 1, 2005, allowing for sex criminals' to be monitored (Matsui, 2007). In addition, prison law has been revised so that re-education and treatment (making perpetrators understand their victims' suffering, the results of their crimes, how to control sexually deviant urges and impulses, etc.) during imprisonment will happen.

Nonetheless, proposals for action to reduce recidivism have been gaining both public and local government support, the most notable being an anti-recidivism law that would make information on inmates available to the public. Supporters, such as Hidemichi Morosawa, a professor of criminal law policy and victimology at Tokiwa University's graduate school, states Japan needs "a system to build a database on criminals that can be shared by police, prosecutors, courts and psychiatrists" (Sasaki & Sumida, 2005, para. 17); however, Yoji Morita, a professor of criminal sociology at Osaka Shoin Women's University, says Japan isn't ready for data sharing, fearing it could lead to discrimination against those with criminal records (Sasaki & Sumida, 2005).

According to Sakuta (2006), the reasons why discussions on whether or not to implement Megan's Law in Japan come up in the first place is because of (a) the undercurrent movements of administrative and political attempts to enact new and critical law based on very specific, unique, and uncommon incidents that only occur at a frequency of once every few years; and (b) the media's sensationalizing of these crimes, which sway public opinion. If this situation remains, this could lead to public misunderstanding, so it is desired that every citizen have accurate knowledge and judgment of sex crimes, criminal rates and trends, offender treatment and rehabilitation, and victims' actual conditions (Sakuta).

Sex offender crimes and accompanying punishment, including registration, are at the forefront of Japanese legislation, with many prefectures calling for an adoption of harsher laws that will give the public a feeling of security and protection against perpetrators. Opponents argue indecent and obscene sexual acts are still ambiguous, and therefore unconstitutional. Researchers and lawmakers are debating whether registration requirements and public notification will be effective, but while experts debate, it appears that the consensus is clear: What is needed are treatments and correctional education of sex offenders in Japan that will control sexual behaviors prior to committing crimes (Matsui, 2007).

Current treatment in Japan is not standardized as it is in the United States. In April 2005, the "Study of Sex Offender Treatment Program" was launched, and the scientific and systematic recidivism prevention program was developed, which included the prevention of recidivism, protection for women and children, enhanced public safety, a collaboration between correctional facilities and probation officers, including the exchange of perpetrator information, Cognitive Behavioral Therapy and Relapse Prevention (Fujimoto, 2008, p. 1).

In addition, according to the Justice Ministry, Japanese prisons offer counseling to convicted sex offenders. Despite these efforts, Fujimoto (2008) warns,

Cognitive behavioral therapy is not universal, is not perfect. During the study of treatment program development, it goes without saying that there was an agreement that there is still a need for consideration of modalities for treatment and prevention of recidivism for those who do not apply to cognitive-behavioral therapy. (p. 3)

## Summary

Sexually deviant behavior appears to manifest itself in different ways depending on the country, but steps have been taken on national and local levels to criminalize sexually deviant acts, understand why these acts are being committed, and treat those who commit them. The literature also revealed that the United States and Japan have both generally accepted cognitive-behavioral therapy with relapse prevention as the preferred sexual offender

treatment method, although it is unclear exactly how influential this approach is in each country and how its effectiveness is perceived.

## **Method**

### **Participants**

In order to address all of the research questions and hypotheses, it was necessary to recruit participants from both the mental health field and the general population in both the United States and Japan. Specifically, the samples for this project consisted of the following groups:

Ten American mental health practitioners, licensed in the state of California to practice marriage and family therapy or clinical social work, and who worked directly with sexual offenders or victims.

Ten Japanese mental health practitioners, licensed in Japan to practice the equivalent of marriage and family therapy or clinical social work, and who worked directly with sexual offenders or victims.

One hundred adult (18 years of age or older) American men and women from the general public.

One hundred adult (18 years of age or older) Japanese men and women from the general public.

The selection criteria for the American and Japanese mental health practitioners consisted of licensure, experience working with sexual offenders, and the ability to verbally consent to the interview process. Interview participants were first selected based on his or her profession (mental health counselor, marriage and family therapist, licensed clinical social worker, psychiatrist, and any other person authorized to provide mental health services to sexual offenders) and work with pertinent mental health counseling centers.

The selection criteria for members of the American and Japanese general population consisted of age (18 years of age and older), and the ability to verbally consent to participate in completing the questionnaire. Questionnaire participants were recruited in public areas, such as supermarkets, outdoor shopping centers, and train stations. Participants were approached in these areas and asked to complete a questionnaire on sexual offending and the perceived effectiveness of sexual offender treatment and laws. Because non-English speaking populations were targeted for participation in the research project, translated oral consent scripts were used, along with a Japanese interpreter.

### **Materials**

Permission was obtained from Jill S. Levenson to use the questionnaire that was originally created for her study, *Public Perceptions About Sex Offenders and Community Protection Policies*. The questionnaire is a 51-item instrument “devised to gather information from community members about their perceptions of sex offenders, their familiarity with notification laws, and their opinions about the ability of community protection strategies” (Levenson, Brannon, Fortney, & Baker, 2007, p. 9). Because the questionnaire was based on sex offender policies in the state of Florida, it had to not only be slightly altered to accommodate participants who may or may not have been familiar with California sexual offender laws, but it also had to be translated into Japanese for use with Japanese participants.

According to Levenson et al. (2007), the survey incorporated previous research considerations that inquired about offenders and community notification policies, and covered five general areas: participant familiarity with community notification, types of information that should be disclosed to the public, beliefs and perceptions about sex offenders and sex crimes, opinions about prison sentences, psychological treatments, and probation, and finally, perceived effectiveness of community protection strategies.

The structured interview questions used to interview mental health professionals on their experiences and perceived effectiveness of current sex offender treatment modalities were created for this study by the author and primary researcher, and were also translated into Japanese to accommodate the Japanese mental health practitioners. The interview contained 10 questions inquiring about professional experiences working with sex offenders, common treatments, the perceived effectiveness and ineffectiveness of traditional approaches, and opinions on Megan's Law and lifetime registration. Participants were encouraged, but not required, to answer all of the questions as thoroughly as possible.

The data was analyzed using the Statistical Package for the Social Sciences (SPSS), and *t*-tests were used to determine mean differences.

### **Procedure**

Interview participants in Los Angeles, California, and in Tokyo, Japan, were informally contacted by email or phone for initial recruitment during the month of December 2011. No script was used for this informal communication. Upon receiving an informal written or verbal commitment to participate, the primary researcher (and the translator, when needed) visited the participants during the months of December 2011, and January 2012, and conducted the interview. An oral consent script was used prior to beginning the interview process. Because non-English speaking populations were targeted for participation in the research project, translated oral consent scripts were used, along with a Japanese interpreter. On average, the interview lasted between 10 and 20 minutes, and at no time was any personal identifying information collected or documented.

Questionnaire participants were chosen at random amongst crowds of people shopping at various venues. Attempts were made to ask each person or group of people for participation in order to not bias the sample. Potential questionnaire participants were approached in a public setting and their participation was solicited by explaining the project and reciting the oral consent form. Any questions they had were answered prior to being handed the questionnaire, and after they verbally consented, they receive the document to fill out. On average, the questionnaire took between 10 to 15 minutes to fill out, and at no time was any identifying information asked, collected or documented.

### **Data Preparation and Results**

The data received from Japanese participants (general population and mental health practitioners) was transcribed, translated into English, and checked for linguistic accuracy by two Japanese translators. Because two countries and two samples within those countries were studied in this investigation; therefore, it will be necessary to present the results by country.

### **The United States**

#### **Questionnaire**

One hundred adult (18 years of age or older) American men and women from the general public were given a questionnaire that measured participants' knowledge of sex offenders, sex offender laws and community notification strategies, and perceived effectiveness of these laws and treatment.

Questions number one, two, and eight reveal much with regards to the general public's views on the effectiveness and fairness of the community notification laws. In question one, 60% of the participants believed the community notification laws create little to no reduction in the number of sex offenses committed; only 5% believed the laws to be effective. The second question inquired as to the perceived fairness of the notification laws: 55% believed the laws were "mostly" to "completely fair" (40% "mostly fair," 10% "fair," 5% "completely fair"); 45% believed them to be "unfair" or "somewhat unfair" (10% "unfair," 35% "somewhat unfair"). Question eight asked participants how offenders' feelings of shame

would impact reoffending: 60% believed shame would reduce re-offenses (20% significantly reduce chances of reoffending, 40% slightly reduce).

After questions one and two, the next set of questions dealt with known methods of community notification (law enforcement or members of a community notifying residents of that community that a sex offender has moved into the area), from posted or circulated flyers to community meetings (see Table 1). The majority of participants either stated the listed notifications never occur in their neighborhood or they were unaware of them occurring, even though 40% reported local newspapers publishing the whereabouts of local sex offenders.

Participants' perceptions and beliefs were measured with the next set of questions asking for believed percentages regarding sex offenders and sex crimes (see Table 2). Participants believed 51% of sex offenders will commit another sex offense (61% of convicted child molesters, 59% of rapists), and that more than half of offenders (54%) were abused as children; participants also believed over half of boys and girls who are sexually abused are abused by someone they knew prior to the offense (53% and 52% respectively); lastly, participants estimated that 81% of sex offenders are male.

While the purpose of this study was not to replicate Levenson et al.'s (2007) study, a modified version of their questionnaire was used to gauge the public's perceived effectiveness of current sex offender treatment and notification laws. Levenson et al.'s study (2007) revealed participants' skepticism regarding the value of psychological therapy in preventing recidivism even though 73% would likely "support such policies even in the absence of scientific evidence that they achieved their goals" (pp. 12-13).

Table 3 shows the results from the question, "Which of the Following Do You Believe Would Be Helpful in Reducing Child Sexual Abuse?" (Question 35), highlighting the perceived effectiveness not of tougher laws or longer prison sentences, but of in-prison treatment (80%), outpatient programs (75%), and society education about sexual offending (70%).

Although Levenson et al.'s (2007) study was conducted five years prior to this study, the results are similar, and strongly suggest that the public continues to hold onto misconceptions about sex offenders and crimes. The results also point to an entrenched skepticism about the effectiveness of treatment and community notification laws. The results also point to a hesitancy supporting policies that lack scientific evidence of reducing sexual offenses (30% answered "Partially True" and only 5% answered "Completely True" to the question "I would support these policies even if there is no scientific evidence showing that they reduce sexual abuse).

Compared to Levenson et al.'s (2007) study, the results show an increase in the public's awareness of sexual offender crimes, policies, and a desire to find new ways to lower recidivism, including educating not only the offenders, but also the public themselves.

## **Interview**

Ten American mental health practitioners, licensed in the state of California to practice marriage and family therapy or clinical social work, and who worked directly with sexual offenders and victims, were asked ten questions created specifically for this study. Although the interview was structured, the interviewees were not required to answer any of the questions, and the interviewer often raised other questions related to the discussion (e.g., "How effective are current treatment modalities?"). The answers were documented, and categories were identified based upon frequency of occurrence and relevancy to the main topic of sexual offenders and treatments.

Three main treatment modalities were identified based on the responses: (a) Cognitive-Behavioral Therapy (CBT) with a focus on Relapse Prevention (RP); (b) Psychotherapy (non-specific); and (c) The Good Lives Model (GLM) (see Table 4). The Containment Model was

also mentioned significantly, as was the need for an in-prison treatment program (currently there is no mandatory psychological counseling for incarcerated sex offenders) (see Table 4).

As Table 4 illustrates, the main treatment used for sex offender management is Cognitive-Behavioral Therapy (CBT) and Relapse Prevention (RP). With regards to this study's research questions, interviewees listed the three main ways traditional treatment approaches to sexual offending have been effective as (a) group therapy sessions (80%), (b) sex offender education (e.g., teaching offense accountability and victim empathy) (90%), and (c) identifying cognitive distortions (70%). Interviewees also listed ineffective facets of treatment, the most notable being (a) the length of treatment (90%), (b) the setting of treatment goals (70%), and (c) the communication between therapist and parole/probation department (60%).

All respondents recognized the good intentions of Megan's Law, but admitted the system is flawed (difficulty reintegrating sex offenders into society, all offenders placed under one "umbrella"). While all respondents reported significant change in their ideas, attitudes, and approaches since working with sex offenders, none of them could identify any current treatment modality that could provide cross-cultural utility.

## **Japan Questionnaire**

One hundred adult (18 years of age or older) Japanese men and women from the general public were also given the same questionnaire that measured participants' knowledge of sex offenders, sex offender laws and community notification strategies, and perceived effectiveness of these laws and treatment, translated into Japanese. Although Japan does not have sex offender laws and methods of community notification similar to those in the United States, there has been much publicity over the potential implementation of similar laws and notifications, and therefore most of the participants were familiar with the content and understood the hypothetical nature of this portion of the study.

As stated in the previous section, the first two questions create a foundation for the proceeding questions, as they inquire about the general public's views on the effectiveness and fairness of the United States' community notification laws: 35% of the participants believed the community notification laws would create little to no reduction in the number of sex offenses committed; 35% believed the laws would be effective or very effective. The second question inquired as to the perceived fairness of the notification laws: 75% believed the laws were "mostly" to "completely fair" (42.5% mostly fair, 22.5% fair, 10% completely fair); 25% believed them to be "unfair" or "somewhat unfair" (5% unfair, 20% somewhat unfair).

After questions one and two, the next set of questions dealt with known methods of community notification (see Table 1). Although Japan has no national or local laws requiring sex offender registration of information or community notification (the majority of responses fell into the "Never" or "Don't Know" categories), 2.5% of Japanese participants reported local newspapers publishing the whereabouts of local sex offenders.

The next set of questions asking for believed percentages regarding sex offenders and sex crimes. Participants believed 57% of sex offenders will commit another sex offense (60% of convicted child molesters, 62% of rapists), and that 42% were abused as children; participants also believed close to 40% of boys and girls who are sexually abused are abused by someone they knew prior to the offense (37% and 39% respectively); lastly, participants estimated that 85% of sex offenders are male (see Table 2). Interestingly, participants believed that strangers commit 55% of sex assaults (see Table 2).

Table 3 shows the results from question, "Which of the Following Do You Believe Would Be Helpful in Reducing Child Sexual Abuse?" (Question 35), highlighting the perceived effectiveness not of tougher laws or longer prison sentences, but of in-prison

treatment (62.5%), outpatient programs (52.5%), and society education about sexual offending (60%). Almost half of the participants believed GPS monitoring would be helpful in reducing sex crimes (see Table 3).

Although Levenson et al.'s (2007) study was never conducted in a foreign country, conducting it in Japan is significant because many parts of the country are considering adopting similar, if not identical, community notification and sex offender registration policies and procedures. The results reveal the Japanese general public continues to hold onto misconceptions about sex offenders and crimes, is skeptical about the effectiveness of treatment and community notification laws, but would be willing to support policies that lack scientific evidence showing they reduce sexual offenses (25% answered "Partially True" and 32.5% answered "Completely True" to the question "I would support these policies even if there is no scientific evidence showing that they reduce sexual abuse).

Despite this revelation, the questionnaire results also reveal a desire to find new ways to lower recidivism rates besides registration and community notification, being mindful of publicly shaming and ostracizing members of Japanese society who commit a sex crime.

One questionnaire participant wrote,

Sex crimes cannot be forgiven, however, when it comes to community notification, there are damages that family members and people around will suffer as well. I believe that the communication notification is necessary when sex crime has been committed twice or more.

Another participant wrote,

Although I think it is necessary for a measure to stop sex offender recidivism, in a close-knit society like Japan, there is also a risk of people retaliating those who are desperately trying to get back on their feet. It is important that the society as a whole understands and responds to these problems correctly.

Another warned,

I have been a victim of a sex crime. There is a very strong curiosity of wanting to know the criminal's information, however, if notifying the community invades the right of the offenders, it seems as though it may lead to a more flagrant crime. Therefore, it is questionable whether community notification law prevents recidivism.

## **Interview**

Ten Japanese mental health practitioners, licensed in Japan to practice the American equivalent of marriage and family therapy or clinical social work, and who worked directly with sexual offenders and victims, were asked ten questions created specifically for this study. Like the interviews conducted in the United States, the interview was structured, and although the interviewees were not required to answer any of the questions, other questions were raised throughout the process. The responses were documented, and categories were identified based upon frequency of occurrence and relevancy to the main topic of sexual offenders and treatments.

Three main treatment modalities were identified based on the responses: (a) Cognitive-Behavioral Therapy (CBT) with a focus on Relapse Prevention (RP); (b) Psychotherapy (non-specific); and (c) in-prison treatment programs (see Table 4). (It should be noted that while in-prison sex offender treatment is a part of the Japanese legal and mental health system, programs are government operated, and therefore they are difficult to monitor. The one interviewee who listed in-prison treatment as a utilized modality would not provide sufficient details for elaboration in this study.)

As Table 4 illustrates, the main treatment approach used for sex offender management in Japan is Cognitive-Behavioral Therapy (CBT) and Relapse Prevention (RP). Because sex offender treatment is relatively new to Japan, and imported from other countries, traditional treatment for sex offenders was limited to imprisonment. Thus, most interviewees (90%)

stated the current preferred treatment modality (CBT and RP) was an improvement. Almost all interviewees (90%) also said the most ineffective treatment approach as the standardized, “one size fits all” approach to sex offender treatment (one interviewed declined to answer this question). As one interviewee explained, “I do not believe that there is only one treatment that can be applied to sex offenders. Treatments must be individualized, flexible, and fitting to the patients’ needs (psychologically, socially, financially, culturally, spiritually), meaning it is not “one fits all”. Because there is a tendency of “one fits all” premise in traditional treatments, I believe they are ineffective.”

All respondents expressed skepticism with regards to the effectiveness of Megan’s Law in the United States, and its impact on Japan should the country adopt a similar law. None of the interviewees listed any treatment modalities that could provide cross-cultural utility because, as one interviewee stated, “No sex offender treatment approach originates from Japan. The approaches currently used to treat sex criminals come from outside Japan.”

Table 1  
*Methods of Community Notification*

Method	Never		Sometimes		Most of time		Regularly		Don’t know	
	US	Japan	US	Japan	US	Japan	US	Japan	US	Japan
Flyers are posted in my neighborhood to show and/or warn of convicted sex offenders who live nearby.	80%	97.5%	0%	0%	0%	0%	0%	0%	20%	2.5%
The police or someone else goes door-to-door to inform neighbors that sex offenders live nearby.	85%	97.5%	5%	0%	0%	0%	0%	0%	10%	2.5%
My neighborhood holds meetings to inform neighbors of the presence of sex offenders who live nearby.	50%	92.5%	5%	0%	0%	0%	0%	0%	45%	7.5%
Flyers are sent home with school children to alert families that sex offenders live nearby.	35%	92.5%	5%	0%	0%	0%	0%	0%	60%	7.5%
The local newspaper in my neighborhood publishes the whereabouts of sex offenders who live nearby.	40%	82.5%	10%	2.5%	0%	0%	0%	0%	50%	15%

Table 2  
*Perceptions about Sex Offenders and Sex Crimes*

Question	N		Mean		SD		Median		Mode	
	US	Japan	US	Japan	US	Japan	US	Japan	US	Japan
What percentage of sex offenders commit another sex offense?	100	100	51%	57%	26.5	21.7	50	60	20,50,70,90	30,50
What percentage of child	100	100	61%	60%	21.9	22.1	60	60	80	50

molesters reoffend? What percentage of rapists reoffend?	100	100	59%	62%	22.5	24.7	60	70	60,80	70
What percentage of adult offenders were sexually abused as children? What percentage of sex assaults of adults are committed by strangers?	100	100	54%	42%	26.5	24.6	55	45	70	50
What percentage of sex offenders are severely mentally ill?	100	100	26%	55%	13.3	22.6	25	50	30	50,70
What percentage of children find sex with an adult a positive experience?	100	100	31%	36%	27.3	31.2	20	20	10	10
What percentage of boys are abused by someone they knew prior to the offense?	100	100	7%	9%	8.5	12.2	5	0	0	0
What percentage of girls are abused by someone they knew prior to the offense?	100	100	53%	37%	29.8	30.5	55	30	90	10
What percentage of sex offenders are male?	100	100	52%	39%	23.2	29	50	30	50	10
What percentage of sex offenders are male?	100	100	81%	85%	13.1	8.6	80	90	80	90

Table 3  
*Which of the Following Do You Believe Would be Helpful in Reducing Child Sexual Abuse?*

	Percentage in Support of US	Percentage in Support of Japan
Community notification for sex offenders	55.0%	45.0%
Requires sex offender treatment in prison prior to being released	80.0%	62.5%
Restricting where sex offenders live	25.0%	17.5%
Outpatient treatment programs for sex offenders	75.0%	52.5%
Treatment programs for the entire family of sex offenders	30.0%	17.5%
Society education about sexual offending	70.0%	60.0%
Chemical castration for sex offenders	40.0%	27.5%
Restitution or community service by sex offenders	25.0%	40.0%
Prison sentence	35.0%	40.0%
Global Positioning System (GPS) monitoring of an offender's location	40.0%	47.5%

Table 4  
 Interview with Mental Health Practitioners (MHPs)

Treatment Modality Used	Number of MHPs	
	US	Japan
Cognitive-Behavioral Therapy (CBT) and Relapse Prevention (RP)	7	9
Psychotherapy (non-specific)	2	1
Good Lives Model (GLM)	1	0
Containment Model	8	0
In-Prison Treatment Program	0	1

## Conclusion

Interviews with Japanese and American mental health professionals revealed a preferred therapeutic approach to sex offender treatment: Cognitive-Behavioral Therapy and Relapse Prevention. Because America--particularly Los Angeles, California, where the US portion of the study was conducted--is so multiethnic, multicultural, and multilingual, one would assume multicultural counseling techniques would be incorporated; however, interview responses seem to point toward a “one-size-fits-all” approach that mental health professionals have deemed relatively effective, but yet also in desperate need of an overhaul. Japan, although only slightly culturally and ethnically diverse in Tokyo and other large cities, does not incorporate Japanese indigenous psychologies, such as *Morita* and *Naikan* Therapy, and, like their American colleagues, struggles with a “one-size-fits-all” approach.

The United States uses more approaches (e.g., Good Lives Model), but generalizes treatment, and, as one interviewee bluntly expressed, “The US is concerned with punishment and public shaming” (referring to lifetime registration). In contrast, Japan is interested in providing treatment for offenders as soon as they are incarcerated, although interviews suggest these in-prison programs are not very accessible, as the Japanese government monitors them. Japanese interviewees also acknowledged hesitation with regards to adopting new policies and treatment programs, such as Megan’s Law and the Good Lives Model, because as a Japanese interviewee stated, “People are different and need to be treated differently. Sex offenders are far more complex, and you cannot generalize about them when considering treatment. Culture needs to be taken into consideration.”

It was hypothesized that both the general population and mental health professionals will perceive current sex offender laws and treatment programs as insufficient for reducing new sexual offenses and recidivism rates, and both the general population questionnaire and mental health professional interview responses support the need for further research and development of sex offender treatments and laws.

It was also hypothesized that certain aspects of American and Japanese treatment approaches could provide cross-cultural utility, and while this study was unable to identify unique aspects utilized by American and Japanese practitioners beyond cognitive-behavioral therapy and relapse prevention, there are clinical, professional, and legal implications each country should consider:

- The United States might benefit from considering creating an in-prison treatment program that will provide consistent sex offender treatment upon conviction of a sexual offense.

- The United States could focus more on a holistic, empathetic approach to sex offender treatment rather than attempting to reduce sex crime rates via standardized treatment methods, public shaming, and social ostracization.

- Japan could benefit from more thorough research into different therapeutic approaches, such as the Good Lives Model-Comprehensive (Ward & Gannon, 2005), and incorporate them into current treatment programs.

- Both countries need to reevaluate what the effects of lifetime registration, community notification, residency restrictions, and similar policies have on the community, the victims, and the offenders before proceeding with further development and adoption of new and existing policies.

- Both countries need to consider public education programs aimed at eliminating sex offender myths while supporting safe integration of sex offenders back into the general population.

- Both countries need to consider creating prevention programs (e.g., professional development program aimed at educating teachers-in-training to the realities and dangers of committing a sexual offense) while discovering new ways to strengthen existing intervention programs.

In conclusion, although the United States and Japan have many obvious differences, their attitudes toward sexuality paint a picture of societies that paradoxically promote sex while admonishing overt sexual expression. Reasons for sexually deviant thoughts and actions vary with each perpetrator, and because of this a variety of theories have allowed mental health professionals to examine and further understand the complexity of sexual offending. However, this research has shown the need for more effective treatment approaches and laws that take into consideration more than just the crime committed. Treatment approaches and laws punishing and monitoring offenders would benefit from becoming more flexible, culturally sensitive, and proactive in their support of both intervention and prevention strategies. While it may be impossible for one theory, treatment, and set of laws to be applied to sexual offenders on a global level, this overarching goal of understanding cultural motivations and treating them appropriately should not be abandoned, for as technology, business, and intercultural relationships bring the world closer, there will be a need for something greater.

Unfortunately, and in spite of these global changes, the world's countries continue to segregate themselves, and local, state, and national budgets, political motivations, myth and paranoia hinder many of the movements working toward achieving what the California Coalition on Sexual Offending (2001) state as their organizational vision: A world without sexual abuse.

### References:

- California Coalition on Sexual Offending. (2001). *Objectives*. Retrieved on April 23, 2011, from <http://www.ccoso.org/objectives.php>
- Ellis, H. (1927). *Studies in the psychology of sex, Vol. 4*. Retrieved on February 11, 2011, from [http://www.gutenberg.org/catalog/world/readfile?fk\\_files=1492322&pageno=52](http://www.gutenberg.org/catalog/world/readfile?fk_files=1492322&pageno=52)
- Fujimoto, T. (2008). *Seihanzaikenkyu*. Tokyo, Japan: Chuo Daigaku Shuppanbu.
- Hatano, Y., & Shimazaki, T. (2004). Japan: Significant unconventional sexual behaviors. In R. T. Francour & R. J. Noonan (Eds.), *The Continuum Complete International Encyclopedia of Sexuality* (pp. 636-678). New York: Continuum International Publishing Group.
- Hill, C. A. (2008). *Human sexuality: Personality and social psychological perspectives*. Thousand Oaks, CA: Sage.
- Levenson, J. S., Brannon, Y. N., Fortney, T., & Baker, J. (2007). Public perceptions about sex offenders and community protection policies. *Analyses of Social Issues and Public Policy*, 7(1), 1-25. Washington, DC: Society for the Psychological Study of Social Issues.
- Louis, L. (1992). *Butterflies of the night: Mama-sans, geishas, strippers, and the Japanese men they serve*. New York, NY: Tengue Books.
- Matsui, S. (2007). *Seihanzaikara kodmowo mamoru Megan-hou no kanousei*. Tokyo, Japan: Chuokoron-shinsha.
- Oda, S. (1994) *Hito ha naze hanzai wo okasunoka?* Tokyo, Japan: Hamano shuppan.
- Sakuta, A. (2006). *Seihanzainoshinri Anaata wa seihanzai no jittai wo dokomade shitteirunoka?* Tokyo, Japan: Kawade Shobo Shinsha.
- Sasaki, M, & Sumida, Y. (2005). Nara girl's murder spotlights sex-crime recidivism. *The Asahi Shimbun*. Retrieved on October 23, 2011, from <http://www.asahi.com/english/nation/TKY200501050094.html>
- Shigematsu, S. (1999). Dimensions of desire: Sex, fantasy, and fetish in Japanese comics. In J. A. Lent (Ed.), *Themes and issues in Asian cartooning* (pp. 127-163). Bowling Green, OH: Bowling Green State University Popular Press.
- Shiokawa, K. (1999). Cute but deadly: Women and violence in Japanese comics. In J. A. Lent (Ed.), *Themes and issues in Asian cartooning* (pp. 93-125). Bowling Green, OH: Bowling Green State University Popular Press.
- Sinclair, J. (2006). *Pink box: Inside Japan's sex clubs*. New York, NY: Harry N. Abrams.

Taguchi, S., Taira, S., Ikeda M., & Kiryu M. (2010). *Seihanzai no koudou kagaku Hassei to soshi ni muketa gakusaiteki apurochi*. Tokyo, Japan: Kitaoji Shobo.

Ward, T., & Gannon, T. A. (2005). Rehabilitation, etiology, and self-regulation: The comprehensive good lives model of treatment for sexual offenders. *Aggressive and Violent Behavior, 11*, 77-94.

## **CUISINE AS A MARKER OF CULTURAL IDENTITY. A HERMENEUTIC LOOK AT “INDIAN CUISINE”, A SHORT STORY BY TRINIDADIAN-CANADIAN WRITER RAMABAI ESPINET**

*Mario Vicente Ricalo Borrero, Msc*

---

### **Abstract**

When it comes to cultural identity, cuisine is generally overlooked or relegated. Emphasis is rather made on history, religion or language (the so-called deep structure of a culture). Notwithstanding, one's vernacular cuisine outlives one's vernacular language in generations of immigrants. No matter how much it changes as compared to the original food of their homeland, immigrants and their descendants “keep cooking and eating some version of the family's ‘mother cuisine’”. Immigrants' cultural identity is embodied in what has been called “ethnic food”, which is in turn caused by several factors. The author of this paper examines cuisine as a marker of cultural identity and, for that purpose, he gives a hermeneutic look at the short story “Indian Cuisine”, by adhering to Daniel Chandler's typology of codes.

---

**Keywords:** Cultural identity, cuisine, deep structure, ethnic food

### **Introduction**

Senegalese anthropologist Cheik Anta Diop views history, language and psychology as the three pillars of a people or a person's identity. For Elicura Chihuailaf, language, the territory, history and one's way of being are the four fundamental pillars of identity. And when talking about the deep structure of a culture, Samovar and Porter (Communication Between Cultures, p. 82-135) go deep into aspects such as history, religion and family. It has been customary for scholars to leave cuisine aside when it comes to a people's cultural identity. Notwithstanding, cuisine is perhaps one of the most-resistant-to-change issues of cultural identity.

The definition given by Joseph Shaules seems to embrace, however, the concept of cuisine at least implicitly:

“Deep structure refers to the unconscious meanings, values, norms and hidden assumptions that allow us to interpret our experiences as we interact with people. These shared meanings form a framework that acts as a starting point for our sense of what it means to be human, what constitutes normal behavior, how to make moral/ ethic choices, and we generally see as reasonable. Deep culture generally functions out of awareness at the intuitive level, and we generally remain unaware of it until confronted with a need to interact with people who have different cultural assumptions” (Deep culture--- The Hidden Challenges of Global Living).

The relevance of cuisine can be perceived in the fact that,

“Eating is a daily reaffirmation of who you are. Generations after the loss of their mother tongues, ethnic Americans are still likely to be cooking and eating some version of the family's “mother cuisine”, even though it may be significantly changed from food in their homelands” (“Ethnic Cuisine”).

The Indian cuisine is as varied as India's linguistic situation, its ethnicity and its culture. The Indian cuisine has the trace of historical forays on the part of Aryans, Arabs, Persians, British and Portuguese. But at the same time, the Indian cuisine done by Indian

immigrants in countries other than their own has been pervaded by the cooking and eating habits of the local cultures.

In this paper, cuisine is examined as a marker of cultural identity and to that end a hermeneutic look is cast at the short story “Indian Cuisine” (by Trinidadian-Canadian writer Ramabai Espinet); the author has adhered to Daniel Chandler’s typology of codes.

## Development

According to Daniel Chandler’s typology, codes are divided into:

### 1. - Social codes:

a. - Verbal language (phonological, syntactical, lexical, prosodic and paralinguistic codes).

b. - Bodily codes (bodily contact, proximity, physical orientation, appearance, facial expression, gaze, head nods, gesture and posture).

c. - Behavioral codes (protocols, rituals, role-playing, games).

### 2. - Textual codes:

a.- Aesthetic codes ( poetry, drama, painting, sculpture, music and so on),including classicism, romanticism, realism; genre, rhetorical and stylistic codes, as well as plot, characters, action, dialogue, setting, exposition, argument, etc.

### 3. – Interpretative codes:

a. – Perceptual codes: Those of visual perception, for example.

b. - Ideological codes: Codes for encoding and decoding texts. Here he considers the ‘isms’, i.e., individualism, liberalism, feminism, racism, materialism, capitalism, progressivism, conservatism, socialism, objectivism, consumerism and populism.

For Chandler there is a direct correspondence between these three kinds of codes and another three kinds of knowledge that a reader of a text needs. In other words, a text reader necessitates knowledge of: (Semiotics for beginners)

. The world (social knowledge)

. The medium and the genre (textual knowledge)

. The relationship between the other two (modality judgments)

## “Indian Cuisine”.

The story begins with the narrator remembering the smell—the “gramarye”--- of a fruit cocktail that ever since she was a child has been present in her. The fruit cocktail memory came from one Christmas day that she spent in her cousins’ place and she got no Christmas presents. People were singing, drinking and playing “bottle-and-spoon music and a cuatro”, and the kids were given a bowl of fruit cocktail which they ate at 1 o’clock am. The narrator keeps thinking back that she returned home on Boxing Day and she had no gift, the other children were playing and all she found for her was a toothbrush stand with a Mickey Mouse head wrapped in used Christmas paper.

There was poverty all about the house, there was hunger, mainly when Father would lose as he was a heavy gambler. “Things were hard” and Mum got a job. And it was then when the narrator had to begin to do the cooking, so she had the chance to put into practice everything she learned while reading the Boston Cooking School Book.

Eventually, the narrator becomes a “designer of cuisine”, a hobby in which she was the most sought after one and where she brought into practical use all the “training (received) at the school of Indian Cuisine of La Plata”.

## Codes

### Textual

“Indian Cuisine” might be well called Privilege. There is a play with the word *privilege*, which appears several times along the text. “*A childhood of privilege*” is a comment

made at the outset by another character whom the narrator is reading her “therapeutic journal of things past”, and it is irony what this comment resembles the most if we consider the narrator’s childhood was one of poverty, hardships and hunger. The word *privilege* is used rhetorically for the second time. The narrator questions whether having that fruit cocktail on Christmas, away from Dad, Mum and siblings, was a privilege, and she answers she doesn’t know. Later on, she remembers a party where there were people from different backgrounds and everybody took a dish: there was *serre* from Belize, *pelau* from Trinidad and *privilege* from Barbados which was but a “dish made of cornmeal and pigeon peas and coconut milk cooked-down together”. And the narrator didn’t know why they called it *privilege*. Yet, she did know her genuine privilege was having plenty of books at home, and reading them: Dr Chase’s Almanac, Alistair Cooke (Mom’s cookbooks), her father’s pornography, the Reader’s Digest, The Diary of Anne Frank; and writers such as Zola, Marie Corelli, Lloyd C. Douglas, Pearl S. Buck, Sir Walter Scott, Dickens, Thoreau, Ruskin and Shakespeare.

*Privilege* re-appears when she talks about her full-time job as a home cook. Her mother “would go to work and I would have dinner cooked before she came home. Exactly like co-wives. But it wasn’t strange; it was just our life. It wasn’t *privilege*”.

And *privilege* splits the story into two stages:

“*Privilege* is the life I lead now. I can do anything I like in this city because I earn enough and am my own woman (...) Perhaps it’s just old fruit cocktail *privilege*.”

*Privilege* is also my hobby as a designer of cuisine”.

And the final line of the story is: “So *privilege* it really was, fruit cocktail and all”.

The story can be labeled within Realism. The descriptions of both characters and settings are plain, for example:

Biche is an agricultural village in east Trinidad and Tobago, first inhabited in 1874. Chi Yan was a Chinese immigrant whose family owned most of Biche. This location appears in the story, and Mr. Chinaleong—the shop keeper who gave Grandpa credit-- could represent in the story a member of the real Chi Yan family.

The description made of the house where the narrator had lived, in Biche, shows that place and those years were alive in her memory:

“The wooden house sprawled at the front of the land while behind it stretching up a hill on one side and down into a ravine at the back was land, with trees, a chicken-coop, a duck-pen, a pig-pen and tables from long ago. The avocado tree had low branches swooping to the ground where we rode horse, then there was the forest of ochro bushes where we played cowboy-and-Indian, and the bushes near where we played shop”.

And the image of La Plata, where the family moved, was also alive in her mind:

“It was different in the growing suburb of La Plata, just outside of San Fernando, where Da-Da had bought the small concrete house(...)Everyone on the street had a car and a refrigerator; we had neither-Yet. We borrowed ice from the neighbours (...)

In La Plata it was not Ok to carry a gallon of the pitch oil we used for cooking the long distance on foot from the Chinese shop to our house, while the pitch oil leaked against your legs and the gallon tin dug cruelly into the vulnerable area near the back of your knees. Everyone else had gas-stoves and had their gas delivered in huge cylinders (...)The day Papa brought home the sack of flour, Muddie made individual sada rotis on her tawa and crushed some garlic and fresh Spanish thyme into a little margarine”.

Both descriptions contain dishes which are an important part of the narrator’s daily eating and identity. The very narrator says “Ochroes were our salvation”. And the sada rotis is a very popular Indian dish that even though it is made on the tawa (a typically Indian implement) in the story, it was seasoned with Spanish thyme and margarine, two ingredients that might not be commonly used in India for that purpose.

As stated before, the characters are depicted in a plain way. For example, their speech is written in what would be considered sub-standard English:

“(...) if he don’t it drip here yuh bong to get it when yuh go back home” (Her cousin Bella).

“(...) leh mih get rid ah some small change” (Uncle Samuel).

“(...) Yuh eh find yuh too big for all a dat now?” (Her mother).

“If ah didn’t know yuh was a gambling peong I woulda guess by de way yuh handling dem bills.” (Mr Jones).

All of them speak sub-standard English, except the narrator.

### Social

Some dishes mentioned speak in favor of how important cornmeal was in their diet. The dialectal components of the parliaments above may be an indicator of the speaker’s schooling.

Finally, the music they were playing in Uncle Samuel’s place at Christmas is worthy of notice:

“At about midnight we heard loud singing and music from the kitchen, bottle-and-spoon music and a cuatro, and men’s voices carrying on”.

These Indian people, or Trinidadians descending from Indians, were very likely to be playing (according to the instruments used) Trinidadian music, either calypso o soca, not music from India.

### Interpretative

Examining the social codes has allowed this author make some inferences of the characters’ identity. Likewise, there are some clues that may make the reader think of Da-Da (the narrator’s father) as a male chauvinist, and of the narrator’s feminism. Nevertheless, what is all the more important for this author is the analysis of cuisine as a marker of identity. Cuisine is the focus of the narrator’s identity. She ends up by becoming a designer of cuisine, but of what kind of cuisine? Is she a designer of Indian cuisine? After all, Indian cuisine is the title of the story. How come the protagonist of the story turned into a designer of cuisine? By the end, she is asked where she was trained and she answers:

“Well, when I was twelve years old I went through periods of excruciating hunger. So I swallowed the biggest cookbook I could find”.

The client / acquaintance insisted.

“I answered with a straight face, ‘I received most of my training at the school of Indian Cuisine in La Plata. It was a real privilege to be trained there”.

But, as a matter of fact, she had not had a single source of learning, and her sources of learning did not have only one origin.

She became a much respected designer of cuisine, and her knowledge and skills were the upshot of several sources. First, she learned how to cook Indian dishes at home, within the family environment. But she also learned from the Boston Cooking School Book and from her mother’s West Indian cookbook. However, she did not learn to cook *kitchere* (an Indian dish) from any of these sources.

“It was Mousie from the country who came on a visit and told me how to do it. Muddie didn’t know too much about real Indian food and there were no cookbooks for that. I added shrimps to Mousie’s recipe and served it up with tomato *chokha* on the side”.

Typically West Indian dishes and Indian dishes are displayed along the story. The “*corn meal and pigeon peas and coconut milk all cooked down together*” (from Barbados), the *serre* (from Belize) and the *pelau* from Trinidad are present, besides the *toolum*, the *chilibibi* and the *callaloo*, and the *coo-coo* among others; and they were “all poor people’s Caribbean food”. From India, we can find the *kitchere*, the *sada rotis*, the *pakora*, the *bhaji*, the *chokha*, etc. And the menu for the party of a Jamaican actress of renown, a friend of the narrator’s,

which appears by the end of the story, is a reflection of the Indian cuisine that identifies the narrator and which turns her into a very sought after designer of cuisine.

### Conclusions

We could venture to wonder whether Ramabai Espinet is the implied author of the story Indian Cuisine. Does the narrator represent the real author of this story? After all, this stance serves well the task of giving a hermeneutic look at a fictional piece of writing.

If the deep structure of a culture has to do with people's family, religion and history; and if it is what Joseph Shaules says it is, cuisine might be considered part of the deep structure of a culture.

The title of the story suggests a connection or an attachment to the cuisine of a specific country, which in this case is a multi-cultural country. In the story, however, the main character undergoes an enculturation in terms of the cuisine she learns and that comes to be a marker of her cultural identity. The original "Indian cuisine" becomes connotative, acquires a broader dimension and encompasses the East Indian cuisine, the West Indian cuisine and probably beyond.

As said before, the story might well be called Privilege. The narrator seems to be proud, seems to be privileged to have received all those culturally identifying influences: she is an Indian and she is a West Indian. And this mixed identity of hers is her Privilege. As she says in the very end,

"So privilege it really was, fruit cocktail and all".

### Bibliography

Chandler, Daniel. Semiotics for beginners.

Cheik Anta Diop. "Los tres pilares de la identidad cultural". [unesdoc.unesco.org/images/0007/000747/074721so.pdf](http://unesdoc.unesco.org/images/0007/000747/074721so.pdf)

Chihuailaf, Elicura. "Los cuatro pilares fundamentales de la identidad". [oboista.lacocelera.net/.../los-cuatro-pilares-funda...](http://oboista.lacocelera.net/.../los-cuatro-pilares-funda...)

Espinet, Ramabai. "Indian Cuisine".

Ethnic cuisines". [www.answers.com](http://www.answers.com) > Library > Food & Cooking.

Samovar, Larry A. and Richard E. Porter. Communication between cultures, 5<sup>th</sup> Edition. Wadsworth / Thomas Learning. USA. 2004.

Shaules, Joseph. Deep Culture--- The Hidden Challenges of Global Living. [books.google.com](http://books.google.com) > ... > Sociology > General

# **FUTURE TRENDS ON THE SPOT IN INTERNATIONAL TOURISM - MODERN YOUTH EDUCATIONAL TOURISM**

*Diana Foris, PhD*  
*Cristina Nicolau, PhD*  
*Tiberiu Foris, PhD*

Transilvania University of Braşov, Romania

---

## **Abstract**

This paper is focused on the future trends in international tourism, being of outmost importance to underline that international tourism is emerging while developing new forms of tourism, as for example, youth educational tourism. Hence, there will find success those regions, resorts, businesses that rely themselves on the flexibility and creativity of their services provided, whereas using all the natural resources in an environmentally friendly way. Furthermore, this research shows that as an emerging form of tourism, youth educational tourism shall be re-designed so as to meet the needs of its beneficiaries, being a challenge for tourism providers who shall consider it as a great opportunity to start and develop new businesses and to undertake the challenges offered by the tourists' new visions in the hospitality industry. In this view, the marketing research on the consumers' needs had as general objective to identify the tendency on the Romanian market by analysing the youth's attitudes and behaviours towards educational camps.

---

**Keywords:** Youth, tourism, educational camp, marketing research

## **Introduction**

This paper presents a concept that, as much as being used in the educational field, rarely is to be met in the specialty literature in the field of tourism, both as international and European level, the concept of educational tourism. In this view, it appears as necessary to introduce and develop such a concept so as to describe the tourism services offered and designed to students of all ages and intended for their developing personally and educationally. In this respect, the paper is divided in two parts, the first being dedicated to the presentation of educational tourism, whereas the second is a piece of research intended to underline the opportunity offered by the development of this form of tourism.

## **Educational Tourism – Background for Business Development**

Nowadays, educational tourism seems to be a concept that should be developed in two different fields: education and tourism, both of them being both well-developed and important in the life of any human being. Therefore, it is the aim of this paper to introduce this concept and, according to us, it must comprehend the following:

- offering quality product and service packages
- offering product and service packages at prices accessible to customers
- product and service packages should combine tourism and educational elements
- product and service packages should be designed according to beneficiaries age groups and should address to all age groups

product and service packages should be strongly promoted both internally and externally and more precisely, they should face with the powerful competition outside the country that tries as much as possible to extend in Romania

Among the tourism activities offered to the youth, we shall mention the following:

touristic trips  
 visiting museums and tourism objectives  
 sport practicing using the rich infrastructure and certified personnel (ski, skating, biking)

Among the educational activities offered to the youth, we shall mention the following:

Workshops with different topics or practice of arts and crafts  
 Conferences on specific topics, at beneficiaries choice  
 Competitions to assess and develop personal and inter-personal skills  
 Movie and documentaries watching  
 Initiation courses in different arts and crafts

### **Business Entrepreneurial Strategies**

As regards the business entrepreneurship in the field of educational tourism, we have to underline the following:

Development strategies by designing and re-thinking products and services, by launching new products and services, by developing the old products and services so as to meet consumers' needs and to forecast the future trends in the field

Intensive growth strategies by entering the products and services on new distribution channels offered by the tourism agencies

In this respect, we shall underline the importance of the business forecasting and planning in the following constitutive parts of the business:

Marketing research: developing the business by implementing and designing products and services to highly meet customers' needs

Location strategy: the facilities of the business shall be located in attractive natural surroundings

Environment impact study: the business shall be eco-friendly and to emphasize the idea of environment protection

Infrastructure: there shall be an easy access to the educational camps as well as they shall offer reliable conditions customized for the targeted age groups of the population

Attractiveness degree: the educational camps shall be ranked according to the products and services offered, location, conditions offered and customers' satisfaction degree

### **Case Study of Education Tourism Development: Romania**

Before the '89 Revolution, educational tourism in Romania was based on the centralized educational system of a Communist type. Every county of the country offered several tourist destinations of similar capacity, which gathered together as number of places, could not meet the market demand (for students, this was the only way of travelling by themselves, not with their parents and one of the few opportunities of having fun). Thus, what we name today educational tourism was represented by camps in some distinct tourist destinations (rarely close to the towns or villages) located at the seaside or in the mountains, but which offered few educational activities and more tourism ones.

But after the '89 Revolution, these resorts have been little by little destroyed and left undeveloped, little or even no investment being made, the environment surrounding them being damaged due to excessive exploitation, bad infrastructure, cultural or economic situation so as the number of camps decreased and so did their importance in the view of possible consumers. Moreover, as Romania has changed in mentality and consumers changes in habits, there are other forms of tourism that have been developed, as for example abroad and family tourism.

In this respect, our general main hypothesis in this research is to identify whether youth educational tourism plays an important role in the contemporary modern field of tourism or not and to establish some strategies to be implemented by business actors and

public authorities, as well. Furthermore, it is our duty to state that such businesses shall be perceived as profitable ones, both in the public field as they seem to be in the private field (at the moment, no research has been conducted in Romania so as to identify the role and importance of private educational school camps).

### **Marketing Research – Identifying Customers' Needs of Educational Camps:**

This part of the paper is divided into three parts, the first one presenting the research purpose, objectives and methodology, the second one explaining how we conducted sampling and the research instrument whereas the third one consists of data collection and analysis. Hence, this piece of research represents a demand as it requires the characterization of the market of youth educational camps, more precisely aiming at identifying the youth's decision factors in choosing an educational camp. As previously presented, there had been remarked that the market of camps combining educational and tourism activities was emerging, so we had to identify the consumers' behaviours and attitudes towards the means to spend their holidays by themselves, without their parents, in a school camp especially designed by them.

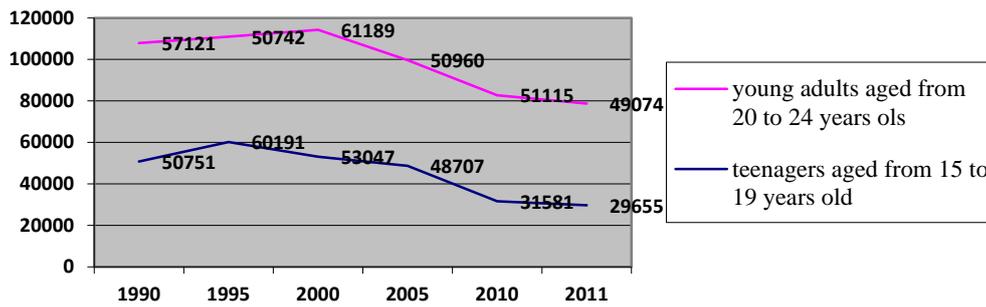
In this respect, our research general objective is to identify students' attitude towards educational camps, whereas our specific objectives are firstly to identify students' attitude towards sport activities and educational activities as main constitutive parts of the product offered, and secondly to highlight the sports that students would like practising and to identify their general education fields of interest.

Moreover, this research is of a descriptive type, our goal being to characterize a series of marketing data that shall proceed to the launching and commercialization of a touristic package of products and services by adapting the product to the marketing needs. From the point of view of the research orientation, it is an applicative research whereas from the point of view of the generated pieces of information, it is a quantitative research. In order to collect data, we used the exploratory enquiry to be applied to a sample representative for the population envisaged.

The questionnaire is based on the research purpose and objectives and it consists of 22 questions of different types and using different scales, the most complex questions being formulated in the middle of the questionnaire. The questionnaire starts with a multiple choice question introducing the topic and it assesses the respondents' preferences of activities practices during their holidays, then there is a filter-question that identifies respondents' travelling as a hobby and a question aimed at presenting whether respondents like travelling with families, friends or school-mates. Next, we address the topic by using a filter-question aimed at identifying our target population whereas the next 16 questions are centred around the topic being intended to discover respondents' attitudes and opinions with respect to past experiences in school camps, transportation means, accommodation, importance of tourist destination, ideal length of the school camp, activities and sports preferred to be practiced by respondents and the importance of such a product on the market. Last, but not least, there are two characterization questions represented by the variables gender and age group.

Furthermore, the researched population consists in this research of the youth, in general aged from 15 to 25 years (teenagers of 15-19 years old who attend to high schools and colleges and young adults of 20-24 years old who attend to universities), whereas our sample consisted of a total of 78,729 persons (registered in 2011, according to the website of the Statistics Office of Braşov County) of which 38% are people aged 15-19 years old and 62% are aged 20-24 years old, a decreasing population in number, as presented in Figure 1 below. We chose to undertake this research in the county of Braşov as this is one of the most frequented travel destination in Romania.

Figure 1. The evolution of the number of the young population in the county of Braşov, Romania, from 1990 to 2011 (Source <http://www.brasov.insse.ro/main.php?id=385> accessed on March 10, 2014)

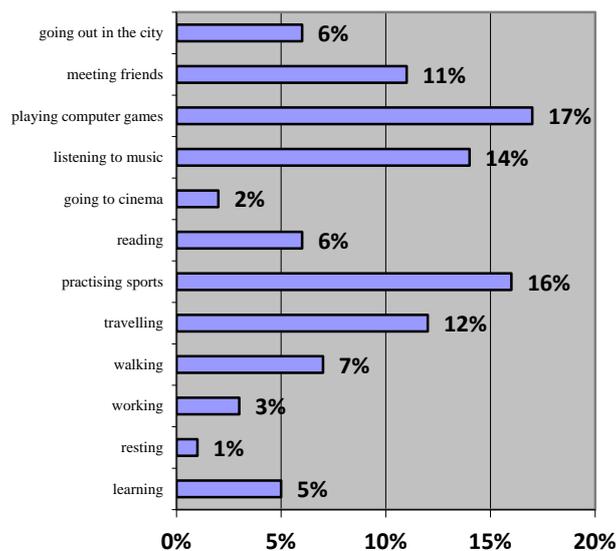


To the questionnaire, we received 321 answers, of which we identified our target sample (according to the two filter questions) of 292 respondents, of which 29% were offered by teenagers aged 15-19 years old and 71% by young adults aged 20-24 years old. In order to validate the sample, we established the measure in which the distribution of the characterization variable of the researched subjects (in this case, the two age groups) is similar to that of the population researched. As the percentages differ, we needed to re-establish our sample, by randomly taking out 26 questionnaires filled by teenagers and replacing them by other 52 newly filled in questionnaires and by taking out 26 questionnaires filled in by young adults aged 20-24 years old.

With respect to data collection, the questionnaire was applied in the last three months of 2013, whereas the answers to the questionnaire were analysed and interpreted at the beginning of 2014, the research hypothesis being represented by the fact whether there are differences between the two age groups as regards attitudes and preferences of their participation in educational camps.

Furthermore, the first data analysis presents the respondents' preferences of activities they like doing during the holiday. According to Figure 2 below, we underline that the most important activities identified were playing computer games (or more generally, using computer, in which respect there can be remarked a tendency of the parents so as want to reduce as time spent by their children), practising sports, listening to music, travelling and meeting friends.

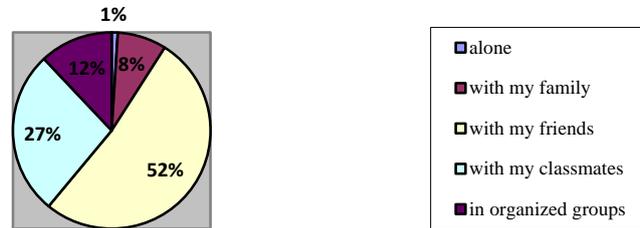
Figure 2. Respondents' habitual activities practised during the holiday



As regards the preferences to travel during the holiday, the respondents answered that 96% use to travel during their holiday, of which 60% are girls and 43% have ages from 14 to

19 years and 21% having ages of 20-25 years. In holidays, students like doing different activities, their answers to question number 3 of our questionnaire presenting that 52% like travelling with their friends, whereas 27% travel with their classmates, 12% in an organized group, 8% with their families (parents) and 1% by themselves, as shown in Figure 3 below:

Figure 3. Respondents' preferences of travelling

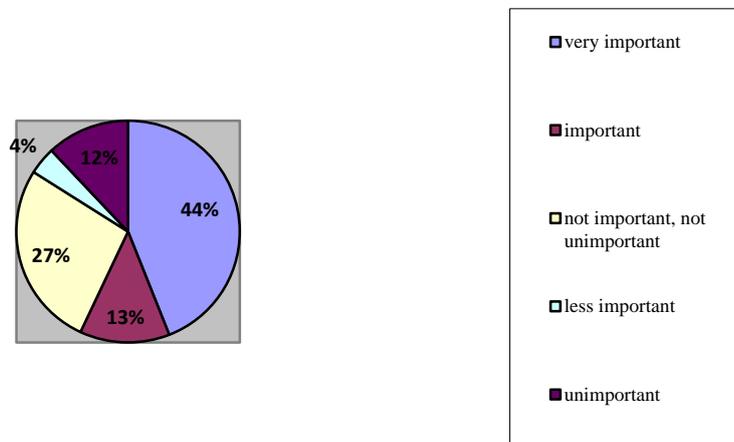


Furthermore, 32% of the respondents have been in a school camp before and of those 68% who have never been, 76% would like to go, their main reasons, according to their preferences, being having fun with their friends, brothers and sisters, practising sports and learning something new. The main reasons for which respondents have not been in a school camp are the lack of money, the past unpleasant experiences and that they have never thought about going as they have not been presented with such an opportunity.

With respect to past experiences, 43% of respondents answered that they have been pleasantly satisfied with their experiences in a school camp, the main reasons being the diversity and originality of natural and cultural resources, but we have to underline that there were not offered too many sports and educational activities, so we can conclude that this market of educational camps is a niche market to be explored by entrepreneurs and we forecast its high development in the near future.

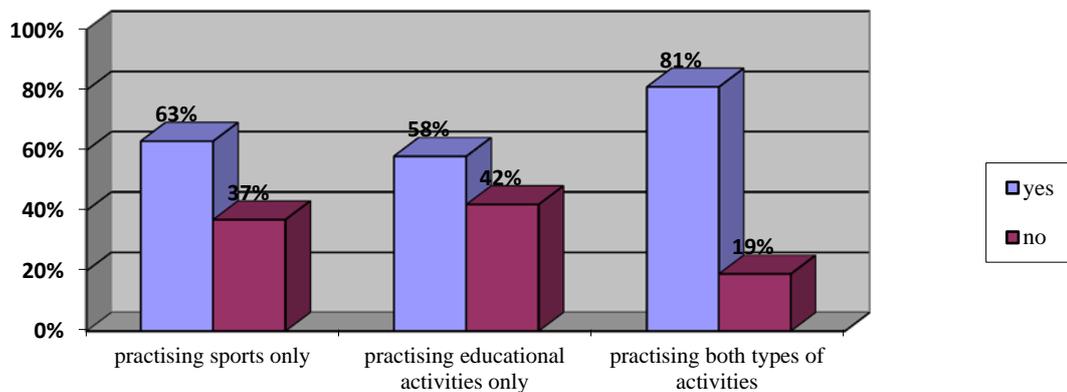
The importance of the tourism destination (as stated in Figure 4 below) is high for 44% of the respondents, whereas 27% consider that the destination is not so important, more important being the accommodation conditions and the activities offered. So, students are willing to go in a school camp with a specific educational theme and their native country (Romania, more precisely the mountainous resorts) is their main choice when thinking about the destination, stating that this country offers many locations worth visiting at affordable prices by their parents and by themselves (in the case of academic students who start working during their studies). The medium length of the school camp should be of 6-8 days whereas the most preferred accommodation units are pensions and tents.

Figure 4. Respondents' attitude regarding the importance of tourism destination



Thus, we can underline the importance of educational camps within modern tourism, and according to our research, we conclude that 81% of the respondents would like to participate in an educational camp in Romania (according to Figure 5 below), so the service product offered to people aged from 15 to 25 years shall be more complex than those offered to them nowadays. In the research, an important role is played by extreme sports (alpinism, hiking, river-drafting, bungee-jumping, snowboarding, parachuting, skiing) whereas among educational activities, arts and crafts play the most important role.

Figure 5. Respondents' attitude towards their choice of camps offering sports and educational activities



## Conclusion

In this paper, we analysed educational tourism from the point of view of a new trend on the tourism market, concept to consist of both tourism and educational activities aimed especially at the young population (ages 15-24 years). In order to present such a modern concept (as opposite to the old concept represented by school camps) we have to highlight that this concept is highly influenced by globalization (the tendency of forming international educational camps networks available to consumers from all around the world) and by the changes in consumers' attitudes and needs. Thus, educational tourism is forecast to register an ascendant development path.

According to the research undertaken in this paper, we must underline the need of such services, but at a developed level meeting the consumers' needs. We found out that the youth prefer spending their time in adventurous places connected to the new technology as well as endowed with the necessary infrastructure so as they to practise a different range of sports and educational activities. By simply analysing the Romanian market of such services, the most sold packages of educational camps are those centred on using a foreign language during the period of the camp. But, in time, this market needs development as the number of European young people is important in the total number of its population, more precisely as it is our duty to educate tourists from early ages.

In this respect, our future research in this field and topic shall comprehend the design and commercialization of such a specific product, an educational camp, stating its strengths and weaknesses during its launching and growth from the point of view of the business developer and entrepreneur in this field. For such a reason, the business entrepreneurial strategies herein presented are to be put into practice by using the opportunities offered by the emerging market.

Another future development of the topic shall be offered by us when doing research on youth educational camps by comparing and contrasting the tendencies and markets offered by other countries so as to develop a national strategy for Romanian youth educational tourism.

## References:

Bratucu, Gabriel and Foris, Tiberiu et al.: Marketing in turism (Marketing in Tourism), Sibiu: Psihimedia Publishing House, 2002

- Bywater, M.: The Youth and student Travel Market in EIU Travel and Tourism Analysis 3, 1993
- Constantin, Cristinel: Introducere în cercetarea de marketing (Introduction to Marketing Research), Braşov: Editura Universitară Publishing, 2013
- Hartmann, J. et al.: Future Forecasts: Youth Tourism in Sociologia Urbana e Rurale 38, 1992
- Lefter, Constantin: Cercetări de marketing (Marketing Research), Braşov: Infomarket Publishing House, 2004
- Reisinger, Y. and F. Mavondo: determinants of Youth Travel Markets' perceptions of Tourism Destinations in Tourism Analysis 7(1), 2002
- \*\*\* <http://www.brasov.insse.ro>

# **DISTORTION OF COLOR IMAGES ON FLAT COMPUTER SCREEN DUE TO CHROMOSTEREOPSIS**

*Maris Ozolinsh*  
*Kristine Muizniece*  
*Gunta Krumina*

University of Latvia, Kengaraga Str., Riga, Latvia

---

## **Abstract**

Illusory depth sense observing colour planar image such as images presented on computer screen is studied. The effect is binocular and is based on human stereovision, i.e., stereopsis. The colour difference threshold needed to induce the depth sense is determined. The effect polarity reversal – the source image red plane in front of blue plane is observed by partial covering of eye pupils medially or laterally. It is explain by the changes of eye point spread function taking into account coloured ray source and longitudinal chromatic eye aberrations. Image lightness affects the inducing of colour stereopsis due to changes of eye pupil size. Illusory depth sense is essential when designing colour graphical output on computer screen.

---

**Keywords:** Eye, chromatic aberrations, Stiles-Crowford effect, stereovision, binocular disparity, chromostereopsis, design of digital information for colour displays

## **Introduction**

Ability of human vision is amazing in spite the fact that optics of human eye is distinctly non-perfect. Human brain due to prolonged experience during extended evolution process has been adapted to non-ideality of his visual system. Various neural pathways of visual inputs correct our visual perception and do that in the most economic manner. During last decades when life changed relatively suddenly conditions and habits, many problems appear to visual perception. This is partly due to the fact that nowadays persons spend long hours looking at colourful however flat visual stimulus. That makes some specific demands to consider that previously were not at foreground. That concerns also the demonstration and seeing by human eyes of the coloured stimulus on different display devices.

Eye optical structures posses the quality heterogeneities and non-perfection of eye geometry, and heterogeneity of the optical index at different wavelengths. Therefore eye segments posses aberrations, which are described as monochromatic and chromatic, as well as transversal and longitudinal (Gross et al., 2008). Presence of chromatic aberrations are resulting in a person perception of a colourful flat surface as an image, consisting of several layers, each of these layers is characterized by the inherent light wavelength or colour (Siegel et al., 1999; Hong et al., 2011). Such effect is readily observed (it manifests more clearly at night when the pupil diameter is increased) – looking at the map suddenly it seems that the blue river or black highway is "flying" somewhere in air, instead located at the paper plane.

This phenomenon has been known before as (induced) colour stereovision or chromostereopsis (Ye et al., 1992; Thompson et al.,1993). Humans posses the ability to perceive the depth of stimulus both to their experience of image content analysis (cues on stimulus element size or their placement basis) or on the basis of neural processing of left and right eyes input – ability to merge the both eyes slightly different retinal images due to image stereo disparity. Merging of binocular retinal images is described elsewhere for disparities originated from different kind of sources – planar or 3D sources, random dot or continuous,

black-white or colour (Howard and Rogers, 2012; Julesz, 1981; Simmons et al., 2002; Ozolinsh et al., 2012). If the source is flat, then the stereo disparity can be created either purposefully showing to both eyes slightly varying images (these images can be separated optically by special devices – i.e., anaglyphs, or by the stereogoggles watching movies demonstrated by special stereoprojectors); or a disparity of retinal images arises due to both eye optical structure inadequacies. Latter perception gaps lying on basis of chromostereopsis can be categorized by the above-mentioned types of aberrations.

In recent times the presence of induced stereopsis is observed in cases where a person actually spends a large percentage of working time at the computer, so the studies of this phenomenon obtain actuality in this aspect (Hayashi et al., 2012). The most commonly induced colour stereovision can be observed if the stimulus contains elements of discrete spatial divisions, and contains the colours of the spectrum far from each other – i.e., blue lettering on a red background. The special features of this visual effect should not be ignored by the persons who deal with visual information design and output to the computer screen (Vos, 2008; Chen et al., 2012). In this moment publications touching the concerned problem analyze the phenomenon on the base of the chromatic aberrations that can be both transversal and longitudinal ones (Kitaoka et al., 2006; Westheimer, 2008, 2013). Longitudinal means that different colour rays are focused in eye in different planes. This phenomenon is also present for rays, which direction coincides with the visual axis of both eyes – rays are aligned with the line of sight.

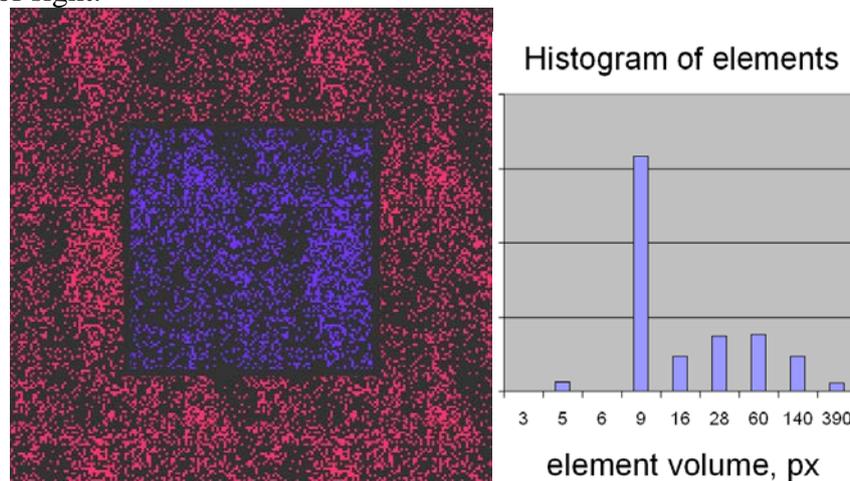


Figure 1. Stimulus presented on planar LED display. Central part 300x300 px, viewing area 600x600 px. Histogram of the coloured element size distribution is shown at the left.

In the case of the lateral aberrations the parallel rays of different wavelengths focus at neighbouring positions of retina. The lateral shift of focus depends on the dispersion of eye optical indices and on the angle between incident rays and the eyesight. These chromatic aberrations are observable for oblique incidence.

Both these phenomena result in different projection of two selected source image points on retinal plane. It can be bilateral effect – then on the left and right eye retinal planes. Mentioned in literature mechanisms of this induced effect – illusory focusing of flat source in various retinal planes depending on radiation wavelength, all are discussing chromostereopsis either for rays of oblique incidence, or for the case of rays coincided with direction of eye sight, however passing the eye pupil which is partially shielded. Here the Stile-Crowford effect – the different eye sensitivity of rays passing the lens central part and those passing lens peripheral zones can be taken into account by analysis of binocular disparity of illusory stereopsis (Ye et al., 1992).

## Experimental

The aim of the present paper was: a) to study the binocular perception of colour images and generation of illusory effect of chromostereopsis; b) to find the effect peculiarities due to partial covering of the eye pupils; and – c) to evaluate the threshold of the minimum colour difference necessary to induce chromostereopsis. The image presented to subjects in our studies was the computer generated random dots on black background stimulus. The central part of stimulus was formed as a square of primary colour which size was 300x300px. Surround of this part comprises 600x600px area and was designed of dot structure of another secondary colour. So the minimum elementary point dot was 3x3 px, and the histogram of size distribution is shown in Figure 1. The average filling ratio of coloured pixels  $r \approx 0.26$  and the average spot area  $\approx 32$ .

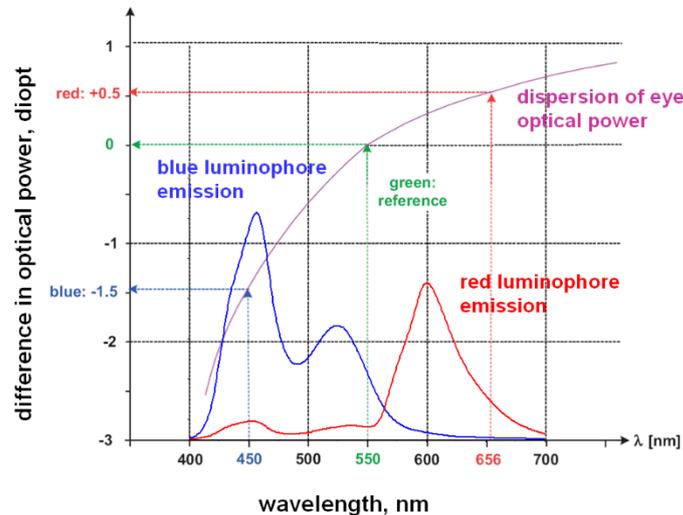


Figure 2. Used in experiments LED screen blue and red pixel emission spectra together with eye refractive power change with emission wavelength (latter data from (Gross et al., 2008)).

Such stimuli were presented in trials where the stimuli primary and secondary colour pair difference varied randomly. Test image colours were created using red and blue luminophore emission from DELL U2412M display with pixel pitch was 0.27 mm. We used series of trials up to 30 presentations for each colour difference pairs. The multichoice task paradigm was used to evaluate the psychophysical testing. The observers' task was to respond to "Is the Center part closer?", and positive responses were counted as "1" and summated. The psychometric curves  $R(\#N)$  were fit to sigmoidal function (where the trial sample set number  $\#N$  was used as ordinate) and the slope parameter  $\sigma$  was used to define the effect threshold.

The trial image set colour pairs were measured and their colours (Fig.2) were drawn in the  $CIE\ xyY$  diagram. The threshold value  $N_{Th}$  was recalculated to find the threshold of colour difference  $\Delta\lambda_{Th}$  (the projections of sample  $\#N$  central and surround colour coordinates in direction to colour gamut borders from initiating point – O point in  $CIE\ xyY$  diagram).

In "regular" viewing conditions eye pupils had no any shielding and the distance to display was 0.8 m. Thus display 1px comprised the angle around visual limit -  $1'$ . In order to diversify experiment conditions we used also partial bilateral covering of eye pupils that can lead to additional kind of retinal stereodisparity. Experiments were carried out in semidarkness. Participants were young students with the stable non-interchanging effect polarity, and an elder presbyope patient using corresponding optical power goggles.

## Results and discussion

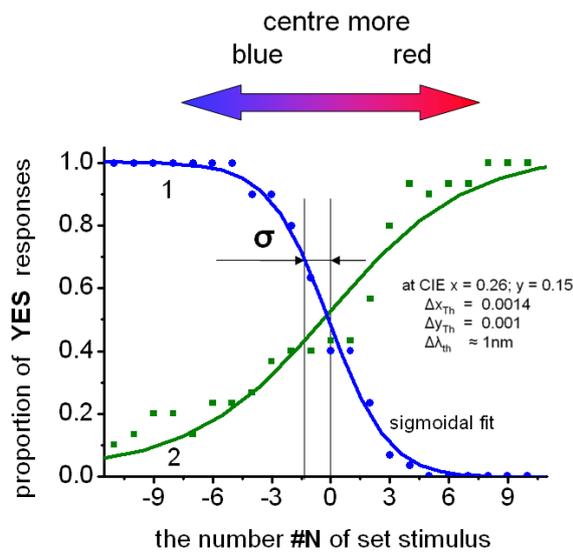


Figure 3. Psychometric curves to determine the threshold of colour difference to detect the induced colour stereoeffect. Curve for viewing with uncovered pupils (1), curve for viewing with lateral shielding (3) that shows the effect “polarity” switching. Data in insert correspond to viewing with uncovered pupils.

We observed the depth sense viewing planar coloured images and proved the binocular nature of this phenomenon. Monocular viewing did not reveal any 3D perception. Binocular stereovision, i.e., stereopsis is detectable if colour difference in trial stimulus is sufficient and if the image texture is optimum.

Perceived stereopsis depends on accommodation habits viewing such composite image, on the geometry of pupil – on pupil distraction degree and the aperture shape. Figure 3 shows the psychometric curve of the results viewing trial set similar to that in Fig.1. Arrows at the top of figure show the direction of corresponding colour increase in the central part of image. Steps of used image colour-pairs are sufficient to obtain sigmoidal fit and to calculate the colour difference threshold.

Patients were asked to respect only their depth sense, ignoring the cues arising from their colour sensation; however one can not completely exclude this argument when interpreting the results. The stereopsis induced in such manner – at “regular” viewing conditions should be explained by transversal chromatic aberrations of oblique rays in eye.

In the case when the eye pupils have not the circular symmetry the chromatic eye lateral aberrations can play the significant role. Figure 3 shows also the psychometric curve of perceived depth if pupils are symmetrically shielded. The effect is binocular. Medial or lateral covering of pupils distinctly switched the “polarity” of the induced depth sense – perceived blue image plane in front of red image plane and vice versa. As the right and left eyes have the mirror symmetry of retinal illumination, also the non-oblique rays due to their lateral aberrations can give contribution to induced stereodisparity.

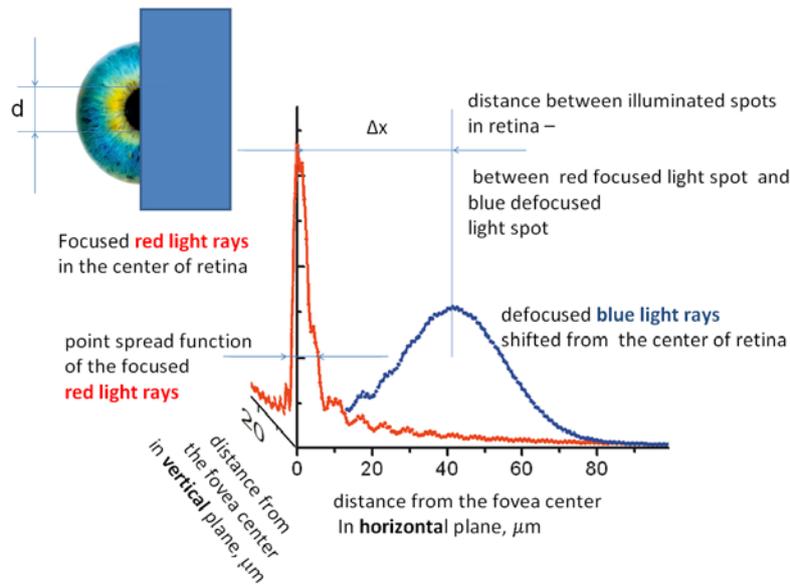


Figure 4. Retinal illumination at eye horizontal and vertical plane from a single display R+B pixel calculated from PSF function and its defocusing for blue emission. Calculations are done for half of pupil covered. Insert shows covering of eye pupils.

To explain the formation of the colour stereodisparity we performed Fourier transformation of the eye pupil of covered eye and calculated the retinal illumination. In Figure 4 the determined point spread function of half-covered eye at focus point for display red emission and defocused illumination for blue emission (the optical power colour shift of eye  $\Delta P \approx 1.3$  according to Fig.2) are shown.

Induced depth sense if eyes are partially shielded is distinctly switchable. However the experimental points of the perceived depth psychophysical curve have larger dispersion, at first, and the colour difference threshold of depth sense is at least doubled, secondly. Such variance can be explained perhaps by decreasing of pupil area and retinal illumination.

## Summary

Chromostereopsis is an optically illusory effect which causes the distortion of retinal images of flat colour sources. Chromostereopsis caused distortion depends on image elements symmetry and viewing angle, on element colour and on ambient luminance or the retinal illumination. Chromostereopsis can be characterized by the colour difference threshold  $\Delta\lambda_{Th}$  of image elements that can induce the depth sense –  $\Delta\lambda_{Th} \approx 1\text{nm}$ . Such values of threshold are for red-blue computer display radiation determined at the difference equilibrium point CIE  $x = 0.26$ ;  $y = 0.15$  at stimuli averaged luminance  $Y = 3.9\text{ cd/m}^2$ . These values are determined at viewing condition in lack of any eye pupil shielding obstacles. Symmetrical bilateral screening of both eye pupils allows the reverse switch of the illusory effect – from blue-in-front-to-red to the reverse one. Shielding of pupil can significantly alter both the induced stereopsis depth and the perceived depth image colour difference threshold. Also by shielding of pupil it is easy to operate the depth sense polarity.

Drawn conclusions are important when evaluating the induced stereopsis effects on images produced on planar screen when digital chromatic output consists of saturated short and long wavelength colours. Using of colours with large wavelength span can cause essential distortion of visual information.

Research was supported by Latvian Science Council. Author G. K. has been supported by project ESF-013/0021/1DP/1.1.1.2.0/13/APIA/VIAA/001.

**References:**

- Chen, Z., Shi, J., Tai, Y., and Yun, L. (2012). Stereoscopic depth perception varies with hues. *Optical Engineering* **51**, N9, p.1-6.
- Gross, H., Blechinger, F., and Achtner, B. (2008). Human eye. Ch.36. *In: Handbook of Optical Systems: Vol. 4. Survey of Optical Instruments*, Gross, H. (Ed.), WILEY-VCH Verlag GmbH & Co., Weinheim, 1092p.
- Hayashi, T., Kawai, Y., and Sakata, Y. (2012). Individual differences in chromostereopsis under natural viewing conditions. *i- perception* **3**, N9, p.617.
- Hong, J.Y., Lee, H.Y., Park, D.S., and Kim, C.Y. (2011). Depth perception enhancement based on chromostereopsis. *Proc. SPIE. Human Vision and Electronic Imaging XVI* **7865**, 786513; doi:10.1117/12.872290.
- Howard, I. P. and Rogers, B. J. (2012). Perceiving in depth. Volume 2. Stereoscopic vision. Oxford: Oxford University Press. ISBN 0199764158.
- Julesz, B. (1981). Textons, the elements of texture perception, and their interactions. *Nature* **290**, N5802, p.91-97.
- Kitaoka, A., Kuriki, I., and Ashida, H. (2006). The Center-of-gravity model of chromostereopsis. *Ritsumeikan Journal of Human Sciences* **27**, N11, p.59-64.
- Ozolinsh, M., Martín, I., Lauva, D., and Karitans, V. (2012). Howard-Dolman stereo-vision test at different opponent colour stimuli. *J. Modern Optics* **58**, N19-20, p.1749-1754.
- Siegel, M., Tobinaga, Y., and Akiya, T. (1999). Kinder Gentler Stereo. *Proc. SPIE. Stereoscopic Displays and Virtual Reality Systems VI* **3639**, p.18-27.
- Simmons, D.R. and Kingdom, F.A. (2002). Interactions between chromatic- and luminance-contrast-sensitive stereopsis mechanisms. *Vision Research* **42**, p.1535-1545.
- Thompson, P., May, K., and Stone, R. (1993). Chromostereopsis: a multicomponent depth effect? *Displays* **14**, N4, p.227-233.
- Vos, J.J. (2008). Depth in colour, a history of a chapter in physiologie optique amusante. *Clinical and Experimental Optometry* **91**, N2, p.139-147.
- Ye, M., Bradley, A., Thibos, L.N., and Zhang, X. (1992). The effect of pupil size on chromostereopsis and chromatic diplopia: interaction between the Stiles-Crawford effect and chromatic aberrations. *Vision Research* **32**, N11, p.2121-2128.
- Westheimer, G. (2008). Illusions in the spatial sense of the eye: Geometrical–optical illusions and the neural representation of space. *Vision Research* **48**, N20, p.2128–2142.
- Westheimer, G. (2013). Clinical evaluation of stereopsis. *Vision Research* **90**, p.38-42.

# HOW TO BRIDGE THE GAP BETWEEN THE RESULTS OF PSYCHOLOGICAL RESEARCH AND THE REALITY OF EVERYDAY CLASSROOM LEARNING

*Iveta Kovalčíková, Associate Prof., PhD*  
University of Prešov, Slovak Republic

---

## Abstract

The article discusses a systematic research approach to the transformation of the educational system in the midst of curricular reform in Slovakia. During this period of curricular reform in Slovakia, experts consider what the features of an ideal school system and the goals of their reforming efforts should be. This article argues that: reforming tendencies should not ignore the results of the latest neuropsychological and cognitive-psychological research into learning and refers to the growing divide between the results of neurological and psychological research and their application within the classroom. The author describes an example of interdisciplinary research involving expertise in four different academic fields aimed at restructuring the curriculum for teacher trainees. The main goals of the research are: to analyze the principles of cognitive education; to create preconditions for its legal implementation into practice; to justify the position of cognitive education as a key principle of education; to create a supportive environment for its development starting with a paradigmatic change of teacher training. Both on the level of basic and of applied research, the research team aims to contribute to the understanding of what is meant by the ability to learn and to identify part of the spectrum of processes which make up this ability. The ability to learn will be examined from the point of view of the cognitivist paradigm, with focus on executive functions and their involvement in the learning processes. The results of this study will then lead to creation of a series of tasks aimed at stimulating and developing those executive functions of the pupils which are identified as being critical in the process of learning curricular contents. This stimulus programme for development of a pupil's executive functions will cover the key curricular subjects in primary education of Mathematics and the pupil's mother tongue.

---

**Keywords:** Curricular reform, cognitive education, executive functions

## Introduction

The article discusses a conceptual and systematic research approach to the transformation of educational system in the midst of curricular reform in Slovakia. The Slovak school system, following the regional traditions of Central and Eastern Europe by having a highly centralized system with a normative curriculum, is currently in the stage of developing more effective educational approaches. Education reform is a process of progressive changes with an impact on the most general levels as well as on single school classes and is not a one-off time-isolated event. Within a reform, it is not only the conceptual outline that is important. Educational reform involves a process of gradual changes ranging from the most general to those on an individual classroom level, changes which are not merely one-off events. In creating a compact and cohesive system of education, it is necessary that the experts charged with this task can support their arguments for such a programme:

- with a theoretical and philosophical outline of its most general aims
- educational ideals relating to key social values
- specific description of its practice in the classroom.

During this period of curricular reform in Slovakia, we consider the questions: *what are the features of an ideal school system today? How should we define the goals of our reforming efforts?* Our thoughts are determined by the fact that in the last few decades, on the basis of new research results in behavioural sciences, neuropsychology, research into artificial intelligence and Information Processing Theories, the behaviourist perspective on learning processes has been shown to be untenable. The relatively newly emerging cognitive paradigm dared to study exactly those aspects of learning that couldn't be looked upon by behaviourists. In the last decade, however, many authors (such as Tokuhama – Espinoza, 2012) have pointed to the growing divide between the results of neurological and psychological research and their application within the classroom. It is often argued that current educational practice fails to reflect the results of the latest research into the brain and into learning processes. The reason is simple: explaining the results of complex neurological and psychological research so that it can then be used in everyday classroom conditions is extremely difficult. The connection between these results and classroom practice, however, is very limited and the dichotomy between those who produce neurological and psychological research findings and those who should be applying them within the teaching process continues to grow. Which leads to the question: who should be the mediator or transmitter in this process?

### **Cognitive pedagogics – the borderline between neuropsychology, cognitive psychology and pedagogy**

Let us now consider the role of cognitive pedagogics and whether it can serve as a border area between neuropsychology, cognitive psychology and pedagogy. What are the possibilities of tying neurological and psychological research projects in with their educational application? We would justify the need to integrate cognitive pedagogics into the teacher's professional profile accordingly: one of the reasons for the absence of a systematic approach towards the study of cognitive aspects of education in the teacher-training process as a possible basis for school reform<sup>378</sup> can be the insufficient professional framework within which such preparation could be carried out. The volume of general psychological and pedagogical disciplines in the curriculum of teacher trainees leaves little space for the application of cognitive approaches. In our country, specialist didactics<sup>379</sup> concentrates on the processes of harmonizing the curriculum of a specific subject with the methodical potential for its transmission in educational practice. We contend that the systematic and end-focused development of cognitive and metacognitive processes in education requires: 1. an interdisciplinary approach to the problem; and 2. a content framework which provides teacher trainees with space in which to gain the competencies for the systematic process of developing a pupil's cognitive processes. Can cognitive pedagogics integrating the latest neuropsychological and cognitive research be a platform for the systematic preparation of a teacher to diagnose and stimulate the thinking of their pupils? In a special issue of the Journal of Cognitive Education and Psychology, R. Sternberg (2013) formulates questions which now face the academic public and which need to be addressed in the upcoming period: *What is cognitive education? How should it be undertaken? And how not? How should the effects of cognitive education be measured? What examples of successful programs/conceptions of cognitive education exist? What recommendations do we have (addressing the community of psychologists, author's note) for cognitive education?* (Sternberg, 2013, p. 4). Sternberg urges experts to reflect on the need to define an area which could transmit learning research into

<sup>378</sup> We are thinking here primarily about Slovakia, however the situation is similar in all countries where educational principles are based on the traditions of the normative pedagogy, of an input-based curriculum with emphasis on acquiring encyclopaedic knowledge.

<sup>379</sup> The didactics of subjects in the primary school curriculum, for instance the didactics of mathematics and the mother tongue.

classroom practice, i.e. to form cognitive pedagogy, the subject of which would be systematic, contextual and procedural definition of cognitive education.

Cognitive education is not a new term in either pedagogical or psychological discourse and was first coined in the 1970s (Arbitman- Smith – Haywood, 1980; Haywood, 1977). Dynamic development of this model was encouraged by numerous psychology research projects documenting higher performance levels in children resulting from intervention or the stimulation of cognitive functions (see, for instance, Feuerstein et al., 2008; Feuerstein, 1970; Paour & Soavi, 1992; Tzuriel, 2001; Kozulin, 1999; Vygotsky, 1978). The need for cognitive education is clear from evidence demonstrating the plasticity of neural structures mediating cognitive processes (see Drubach, 2000; Doige, 2007; Howard-Jones, 2010; Sousa, 2001; Kolb, 2000; Kulišřák, 2003). We have stated that the flexible transfer of cognitive science research results to educational practice can be seen as being insufficient. In literature, however, we find the following conceptual definitions both of cognitive education and of cognitive approaches to education: 1. cognitive education is the deliberate and systematic development of the plasticity of functioning and operations using with both mature and not yet fully mature cognitive structures; 2. it is the systematic modification of thinking under the influence of direct or mediated perception and awareness of surrounding impulses; 3. cognitive education teaches a strategic and purposeful approach to acquiring, evaluating and applying knowledge using such methods as regulation of thinking, focusing attention, the ability to plan and problem solving. In other words, this is learning focused on a process not merely based on acquisition of knowledge but one also focusing on the means of this acquisition. Teaching involves the controlled and conscious activation of cognitive functions. According to Lebeer (2006) cognitive functions are not just a product of the physiological maturing of the brain but – as recent neuropsychological research and theories about the plasticity of the brain and possible structural cognitive change show – also a product of mediated learning. *“The duration, intensity and diversity of experience will have a marked influence on the plasticity (of the brain); a child should have enough opportunities to try new and stimulating activities... and the experience of mediated learning”* (Lebeer, 2006, p. 56).

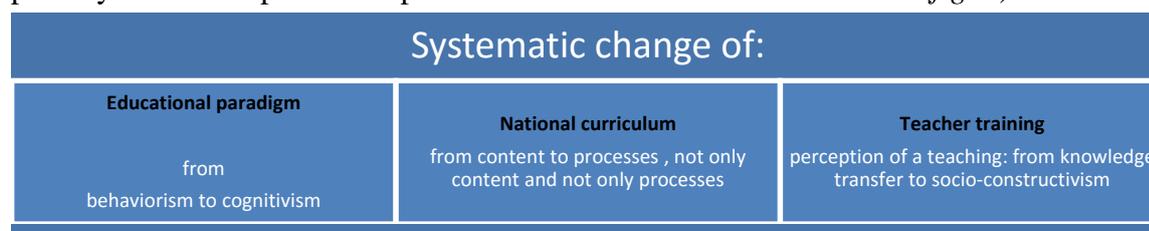
In specialist literature, cognitive education is defined as an educational model based on the study of cognitive sciences (psychology, neurosciences, linguistics, philosophy of the mind and information technology). The primary goal of cognitive education is development of such cognitive functions in the pupil as perception, elaboration and application of information for the purpose of increasing the effectiveness of learning (Sawyer, 2006; Glaser, 1988). Cognitive functions are also essential for mental functioning outside of school education and constitute the ability to think, plan, monitor complex mental activities, regulate emotions, creativity or the ability to gauge the importance of social interaction (Ashman – Conway, 1997). An educational output in the area of cognitive education is therefore not the acquisition of curricular contents but the internalization of higher forms of thinking and metacognitive strategies, as well as the improvement of elementary cognitive functions involved in more complex cognitive processes (Haywood, 2004). The theory of cognitive education is infused with a wide-ranging research base of cognitive sciences looking at aspects of learning abilities, attention, perception, memory, thinking, languages and planning, as well as at affective and cultural aspects. At present (at both the institutional and national level in various countries), a number of cognitive education operational processes are being implemented (Lebeer et al., 2011). Despite clear definitions of what cognitive pedagogy and education are, however, school practice struggles with questions such as: *How should and how shouldn't cognitive education be realized?*

**Conditions for the introduction of an educational paradigm in schools or: Why a cognitive education paradigm can provide a framework for curricular reform**

The term ‘educational paradigm’ is used as a system of complementary opinions, knowledge and research findings for interpreting key system-forming elements and aspects of education. In other words, an educational paradigm is a theory of education which is usually determined by a philosophical outlook, a set of opinions defining and describing: 1. the aims, objectives and ideals which the educational process is designed to fulfil; 2. the content, i.e. concretization of the goal – demands placed on the pupil; 3. the methods and approaches used to achieve the aim; 4. the organisational forms within which these methods are used; 5. the means (teaching aids) which help to make the teaching and learning process more effective; 6. the relations and status of the people involved in the educational process – teacher and pupil. Any paradigmatic change – and its success – is dependent on change to all the system-forming elements. If we reflect on how to bring cognitive education and neuro-scientific and psychological research to the classroom, the only possible way is to think systemically and ask such questions as: 1. How are cognitive approaches manifested in terms of formulation of educational and didactic goals? 2. How will they be reflected in the curricular content? 3. What are the implications for teaching methods and forms? 4. How should these changes be reflected in the preparation of teachers and what demands are placed on them? 5. What is the ideal student at the end of the cognitive education process like? 6. How are standards for his/her evaluation defined? And perhaps the most important question of all is: should cognitive education mainly be for specific groups of the population (the very gifted, the challenged...) or is the standard population its main target group?

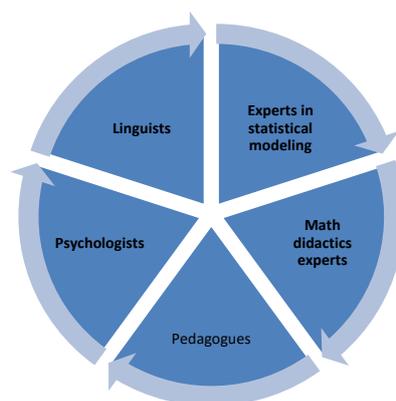
### The three-in-one approach to cognitive education research

The essence and purpose of restructuring the teacher-training curriculum in Slovakia is the effort to integrate cognitive pedagogy and education processes into the systematic institutionalization of teaching practice. Such integration is perceived as changing the traditional teaching process in a typical school so that the teaching is not just orientated towards factual knowledge, but also (and not just on a declarative level) towards procedural knowledge. Cognitive education concentrates on the systematic activation of the pupil’s cognitive functions. We assume that the process of restructuring the teacher-training curriculum will be supported by consequent changes being made to classroom practice in primary schools as part of the process of curricular reform in Slovakia (*fig. 1*).



In the next part we present an example of interdisciplinary research using expertise in four academic fields with the purpose of restructuring the teacher-training curriculum. Since 2012, this research project has been supported by the Agency for the Promotion of Research and Development at the Slovak Ministry of Education<sup>380</sup> (APVV MŠ SR). The research is orientated towards the diagnostics and stimulation of the executive functions of primary school pupils (ISCED 1) and the research team is made up of 14 experts from two Slovak universities. The specialists are as follows: psychologists, experts in statistical modelling, pedagogues, maths didactics experts and linguists (*fig. 2*):

<sup>380</sup> This work was supported by the Slovak Research and Development Agency under the contract No. APVV-0281-11: *Executive functions as a structural component of ability to learn: diagnostics and stimulation, project leader Iveta Kovalčíková, University of Prešov, Slovak Republic*



The main aims of this interdisciplinary research are: *to analyze the principles of cognitive education; to create preconditions for its legal implementation into practice; to justify the position of cognitive education as a key principle of education; to create a supportive environment for its development starting with a paradigmatic change of teacher training.* Research processes aimed at justifying the need for a shift from a traditional input-based curriculum to cognitive-oriented educational paradigm are characterized by the following: 1. basic-research-focus dimension (more psychological); 2. applied-level-focus dimension (more educational).

We can now concentrate on a description of the structure of the research activities of the interdisciplinary team. As stated above, an interdisciplinary approach to exploring learning processes is perceived as: 1. a way of combining basic and applied research in the field of psychological sciences and pedagogy; 2. a means of reducing the dichotomy between produced research results in the area of psychology and the everyday work of a teacher. The aim of the research – both on its basic and its applied level – is to contribute to our knowledge of *what learning ability is and how to identify the processes which this ability constitutes.* The ability to learn will be explored from the cognitive paradigm point of view with focus on executive functions and their part in the learning processes. As part of the project, the *Delis-Kaplan Executive Function System* (D-KEFS; Delis, Kaplan & Kramer, 2001) was used – an instrument for measuring parts of the system of executive functions. This is a set of test assignments based on the latest conception of cognitive functioning. The basic research uses multivariant static models to analyse variations in the child's ability to learn, variations which may be explained by the child's executive functions. From this there will be then be a series of tasks created for stimulation and development of those executive functions which were identified as being of key importance in the process of learning curricular content. The stimulus programme for the development of a pupil's executive functions will cover the curricular content of the key subjects in primary education of Mathematics and the mother tongue. After creation of the stimulus programme, there will be a series of training sessions for primary school teachers. The aim of these sessions will be: 1. to familiarize teachers with the concept of executive – higher cognitive functions; 2. to present diagnostic approaches aimed at discovering the pupil's learning barriers; 3. to present instructions for creating a stimulus programme for pupils with a diagnostic deficit in the area of executive functioning.

## Conclusion

This article describes the aims and processes of interdisciplinary research carried out to create a supportive environment for conceptualization of cognitive education as a basis for a paradigmatic change of teacher training and consequently for educational reform.

Research aims include the following:

Exploring the possibilities of child's cognitive performance assessment

Studying the executive functions in relation to the ability to learn

Defining and specifying the underlying processes that affect cognitive performance

Creating the cognitive and executive profile of gifted children

Creating the cognitive and executive profile of children whose native language is not the language of instruction

Identifying the peculiarities of executive functioning in children from socially disadvantaged environments

Analysing how to prescribe the remediation of deficient cognitive functions

Designing curricular-oriented stimulation programmes aimed at the development of executive functions within the curricular domains of Slovak language and Maths

Finding out how it is possible to stimulate the child's metacognitive processes within the standard education environment

The research represents an approach to both understanding and measuring cognition in such a way that it stresses the triple function of: 1. measuring cognitive abilities (including intelligence): norm referenced measurement; 2. specifying processes; and 3. prescribing remedies and interventions in the school setting. The above functions provide a framework for understanding the processes of standard, exceptional (including gifted children and children with learning disability) and lower cognitive performance. They also provide implication for remedial intervention. It is supposed that the research results will contribute to wider areas of discourse than psychological diagnostics. Developing cognitive and learning abilities by introducing cognitive approaches in everyday educational practice is a strategic priority of the Slovak school system in the period of school reforms and curricular transformation. The research has a real-life utility and seeks to identify the elementary components of the ability to learn. The entire research can thus be seen as a preliminary phase preceding the development of stimulation and intervention programmes aimed at various target groups. In short, the research project is designed so that its added value is assessed in terms of how it can be contributory in the areas of:

*A) cognitive psychology* – exploration of the concept executive functions as a mechanism of activation and control of cognitive performance,

*B) educational psychology* – studying relations between the domains of executive functions and learning ability,

*C) psychological assessment* – a) establishing construct validity on the selected tools for measuring the cognitive abilities of a junior school age child, b) validation of the tool for measuring cognitive abilities including setting partial norms for pupils with specific educational needs (gifted pupils, pupils from ethnic minority),

*D) education* – making the effort to synchronise the diagnostics of cognitive abilities with subsequent intervention – using research results to make cognitive analysis of the contents and tasks of Mathematics and Slovak language lessons in terms of their value in stimulating the pupil's cognitive functions.

The results of the above interdisciplinary research show how it is possible to tie in psychological research with educational practice. Results of psychological research into the relationship between executive functions and learning ability enable us to use and adapt the content and process of teaching Slovak language and literature and Mathematics in order to stimulate cognitive functions through development of the pupil's linguistic and mathematical abilities. We assume that after a training course, teachers will be qualified: 1. to apply the strategies and methods of cognitive diagnostics and stimulation within the framework of the mathematics and Slovak language and literature curricula at primary education level; 2. to create stimulation programmes according to individual content areas of the taught subject as part of the school's educational programme and the pupil's individual educational programme.

## References:

- Adey, P. S., Shayer, M., Yates, C. 1992. *Thinking science*. Philadelphia, PA: Research for Better Schools.
- Adey, P. 2003. Changing minds. *Educational and Child Psychology*, 20, 19–30.
- Arbitman-Smith, R., Haywood, H. C. 1980. Cognitive education for learning-disabled adolescents. *Journal of Abnormal Child Psychology*, 8 (1), 51–64.
- Ashman, A. F., Conway, R. N. F. 1997. Cognition and cognitive concepts. In *An introduction to cognitive education: Theory and applications* (pp. 41–61). London, United Kingdom: Routledge.
- Binet, A. 1916. *The development of intelligence in the child. The development of intelligence in children*. Baltimore, MD: Williams & Wilkins. (Original work published 1908).
- De Bono, E. 1991. *I Am Right, You Are Wrong. From This to the New Renaissance: From Rock Logic to Water Logic*. UK : Penguin Books.
- De Bono, E. 1970. *Lateral thinking: Creativity step by step*. New York, NY: Harper & Row.
- Dehn, M. J. 2008. *Working Memory and Academic learning: Assessment and Intervention*. Hoboken, NJ : Jon Wiley & Sons.
- Delis, D. C., Kaplan, E., & Kramer, J. H. 2001. *Delis-Kaplan executive function system (D-KEFS)*. San Antonio: The Psychological Corporation.
- Doidge, N. 2007. *The Brain That Changes Itself: Stories of Personal Triumph from the Frontiers of Brain Science*. US : Viking Press.
- Drubach, D. 2000. *The Brain Explained*. Upper Saddle River, NJ : Prentice Hall Health.
- Engelmann, S., Carnine, D. 1991. *Theory of instruction: Principles and applications*. Eugene, OR : ADI Press.
- Feuerstein, R. 1970. A dynamic approach to causation, prevention, and alleviation of retarded performance. In C. Haywood (Ed.), *Social-cultural aspects of mental retardation*. New York : Appleton Century Crofts.
- Feuerstein, R., Feuerstein, R. S., Falik, L. H., Rand, Y. 2002. *The dynamic assessment of cognitive modifiability: The learning propensity assessment device, theory, instruments, and techniques*. Jerusalem, Israel: ICELP Press.
- Feuerstein, R., Rand, Y., Hoffman, M. B., & Miller, R. 1980. *Instrumental enrichment*. Baltimore, MD: University Park Press.
- Glaser, R. 1988. Cognitive Science and Education. In J. Crowley (Ed.), *International Social Science Journal*, 40 (1), s. 21-44.
- Greenberg, K. H. 2000. Attending to hidden needs: The cognitive enrichment advantage perspective. *Educational and Child Psychology: Psychological Influences upon Educational Intervention*, 17 (3), 51–69.
- Guilford, J. P. 1977. *Way beyond the IQ*. Boston, MA : Creative Education Foundation.
- Haywood, H. C. 1977. A cognitive approach to the education of retarded children. *Peabody Journal of Education*, 54, 110–116.
- Haywood, H. C., Brooks, P. H., Burns, M. S. 1992. *Bright Start: Cognitive curriculum for young children*. Watertown, MA: Charlesbridge.
- Howard-Jones, P. 2010. *The Teacher's Handbook of Twig: Minds, Brains and Teaching With Immersive Gaming*. Online. Dostupne na : [www.lulu.com:NEnet](http://www.lulu.com:NEnet). 2010.
- Ihnot, C. et al. 2000. *Read Naturally: Master's Edition, Reading Level 5.8/6.0 (Blackline Masters)*. Saint Paul, MI : Read Naturally.
- Kirby, J. R., Robinson, G. W. 1987. Simultaneous and Successive Processing in Reading Disabled Children. In *Journal of Learning Disabilities*. 1987, vol. 20, no. 4, p. 243-252.

Klauer, K. 1987. Criterion-referenced testing: The inference to the item pool. *Zeitschrift für differentielle und diagnostische Psychologie*, 8, 141-147.

Klauer, K. J., Phye, G. D. 1995. Fallbuch der klinischen Psychologie: Modelle psychischer Störungen : Einzelfallstudien zum Lehrbuch der klinischen Psychologie. Germany : Hogrefe, Verlag für Psychologie. 357 s. ISBN 3-801-7071-80

Kolb, D. A., Boyatzis, R., Mainemelis, C. 2000. Experiential Learning Theory: Previous Research and New Directions. In R. J. Sternberg and L. F. Zhang (Eds.), Perspectives on cognitive learning and thinking styles. New Jersey : Lawrence Erlbaum.

Kozulin, A. 1999. Profiles of immigrant students` cognitive performance on Raven`s progressive matrices. In R. B. Ammons (Ed.), Perceptual and Motor Skills. Montana : Ammons Pbl.

Kulišťák, P. 2003. Neuropsychologie. Praha : Portál.

Lebeer, J. (Ed.) (2006). Programy pro rozvoj myšlení dětí s odchýlkami vývoje (*Programs for child's thinking stimulation*). Portál: Praha, 2006.

Lebeer, J. et al. 2011. With a different glance. Dynamic Assessment and Functioning of Children Oriented at Development & Inclusive Learning. Belgium : Garant Publishers.

Lovett, M. W., Lacerenza, L., Borden, S. B. 2000. Putting struggling readers on the PHAST track: A program to integrate phonological and strategy-based remedial reading instruction and maximize outcomes. In Journal of Learning Disabilities. Texas : Sage Publications, S. 458-476.

Marzano, R. J. 1998. A theory-based meta-analysis of research on instruction. Aurora, CO: Mid-continent Regional Educational Laboratory.

Miles, D., Forcht, J. P. 1995. Mathematics Strategies for Secondary Students with Learning Disabilities or Mathematics Deficiencies: A Cognitive Approach. In Intervention in School and Clinic (31). Texas : Sage Publications. S. 91– 96.

Paour, J. L., Soavi, G. 1992. A case study in the induction of logic structures. In H. C. Haywood and D. Tzuriel (Eds.), Interactive Assessment. New York : Springer, 1992. S. 419-442.

Sawyer, R. K. 2006. Educating for Innovation. In A. Craft and R. Wegerif (Eds.), The International Journal of Thinking Skills and Creativity, 1(1). Elsevier, S. 41-48.

Sousa, D. 2001. How the brain learns. Thousand Oaks, California: Corwin Press.

Sternberg, R. 2013. Introduction to the special issue. Journal of Cognitive Education and Psychology, 12, (1), S. 4-5.

Tokuhama – Espinosa, T. 2011. Mind, Brain and Education Science. New York: W.W. Norton Company.

Tzuriel, D. 2001. Dynamic assessment of young children. New York, NY: Kluwer Academic/Plenum Press.

Tzuriel, D., Shamir, A. 2007. The effects of peer mediation with young children (PMYC) on children`s cognitive modifiability. British Journal of Educational Psychology, 77, 143–165.

Vygotsky, L. 1978. Mind in society. Cambridge, MA: Harvard University Press.

Wolf, O. T., Schommer, N. C., Hellhammer, D. H., Reischies, F.M., Kirschbaum, C. 2002. Moderate psychosocial stress appears not to impair recall of words learned four weeks prior to stress exposure. In Stress (5). Informa. S. 59-64.

# EUROPEAN ISOTHERMS MOVE NORTHWARDS BY UP TO 15 KM/YEAR: USING CLIMATE ANALOGUES FOR AWARENESS-RAISING

*Martin Beniston*

Institute for Environmental Sciences and Department of Physics,  
University of Geneva, Switzerland

---

## Abstract

Little use has been made up till now of the concept of climate analogues to link the present and the past, i.e., places whose current climate (“target” locations) is similar to that experienced some decades ago at distant locations (“reference” sites). Indeed, most research up till now has focused on analogues between present and future climates. Here we assess at what period in time the climate at a target station in Europe has reached – or will reach – that of a reference location, and show that the velocity of northward-moving isotherms can attain 15 km/year. Such displacements in space imply that temperatures at many target sites in Europe have already exceeded those experienced by stations located 300-500 km to the south in the last half-century. Such results can serve to better portray what a rapidly-changing climate means to a lay audience, and can provide useful information to the policy-making community.

---

## Introduction

The concept of geographical climate analogues, namely the use of locations that currently enjoy climatic conditions close to those that existed elsewhere in the past or that may exist in the future, has to date had only very limited coverage in the scientific literature. One reason for this is that, in scientific terms, it is probably questionable whether a statement such as “the climate of London in a greenhouse climate may resemble that of Lisbon today” (e.g., UNWTO, 2008) can genuinely be embedded within physical science. On the other hand, this kind of analogy can probably be of use to a non-expert community, because it represents a simple manner by which the amplitude and speed of climatic change can be portrayed.

In order to portray possible climate impacts, the concept of analogue climates has been used within the EU “ENSEMBLES” project ([www.ensembles-eu.org](http://www.ensembles-eu.org)) to quantify the possible impacts of a scenario climate on European cities (Hallegatte et al., 2007), by comparing the costs of impacts that occur *today* in certain cities (e.g., Lisbon) that could become the type of impacts that may *tomorrow* threaten cities located in other latitudes (e.g., London). This is because, according to the underlying analogue climate philosophy, the climate of the latter city in a greenhouse climate may resemble that of the former city under current climate regimes. While there are obvious limitations to such approaches – namely large differences in terms of the type and cost of infrastructure, and the response strategies that may be implemented, between two cities such as London and Lisbon – they do have some merit in terms of raising awareness to the fact that in a changing world, climate impacts in a given city may indeed be very different (both in a positive and in a negative sense) from those experienced in the past. Williams et al. (2007) have shown that in some instances, the pace of climatic change over the course of coming decades will be such that there may be no analogue in the future compared to those that have been experienced in the past; the authors of this investigation refer to “*novel climates*” where there may be “*prospects of new climate states with no current analogue and the disappearance of some extant climates*”.

Using similar analogue approaches, Ramirez-Villegas et al. (2011) conducted an extensive study to determine regions in a future climate where conditions may be appropriate for agricultural practices as practiced elsewhere today. In the same vein, the United States Department of Agriculture (USDA, 2012) has published “plant hardiness maps” available online that illustrate how conditions appropriate for agriculture today in specific geographic quadrants are similar to those that existed sometime in the past in other quadrants.

The analogue climate applications described above remain, however, fairly rare in the literature and have almost exclusively explored analogies between current and future climates. In contrast, the present paper will explore the climate analogue method to assess the manner in which climatic conditions in European cities in the last decade compare to those that prevailed in the 1950s in other locations generally located well to the south. These observations enable to compute a velocity of change of isotherms (i.e., the speed of their displacement in space) between geographical locations.

### **Data and methods**

Following the site selection used in an earlier paper by Beniston (2011), 20 European sites are used here for the statistical interpretation of temperature and precipitation data; the sites have been chosen as a function of the availability of daily data over long time scales (i.e., the 60-year period spanning 1951 to 2010) and their distribution within a number of broad climatic zones. The temperature and precipitation data have been extracted from the European Climate Assessment and Data database (ECA&D; Klein Tank et al., 2002), where the information has been quality-checked for homogeneity. The three south-to-north transects shown in Figure 1 stretch along what can be broadly identified as Maritime (1), Continental (2), and Eastern European transects (3). In addition, two east-west lines connect Mediterranean (4) locations as well as an Atlantic to Black Sea segment (5) in order to identify any possible longitudinal shifts in climate in addition to changes across latitudes. In this paper, we shall refer to the “target” station as the location at which we wish to determine whether its climatic characteristics are already those experienced in the past at a station located elsewhere (referred to as the “reference” station).

In order to represent the particular climate characteristics of a given location, not only have the mean temperature and precipitation conditions been computed, but also the one standard deviation (1- $\sigma$ ) for both variables. The standard deviation is computed on the basis of daily values in order to determine the day-to-day variability. The mean and variability statistics at a target station have also been defined for both the 1950s and the decade between 2001 and 2010, in order to highlight the changes that have occurred since the middle of the last century, and to see how current statistics of the target station correspond to the situation existing in the 1950s at the reference station.

In this study, summer climate statistics (maximum daily temperature for June, July and August – JJA – and daily precipitation for these three months) have been used rather than annual statistics, or statistics from other seasons. This is because winters generally exhibit a marked transition between parts of the continent that are covered by snow and those that are not. As a consequence, winters in the target locations are unlikely to come anywhere close to the reference stations in a foreseeable future. Winter statistics would thus be seen to bias annual statistics. In contrast, changes in summer temperature and precipitation are not governed by freezing temperatures that tend to sharply delineate winter climates between southern, central and northern Europe, and thus summer is the more appropriate season for climate analogue studies.

In order to compute the velocity of change, simple linear regression has been used in order to determine at what time in the record (either in the recent past or in the near future) the trend line of temperature for a particular target station - in this case Bordeaux for the example shown in Figure 2 – intersects the horizontal line representing the mean summer temperatures

for the decade of the 1950s at the reference station – in this example: Lisbon. Knowing the latitudinal distance from reference to target and the time taken for climatic conditions to migrate northwards between the two stations subsequently enables speed of change to be ascertained.

### Results and discussion

Figure 3 illustrates the kind of statistics that have been analyzed for the different locations shown in Figure 1, which lead to three different configurations namely:

Toulouse-Madrid, where the temperature statistics of the target station have not yet attained those experienced by the Madrid reference station in the 1950s. Using linear regression statistics, it is estimated that Toulouse will see similar temperatures to Madrid by 2014. The ellipse representing the 1- $\sigma$  plots of temperature and precipitation indeed suggest that these characteristics for Toulouse are gradually converging towards those of Madrid in the 1950s. In other words, over a period of half a century, Toulouse has warmed by almost 3°C while at the same time its mean precipitation has diminished by almost a factor of two. The 1- $\sigma$  temperature-precipitation plots for Toulouse will, if current trends continue, be soon very much in line with the Madrid statistics.

Geneva-Toulouse, where temperatures in Geneva now exceed those experienced in Toulouse in the 1950s. The linear regression analysis suggests that Geneva temperatures have exceeded those of Toulouse in the 1950s since 2002. In addition, while precipitation in western Switzerland still remains higher than in southern France, there is clearly a general drying trend in Geneva which implies, if trends continue at current rates, that Geneva will be as dry or dryer than conditions that existed in southern France a half century ago. It is interesting to note that the 1- $\sigma$  bounds of temperature at the target location already exceed those characterizing the reference station in the 1950s.

A third configuration along the east-west transect from the Atlantic to the Black Sea (i.e., transect 5 in Figure 1), comparing Geneva (reference station) statistics to shifts in Vienna (target station) statistics in the 1950s, shows that the target station was already warmer and dryer than the reference site in the 1950s. Figure 3c suggests that a Geneva-type of climate is unlikely to replace a Vienna-type of climate since the latter is changing as rapidly as the former. This situation, whereby climate at a station located to the east never tends towards former climate conditions at stations located further west, is common to all the sites located on the two east-west segments illustrated in Figure 1, with the exception of Valencia, Spain, where temperatures today have exceeded those in Malaga in the 1950s. The shift in climate regimes is thus dominantly, and as expected, directed from south to north rather than from west to east.

Table 1 summarizes for the south-to-north Maritime, Continental and Eastern European transects the year in which climatic conditions at a particular target location began to exceed (in terms of temperature) those experienced in the last half century at the reference location to the south or, if this crossover has not already occurred, when it is likely to take place in the future. Table 1 also provides the estimates of the speed of the northward migration of 1°C isotherms from the reference towards the target station, i.e., the speed with which a “temperature line” moves to the north bringing with it an increase of 1°C to the target location. In most instances, this velocity ranges from 2-14 km/year. Table 1 shows that velocities are slower in the Maritime segment than in the Continental or Eastern European transects; furthermore, the northward velocity of 1°C isotherms seems to slow down as one reaches the northern parts of the continent. This is, however, a very tenuous conclusion, and would need to be confirmed by far more station analyses than what the EC&D database currently allows. In addition, these preliminary analyses have made no attempt at correcting for altitude differences between stations; the results simply provide an estimate of how fast the climate of a region is migrating to the north, irrespective of local geographical conditions.

The behavior of the upper extremes of temperature also provides another indication of the velocity and amplitude of change. In a similar manner to the analyses conducted for the changes in mean conditions discussed above, Figure 4 illustrates, for the “Maritime transect” (Transect 1 in Figure 1) the manner in which both the 90% quantiles of temperature and the number of days exceeding the 30°C threshold at the target station are close to, or exceed, those of the reference station in the mid-20<sup>th</sup> Century. In order to enable a simple comparison, the histograms for the target stations representing the average of the 2001-2010 period are placed next to the histograms for the reference stations representing the 1950s average. The arrows indicate the change that has intervened at each target station between the middle of the 20<sup>th</sup> century and the most recent decade of the record. The “extreme” temperatures represented by either the quantile levels or the 30°C threshold exceedance suggest that the upper range of temperatures in Bordeaux today, for example, exceed those of Lisbon a half-century ago; extremes in northern France are today similar to those in Bordeaux in the 1950s; Bremen on the North Sea experiences today warmer extremes than Beauvais (north of Paris) 60 years ago, etc.

These approaches help bring home to a non-specialized audience the fact that climate change is indeed occurring, since it is relatively easy to portray the notion that the current climate of a given region is close to that experienced 50 years ago or less in regions located elsewhere. In other words, the displacement in space of temperature and precipitation regimes, can perhaps be more readily interpreted than the more common metric related to rates of change (e.g., °C/decade) at a specific location. Rates of change of temperature or precipitation at a point in space are difficult to perceive at the scale of human lifetimes because of the relatively small amplitudes over long time spans that are involved. It is thus often easier to have a mental representation of what is meant by the fact that Bordeaux’ climate is today that of Lisbon in the 1950s, or that by 2016 the climate of northern Estonia will be close to that of southern Lithuania a few decades ago, than to interpret what is meant by a 2-3°C warming in Bordeaux or Tallinn since 1900. The 1- $\sigma$  spread of temperature and precipitation, that reflects a converging level of climatic variability between the reference and target sites, can also serve to raise awareness as to the kind of climate impacts that could be expected from such variability at the target location.

In terms of policy, acknowledging that climate in a given region already resembles that of other regions in the past can help in assessing the type of adaptation strategies that could be put into effect to alleviate the more negative climate impacts as experienced in the reference locations. Of course, it would be necessary to take into account other similarities or differences between the target and the reference locations, especially in social and economic terms.

Interestingly, the velocities computed from ECA&D can help consolidate arguments regarding possible climate triggers that result in northward migration of various species, as determined from ecological studies. In an early paper on changes in the range of non-migrating butterfly species in the UK, Parmesan et al. (1999) estimated that close to two-thirds of these experienced northward habitat shifts by 35-240 km. In their study, the authors define a range shift as taking place if there is a net extinction at the southern limit or net colonization in the northern part of the of the habitat range. The authors suggest that these shifts have taken place “*during the past 30-100 years*”. A more recent paper by Chen et al. (2011), has found more rapid rates of change for many UK species than previously reported by Parmesan et al. (1999). For the species sampled, the paper reports a median latitudinal migration rate of close to 17 km/decade, which is roughly a factor of 5 less than our estimates of northward “climate migration”; in addition, the study finds migration speeds that are faster in places where warming is greater. If the speed of species’ migration is slower than that of climate migration, it is because of the lag-time required for species to respond to their changing climatic environment that will be different according to species. Indeed, as the Chen

et al. (2011) study points out, “*individual species vary greatly in their rates of change, suggesting that the range shift of each species depends on multiple internal species traits and external drivers of change.*” Because the estimated migration velocities of species are always slower than those of climate, the question then arises as to whether all species can migrate sufficiently rapidly; the question is beyond the scope of this paper, however, but would warrant further investigations based on the climate analogue methodology.

## Conclusion

Although climate analogues are a statistical concept and do not explicitly take into account the underlying physics that govern the changes in climate regimes that are occurring around the globe, they can be of interest when investigating potential climate impacts on a range of natural and socio-economic sectors. These include *inter alia* ecosystems, agriculture, tourism, water availability and energy supply; by assessing how these and other sectors responded in the past at the reference locations and how these may be comparable in today’s climate in the target locations, a number of conclusions can already be drawn that could help guide decision-making processes, even though many other conditions (demographics, standards of living, resource use) have likely changed considerably since the middle of the 20<sup>th</sup> century at both reference and target stations.

Extreme weather events can shed light on the behavioral response of actors – citizens and policymakers alike – at the local (city) and regional levels in terms of their handling of difficult situations and the success of any adaptation measures that were taken to counter the more negative impacts of extreme heat, drought or precipitation. By focusing on events in the reference sites, the costs of climate impacts (weighted for changes in the value of currencies over the intervening period), the resilience and recovery following extreme events that may become increasingly common in the target stations, decision makers in the target locations can to some extent put into practice adaptive strategies that consider the similarities between reference sites in the past and target sites today.

## References:

- Beniston, M, 2012: Exploring the behavior of atmospheric temperatures under dry conditions in Europe: evolution since the mid-20<sup>th</sup> century and projections for the end of the 21<sup>st</sup> century. *International Journal of Climatology*, doi: 10.1002/joc.3436
- Chen, I-C, Hill, JK, Ohlemüller, Roy, DB, and Thomas, CD, 2011: Rapid range shifts of species associated with high levels of climate warming. *Science*, 333, DOI: 10.1126/science.1206432
- Hallegatte S, Hourcade JC, and Ambrosi P, 2007: Using climate analogues for assessing climate change economic impacts in urban areas. *Climatic Change* 82, 47–60
- Klein Tank, A et al., 2002: Daily dataset of 20th-century surface air temperature and precipitation series for the European Climate Assessment. *Int. J. Climatol.*, 22, 1441-1453
- Parmesan, C, Ryrholm, N, Stefanescu, C, Hill, JK, Thomas, CD, Descimon, H, Huntley, B, Kaila, L, Kullberg, J, Tammaru, T, Tennent, WJ, Thomas, JA, and Warren, M, 1999: Poleward shifts in geographical ranges of butterfly species associated with regional warming. *Nature* 399, 579-583
- Ramírez-Villegas J, Lau C, Köhler AK, Signer J, Jarvis A, Arnell N, Osborne T, and Hooker J, 2011: Climate analogues: finding tomorrow’s agriculture today. Working Paper no. 12. Cali, Colombia: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available online at: [www.ccafs.cgiar.org](http://www.ccafs.cgiar.org)
- UNWTO, 2008: *Climate Change and Tourism; Responding to Global Challenges*. United Nations World Tourism Organization (UNWTO) Publication, Madrid, 269 pp.
- USDA, 2012: <http://planthardiness.ars.usda.gov/PHZMWeb/>

Williams, JW, Jackson, ST, and Kutzbach, JE, 2007: Projected distributions of novel and disappearing climates by 2100 AD. PNAS, 104, 5738-5742, doi:10.1073/pnas.0606292104

## Table and Figure Captions

**Table 1.** Statistics of the timing of speed of change between locations. The row line for each transect gives the year in which the climate at a particular location has become (“crossover year”) or will become similar to that of the station located to the south (i.e., to the left in this table). The lower line for each transect gives the velocity at which 1°C isotherms move northwards between the reference and the target stations.

**Figure 1.** Map of Europe showing the location of the sampled sites, with the three south-to-north transects (1: “Maritime”, from Lisbon to Vestervik; 2: “Continental”, from Malaga to Berlin; and 3: “Eastern European”, from Belgrade to Tallinn). Two west-to-east transects (4: “Mediterranean” to the south and 5: “Atlantic to Black Sea” to the north) are also used in this study.

**Figure 2.** Example of “crossover” computation to determine in what year temperatures at a target location begin to exceed those at the reference location to the south (here Bordeaux as the target and Lisbon as the reference station).

**Figure 3.** Mean temperature and precipitation plots, and the bounds given by 1- $\sigma$  temperature and precipitation statistics, for a reference station in the 1950s, and a target site showing its evolution between the decade 1951-1960 and the decade 2001-2010. The centers of the ellipses indicate the mean summer (JJA) temperature and precipitation conditions for each location and decade.

Lisbon in the 1950s compared to Bordeaux in the 1950s and the 2000s;  
Geneva in the 1950s compared to Toulouse in the 1950s and the 2000s;  
Geneva in the 1950s compared to Vienna in the 1950s and the 2000s.

**Figure 4.** Shifts in the behavior of higher bounds of summer temperatures at reference sites in the 1950s (black histograms) and at target locations (grey histograms) in the 2000s.

90% quantiles of JJA temperatures

Number of days exceeding the 30°C threshold

Each target for the 2001 to 2010 period are placed next to the reference site for the 1951-1960 period; the arrows show the evolution at the target sites between the 1950s and the 2000s.

Figure 1

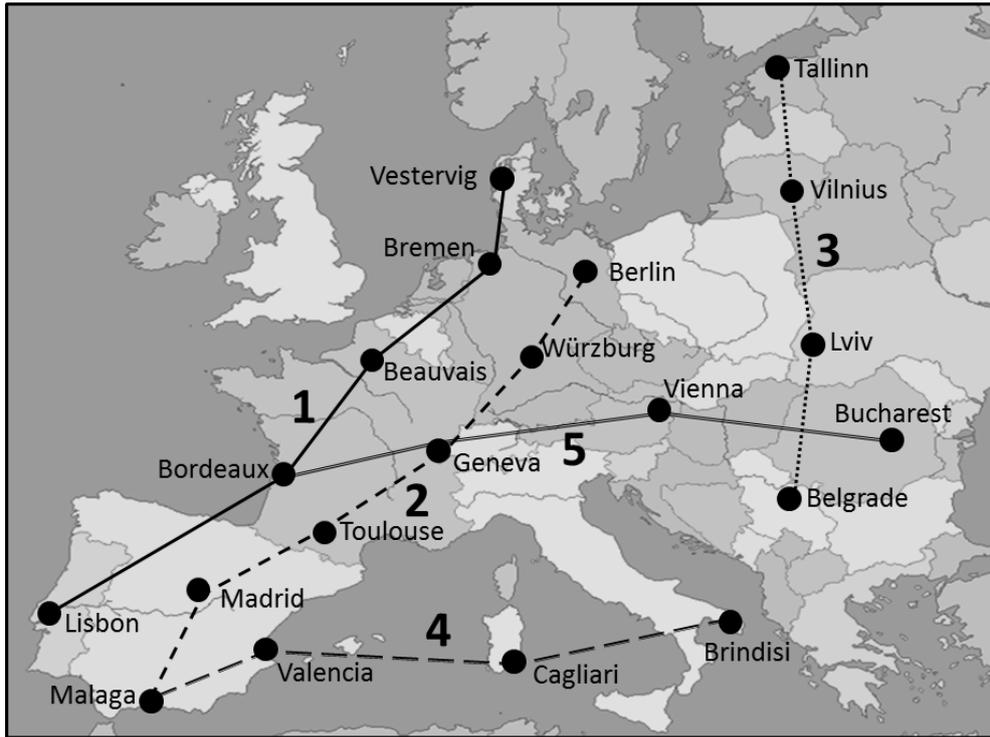


Figure 2

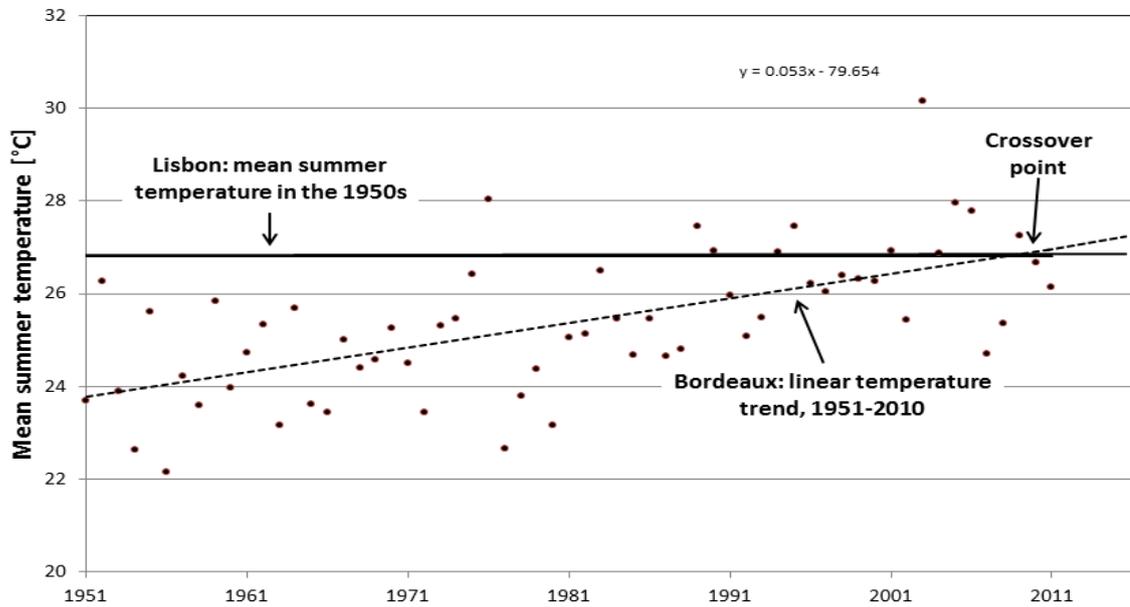


Figure 3a

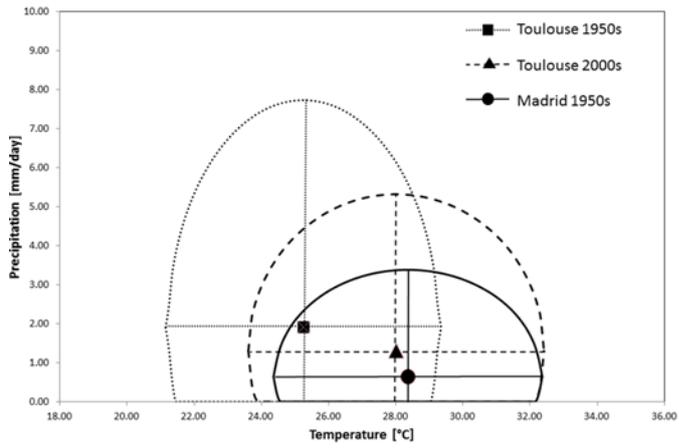


Figure 3b

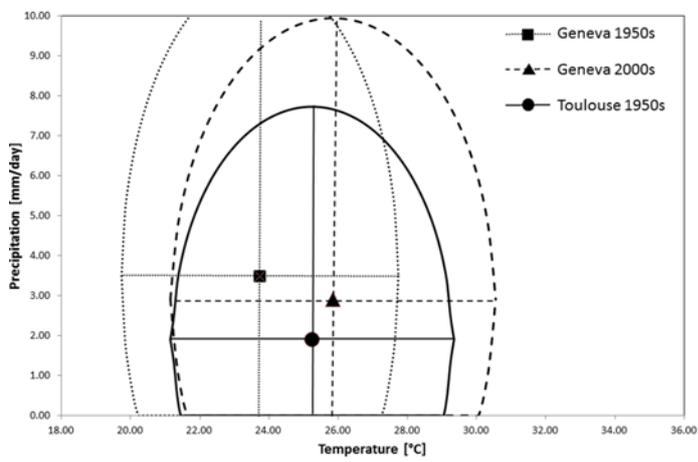


Figure 3c

Figure 4a

Figure 4b

# AFRICA VIEWED THROUGH ITS PROVERBS AND LITERATURE

*Lic. Ana Cristina Pinheiro Fortes*

---

## Abstract

This paper aims at demonstrating that a better and richer analysis of a literary work can be realized if a deep exam of the proverbs used is carried out. This work has a semiotic rather than a linguistic perspective as we try to throw light on the world-view of the people the literary text refers to.

The work is divided into two chapters. In Chapter 1 we give a bird's eye view of African proverbs and their use in African literature, and in Chapter 2 we focus on Chinua Achebe's masterpiece Things Fall Apart. We have adhered to Bhuvaneshwar's classification of proverbs into prototypical, vehicle and contextual so as to carry out a semiotic analysis of the proverbs used by Chinua Achebe.

---

## Introduction

Proverbs have been used since the world began. It is possible to make this assertion, considering that the history of man is mostly signed by the history of oral cultures, and if we bear in mind that every society had its wise men who summarized the people's beliefs and customs in short sententious sayings. For example,

"The Book of Proverbs, in the Old Testament of the Bible, is a group of wisdom sayings, and longer connected poems from the 10<sup>th</sup> to the 4<sup>th</sup> century BC and finally collected about 300 BC. The sayings are either statements that provoke further thought or admonitions to behave in particular ways. The longer poems celebrate wisdom, encourage its observance, and personify it as a woman who at God's right hand assisted in creation. Egyptian wisdom is evident in Proverbs, making it possible to date the nucleus of the book to pre-exilic times. The book as a whole reflects the ideology of enterprising privileged classes and expresses a general confidence in the human capacity to act freely and wisely. Self-interest and religious devotion are shown to be congruent. Respect for women (31:10- 31) is encouraged. The book is conventionally attributed to Solomon as the prototype of Israelite wisdom, but many sages had a hand in composing and collecting the subsections; mentioned specifically are the term 'men' of Hezekiah" (<http://mb-soft.com/believe/txs/proverbs.htm>).

Well, what are proverbs? The Penguin English Dictionary, 2<sup>nd</sup> Edition, defines them as: "A brief pithy saying embodying a truth, a widely held belief, or a piece of advice" (p. 1121). Paul Hernadi and Francis Steen give the following definition: "Proverbs are brief, memorable, and intuitively convincing formulations of socially sanctioned advice" (p.1. "The Tropical Landscapes of Proverbia: A Cross-disciplinary Travelogue" apud [http://cogweb.ucla.edu/Culture/Hernadi Steen 99.html](http://cogweb.ucla.edu/Culture/Hernadi%20Steen%2099.html)). And the great North American philosopher Ralph Waldo Emerson said:

"Proverbs, like the sacred books of each nation, are the sanctuary of the intuitions. That which the droning world, chained to appearances, will not allow the realist to say in his own words, it will suffer him in proverbs without contradictions. And this law of laws which the pulpit, the senate, and the college deny is hourly preached in all markets and workshops by flights of proverbs whose teaching is as true and omnipresent as that of birds and flies". ("Compensation", p. 7 apud [http://www.rwe.org/works/Essays-1st Series 03 compensation.htm](http://www.rwe.org/works/Essays-1st%20Series%2003%20compensation.htm)).

“The vulgar proverb, ‘I will get it from his purse or get it from his skin’, is sound philosophy” (ibid., p. 8).

Each of the three quotes above presents proverbs as an epitome of the objective and the subjective, and as messages of social behaviors. And Emerson went so far beyond as to brand them as “sacred books of each nation”.

In setting about doing this work, we defend the notion that ourproposed semiotic-paremiological probewould enable a deeper and pleasurable analysis of a literary work.

### **Proverbs and African literature**

Both methodological and epistemological reasons could lead us to divide African literature into oral and written. African literature was mainly oral until the 20<sup>th</sup> century, yet, it is worth mentioning that oral traditions of mythological narratives, poetry and proverbs are still present and have an influence in contemporary writing. “The Lazy Rock-Rabbit” is an African oral-literature piece out of which came the proverb “The rock-rabbit lacked a tail by sending others”. In Chaka, Child of Sin, a novel by Thomas Mofolo, we find the proverb “Scandal is not like bread: there is never any shortage” (apud Drachler, Jacob, African Heritage, p. 67) to summarize the fix the main character Senzangakona was in for having had a son out of wedlock.

Proverbs, as a sample of African oral traditions, constitute a literary resource and a literary potential that carry values, beliefs, customs; in a nutshell, the world-view of African cultures. Metaphor, wisdom, sarcasm, happiness, schooling, humor, tenderness, ethics, disappointment, praise, etiquette, friendship, enmity, religion, human ways of communication and war are- among others- matters which are conveyed through African proverbs. The importance Africans attach to proverbs is illustrated in a Nigerian Yoruba proverb going like this, “A proverb is like the horse which can carry one swiftly to the discovery of ideas “. The Yoruba proverbs are currently being used to express modern messages, so much so that former US Secretary of State Hillary Clinton used one to title a book she wrote which focuses on the community’s importance in transmitting values to children, It takes a village to raise a child. For the African continent, which has always been said by the white man to be devoid of culture, proverbs are cultural vehicles and windows through which it is possible to cast a look at the Africans’ world-view. It was not in vain (we are of the opinion that African proverbs should be included in every collection of African literature) that Jacob Drachler included “Ten Proverbs from Liberia” in his African-literature anthology African Heritage, being cautious to warn that “to use them as valuable clues to ways of thinking and feeling, we must know how they are employed, in what situations and with what intent? (p. 44). Behold the proverbs:

*“When it rains, the roof always drips the same way”.*

This is a comment on the immutability of certain laws. Whenever there is rain, the roof will drip, and always drip downward, no matter how the roof is placed or from what direction the rain is hitting it. The proverb also has implications like our ‘As ye sow, so shall ye reap’. The following illustration was given: ‘we and the people of Fishtown agreed that we would not fight any more’. In making this agreement we called upon God. If one of the parties breaks an agreement like this, he is bound to lose. The Fishtown people broke the agreement and so we won the war.

*“We climb the hill before we recognize the land”.*

This is used also as an honorary title on the horn. The title belonged to a public speaker of Nimiah, now dead. The office of the speaker is to set the matter before the assembly as objectively as he can, introducing the arguments of both sides without taking a stand of his own. His penetration and elocution elevate the average man to a clear, broad view of the issue, such as a person gains by climbing a hill.

*“One doesn’t throw the stick after the snake has gone”.*

This can be applied to suggest that a passing opportunity may not return; quick action and decision are often imperative.

Whenever a snake is found to be in a Jabo village, the village seems to become transformed into a disturbed ant heap; everybody shouts and runs, but nobody is overanxious to get close to the spot where the snake is supposed to be hiding. Some men finally gather courage and begin to beat about the place, usually hitting anything but the snake, which is most likely to have disappeared by that time. Still, as the hopes of killing it diminish, the number of our dauntless hunters increases, while the women pour forth a generous supply of mocking and teasing remarks until the affair finally dissolves amid general laughter.

*“You kill the snake with whatever may be in your hand”.*

This was applied in a rather characteristic manner. On one occasion three men came to visit the house, and as they prepared to leave they were presented with a leaf of tobacco. Two of the visitors felt that one leaf was hardly enough for three people, but the third guest had more discretion and evinced it by quoting the proverb.

*“He acts like a dog who drives the flies away from food it has spurned”.*

The proverb embodies a criticism of hypocrisy. It is used in questioning the sincerity of someone who seems too particular about something for which he professes to care nothing. For example, if a mother scolds a child of about six or seven years of age about something, the child may become very angry and wish to make his mother feel the intensity of his anger by refusing disdainfully whatever she offers him. But should the child interfere when his brother or another member of the family accepts the offer, the proverb is acceptable.

If someone says he dislikes a certain girl and yet watches her constantly, the girl herself or any other person who suspects him of dissembling may say to him, ‘You behave like a dog who drives the flies away from the food it has spurned’.

A man may have publicly divorced his wife but objects to her going with another man. The woman may rebuke her former husband with the proverb.

A man may openly declare that he is not connected with a project which other men are about to undertake. At the same time he appears quite anxious to give advice. Those who question his attitude will say to him, ‘Why do you act like a dog who drives the flies away from food it has spurned?’

The proverb is also used in law proceedings. If two tribes enter a dispute, one of them may be made to cede its rights to a tract of land in favour of the other. The land offered may not seem fully satisfactory to the second tribe, which would definitely refuse it. The court, however, would make it understood that no further land is forthcoming, that it must accept what is offered and make the best use of it. If the tribe still would not touch the land but would not let anyone else touch it either, the proverb could be quoted.

To recap, this proverb is equivalent to the English-language one: “He is a dog in the manger” (Notice made by the author of this paper).

*“The dog’s nose is cold”.*

The proverb conjures an image often seen in West Africa: the man reclining comfortably in his low chair. Suddenly the dog comes up to him unnoticed and, nudging him, touches his body with its cold nose. The man yells at it, but he has had his unpleasant shock. The proverb serves to express ill bodings or as a warning against the doubtful wisdom of a plan. It may point out that a person in trouble should have foreseen the effects of his ill-advised action. It was recorded as a title praising a man on the horn. The title praises the warrior for his undaunted bravery. Or it may sound a warning to the hero who does not consider any risk. Finally, the cold shock at the touch of the dog’s nose is symbolic of the uncomfortable feelings arising in the warrior’s enemies whenever they think of him or confront him.

*“There is no wealth where there are no children”.*

There is true happiness only where there are children. But children are not only a source of happiness. They are a great help to their parents. When parents become too old to provide for themselves, they pass into the care of their children and are provided for by them. Thus, children are a source of wealth to their parents and a valuable investment.

In the native community, married people are most unhappy if they should have no children of their own, and steps are taken to correct the situation. If, upon examination, it is thought that the husband is sterile, another man is substituted until a child is born to the woman. If the woman is thought sterile, the misfortune is no so great since the husband's other wives may bear him children. If everything should fail, the couple try to adopt children.

If a person boasts copiously of the great things he has done for which the whole tribe praises him, some of his fellows may become annoyed. In their jealousy they would rebuke him, saying, 'Keep quiet; you are worrying us too much for what little you have accomplished!' The man could reply in self-defence; "Yes, but there is no wealth where there are no children. In other words, 'I have good reason to be proud, for I have done something'.

Again, if a person is accused of witchcraft, he is given sasswood poison to prove his innocence. If, after the struggle, he expels the poison from his system and is given the freedom to celebrate his liberation, some unsympathetic individual may remark with sarcasm on the exuberance with which the man enjoys his release. A more sympathetic individual may reply with the proverb.

*"Children are the wisdom of the nation".*

In travelling from village to village the native visitor will almost invariably make it his business to ask the children whom he is certain to find playing below the village, 'Well, children, what is the news of the city?' Without any suspicion or fear the children will tell him the most important of the latest news. If the stranger should find it not expedient to enter the village because the news indicates that his tribe had become involved in some trouble with it, he would turn back at once. The children would calmly resume their play with the feeling that they had done their duty by giving the man the information he desired. The lives of many who were wise enough to trust the knowledge of children have been saved this way. Thus the proverb recognises that children generally know some facts, and, if properly approached, will tell the truth to any who should desire it; they are frank, trusting and friendly.

The proverb is, in the first place, applicable if the testimony of a child is needed badly, and there are still some who tend to make light of the validity of such testimony. In that case, anybody who favours the testimony of the child may say to objectors, "Do not worry, for children are the wisdom of the nation".

The mother of a child may become imbued with the fear that the child is growing too imaginative in his world of fancies to be depended upon for telling the truth. If she wishes to impress upon the child the danger of becoming a habitual liar, and how detestable a creature a liar is, she will say to him, 'Son, it seems you cannot tell the truth about anything lately! You must stop this practice, for it is often said that children are the wisdom of the nation. Let it be said of you that you belong to the group which really constitutes the wisdom of this nation'.

*"A child saw a war that destroyed a city".*

The implication being that even a child has had experience and has seen events. The proverb may have originated from a story. It was quoted when people of Upper Nimiah discussed the grave illness of a boy in Lower Nimiah. Like any other case of illness or death, this was supposed to have been caused by witchcraft. The consensus of opinion in Upper Nimiah was that the people of Lower Nimiah did not act with sufficient zeal to trace the witch in good time. In this matter, as in many others, the town felt that the lower town did not always use good judgement. The lowertown, situated on the seashore, on the road between civilized Liberian towns, was more exposed to Western influences. More used to confronting unforeseen situations, it represented the less conservative element of the tribe. It did not always feel that it had at its disposal the time necessary to observe the formalities prescribed

by tradition. The more conservative upper town regarded this laxity as childish, hasty, and haphazard. 'Nevertheless', to quote the comments of the Upper Nimiah people on the sickness, 'although the people of the Lower Nimiah are like children, we look upon them with hopes since we could not accomplish anything without them'. Then the proverb was quoted. The inhabitants of the lower town are looked upon and referred to as children of the upper town because their settlement is more recent.

*"One who loves the children of his fellow will surely love his own children"*.

Perhaps the truest test of love is to love sincerely that which is not one's own, whereas it is common and easy for a man to love or value the things that are closely related to him or are actually his own. Thus, a father who has love for another father's children will surely be able to love his own. Furthermore, through his experience with other children he will be better equipped to take care of his own.

The question may arise in the assembly whether one's tribe should treat another tribe with toleration. If opinion seems to be divided, the side which is for toleration may quote the proverb to plead for indulgence. People who are unkind to children are often rebuked with the proverb.

People may object bitterly if members of another tribe come to hunt in the forest owned by their tribe. If someone thinks that the objection is ungenerous, he will quote the proverb (ibid., p. 45-50).

It is worth remarking that out of these ten Liberian proverbs, four have to do with children, and they do so in such a way that kids are associated with happiness and welfare at home, with national wisdom, and also with the significance of loving not only one's children but other people's as well. These four proverbs throw light on this particular value and feeling of the Liberian people's world-view, a value and a feeling that do not seem to be observed in the Igbo society, as portrayed by Chinua Achebe in Things Fall Apart.

### **Proverbs Their use in Things Fall Apart**

"Having spoken plainly so far, Okoye said the next half a dozen sentences with proverbs. Among the Ibo the art of conversation is regarded very highly and proverbs are the palm-oil with which words are eaten" (Achebe, Chinua, op.cit., p. 6).

This paragraph lets us know- from the outset of the novel- the role proverbs play both in the Ibo culture and in this literary work. Achebe is quick to convey this feature of his idiolect and of Ibo good talkers' idiolect by means of a character, Okoye, who is said to have uttered six sentences in proverbs, and in the narrator's voice, who likens proverbs to an important Nigerian crop.

Achebe's use of proverbs along the novel substantiates our statement made in Chapter I concerning the overlapping between African oral traditions and African written literature, as well as brings out the novelist's notion that the "English of Africa will have to be a new English, still in communion with its ancestral home but altered to suit its new African surroundings" (<http://www.scholars.nus.edu.sg/landlow/post/achebe/jura01.html>).

### **Proverbs A categorization**

The Umuofia society is achievement-oriented: "Age was respected among his people, but achievement was revered" (Achebe, Chinua, op. cit, p. 6). This idea is summarized in proverbs like "If a child washed his hands, he could eat with kings", (loc. cit.) and "You can tell a ripe corn by its look" (ibid., p. 17), the former denoting how hard Okonkwo worked for success, what made him quite worthy of admiration by the community leaders, and the latter being the opposite side of the Anglophone sayings "Do not judge a book by its cover" and "Never judge from appearances". And the importance attached to achievement is contained in these ones as well: "Looking at a king's mouth, one would think he never sucked at his mother's breast" (ibid., p. 20). These words were stated by an old man in reference to

Okonkwo, who had started from scratch and become wealthy all of a sudden; and “A proud heart can survive a general failure because such a failure does not prick its pride” (ibid. p 19). These words of wisdom are said by Unoka- in the dusk of his life- to Okonkwo after a very bad harvest, “ the worst year in living memory” ( p.18). A translation of the contextual meaning of this African proverb into Western plain English could give us something like: “Come on, you’re a die hard. Every cloud has a silver lining”.

The “chi” or personal spirit is a recurrent topic in the book. It has been compared with the daemon of Socrates, and people believe Okonkwo has a strong “chi”. When Okonkwo endeavored to be well- to-do his chi supported him. Notwithstanding, when he became aggressive his chi helped him no more and he came from bad to worse. This Ibo’s attachment to religious values is summed up in the proverb “When a man says yes, his “chi” says yes also (ibid., p. 20). Okonkwo’s bad end makes this proverb contradictory, a peculiarity which is present in many proverbs, that is, Okonkwo’s assertion was contested by his chi’s denial.

Likewise, another proverb shows Ibo’s particular beliefs, “If a man kills the sacred python in the secrecy of his hut, the matter lies between him and his God” (p. 117). The python was the most revered animal in this culture. “It was addressed as ‘Our Father’ “(p. 116) and anybody killing it by accident was punished. Thus, when rulers and elders meet to decide what to do with the snake killer, someone comes up with this adage, and adds: “If we put ourselves between the god and his victim we may receive blows intended for the offender (ibid., p. 117).

The importance of women in the Ibo society reaches its climax when Okonkwo is deported to his motherland. Uchendu, his uncle, says: “A man belongs to his fatherland when things are good and life is sweet. But when there is sorrow and bitterness he finds refuge in his motherland” (ibid. p. 98). Hence the proverb “Mother is supreme” (loc. cit.), which expresses an Ibo’s standpoint of their society, where mothers are conceded respect. Another proverb about women is said, especially about old women. This is a humorous proverb in its ‘prototypical meaning’, and it is laughing stock in its ‘vehicle’ and ‘contextual’ interpretations (cf. Bhuvanewar, Chilukuri, “Exploring Semantics. Proverbs as Metaphors as Proverbs: Rethinking SFL as Ka:rmik SFL”). For a better understanding of this point, here is an excerpt of the conversation:

“I have heard that many years ago, when his father had not dead very long, he had gone to consult the Oracle. The Oracle said to him, “Your dead father wants you to sacrifice a goat to him. “ Do you know what he told the oracle? He said, “Ask my father if he ever had a fowl when he was alive. “Everybody laughed heartily except Okonkwo, who laughed uneasily because as the saying goes, an old woman is always uneasy when dry bones are mentioned in a proverb. Okonkwo remembered his own father”.

Ibo men’s outlook on the bringing up of children is also present in the book. Okonkwo and his friend Oberika are arguing about the former’s hand in killing Ikemefuma, what the latter does not agree with. Okonkwo replies:

“The Earth cannot punish me for obeying her messenger [...] A child’s fingers are not scalded by a piece of hot yam which its mother puts into its palm” (ibid, p.49).

This proverb is somewhat tantamount to “Spare the rod and spoil the child”. However, we should not overlook the virile denotation of the signifier “hot yam”. The yam is by itself a sign of manhood in Ibo culture, but- to boost- it is about a ‘hot yam’ which would not harm the kid’s hand; its positive effect is implicit.

Trinidadian-American dancer Pearl Primus went to Africa several times to do research on African culture and dance. In her essay “African Dance” ( apud Drachler, Jacob, op.cit.), she states:

“African Dance is basic, vital! For me it is the source, the well from which I draw inspiration for my work. African dance is complete...”

“It is hard for me to think of Africa without hearing again the great drums [...]. I must pause in the writing to quiet that part of me which cries out. Dance” (p. 173).

“Dance was still and still is of vital importance in the life of the African people” (ibid, p. 174).

In a culture so fond of proverbs, and belonging to such a musical and dancing-loving continent it is expected to encounter proverbs dealing with such amusing activities.

After Mr. Brown- the British missionary- died, he was succeeded by a very tough one, Reverend James Smith, for whom “black was evil” (Achebe, Chinua, op. cit., p. 134). And this time it is the narrator who tells us about a saying in Umuofia which goes like this: “As a man danced so the drums were beaten for him”. Mr. Smith danced a furious step and so the drums went mad” (ibid, p. 135).

We can say this proverb is message-equivalent to “As you sow, so you shall reap”.

The remaining category of proverbs used in the novel pertains to nature, that is to say, Ibo’s relation to fauna, flora, the stars, and other components of the external world.

In Chapter 1, Okoye, a very successful man, visits Unoka so that this one gave him back the two hundred cowries he had lent him two years before. Unoka tells him:

“You see, I owe that man a thousand cowries. But he has not come to wake me up in the morning for it. I shall pay you, but not today. Our elders say that the sun will shine on those who stand before it shines on those who kneel under them” (ibid, p. 6).

This character was a loafer, he was a failure according to every index of the Ibo society and, nevertheless, he spoke about dignity: he would not kneel; he would keep his chin up inasmuch as in so doing he would be privileged by the sun.

“If one finger brought oil it soiled the others” (p. 91). This proverb is uttered by the narrator when telling about Obierika, who....

“remembered his wife’s twin children whom he had thrown away. What crime had they committed? The Earth had decreed that they were an offence in the land and must be destroyed. And if the clan did not exact punishment for an offence against the great goddess, her wrath was loosed on all the land and not just on the offender (loc. cit.).

The ‘oil’ alludes to the palm tree, from which it is extracted, and the palm- tree oil is a very important crop in the Ibo society.

When Okonkwo’s seven year “sentence” comes to an end in his motherland, he decides to give a great farewell feast to his mother’s kinsmen who had been so good to him. Upon his wife Ekwefi’s protesting that two goats sufficed for the feast, he tells her: “I am calling a feast because I have the wherewithal. I cannot live on the bank of a river and wash my hands with spittle”. My mother’s people have been good to me and I must show my gratitude” (p. 121). In other words, he could not be mean, close-fisted, as he had the “wherewithal”; he had plenty of water in the river, how come he was going to ‘wash his hands with spittle?’

The signified of this proverb is similar to that of another African proverb: “A barber does not shave himself”, and to that of an Anglophone one, “The tailor’s wife is the best clad”.

And within the category of nature, there are also proverbs specifically related to animals, out of which we will pick one:

“A chick that will grow into a cock can be spotted the very first day it hatches”.

### Meanings in metaphorical proverbs

A classification of the meanings in metaphorical proverbs distinguishes into (See Bhuvanewar, Chilukuri, Exploding Semantics, Proverbs as Metaphors as Proverbs: Rethinking SFL as Karmik SFL):

The referential meaning as given by the expression (vehicle interpretation).

The prototypical meaning (focus interpretation or literal meaning).

The contextual meaning (the complex of focus and vehicle interpretation).

The meaning of a proverb in a context depends on both the referential or figurative meaning and the prototypical meaning. The former can fit two different contexts and the latter works as a model and categorizes the action of the context.

We intend to illustrate the classification above by examining some proverbs from Things Fall Apart.

*“An old woman is always uneasy when bones are mentioned in a proverb”.*

In this case the prototypical meaning is that of an old woman, and her mental unease when she hears people talking about bones. The referent of the proverb, however, can be any old person- regardless of gender- to whom ‘the cap fits’. In the context in question, Okonkwo felt quite embarrassed as he associated this proverb with his own father.

*“When mother-cow is chewing grass its young ones watch its mouth”.* Here, ‘mother-cow’ is a metaphor for mother or father, the act of chewing grass stands for anything done by parents and the ‘young ones’ are the children.

Obierika is told by his elder brother: “You were very much like that yourself” (op. cit, p. 51), and then he enlivens his words with that proverb.

Thus, in this situation Obierika was ‘mother-cow’, his son Maduka was ‘its young one’, and Maduka’s always running instead of walking was the act of chewing grass. To sum up, as the English saying goes, ‘They were cut from the same cloth’.

*“I cannot live on the bank of a river and wash my hands with spittle”.*

Never Okonkwo lived on the bank of a river nor- we feel- he would be capable of washing his hands with spittle.

We think the general referent in this saying is the confrontation between abundance and austerity, especially a critical remark against stingy people. Okonkwo uses it to stop his wife Ekwefi short. As he said to her: “I am calling a feast because I have the wherewithal...” (ibid., p. 121).

*“As a man dances so the drums are beaten for him”.*

The vehicle interpretation here is the same as “As you sow, so you shall reap”. The message denoted is like that of giving somebody their due.

The man referred to by the proverb in the scene in question was Reverend James Smith, who “saw the world as a battlefield in which the children of light were locked in moral conflict with the sons of darkness” (ibid, p. 134).

“There was a saying in Umuofia that as a man danced so the drums were beaten for him. Mr. Smith danced a furious step and so the drums went mad” (ibid., p.135).

*“You can tell a ripe corn by its fruit”.*

*“A chick that will grow into a cock can be spotted the very same day it hatches”.*

We have wanted to examine these two proverbs together.

The prototypical meaning in the former refers to a food which is ready to be eaten. It is ripe and you can say so just by looking at it. The prototypical meaning in the latter makes a distinction between a chick (standing for a baby boy) and a cock (which embodies an adult male).

We feel, however, that in order to discern the referential meaning of the former we need to know the context in which it was said.

“I can trust you. I know it as I look at you. As our fathers said, you can tell a ripe corn by its look” (ibid,p. 17).

Thus, Okonkwo was the ‘ripe corn’. This is the vehicle interpretation of the proverb, and the context was all the more necessary- in this case- to decode the referential meaning.

Nevertheless, it seems to us that the other proverb would have fitted this context as well. In other words, Nwakibie could have said... “I know it as I look at you. As our fathers said, a chick that will grow into a cock can be spotted the very day it hatches”.

Okonkwo would then have been the 'cock', the same as he was the 'ripe corn'. As to the situation in which the second proverb is used in the novel, we can say that the first proverb might also have been suitable: "Nwoye is old enough to impregnate a woman. At his age I was already fending for myself. No, my friend, he is not too young. You can tell a ripe corn by its look.

Yet, we should remark the better suitability of the second proverb in that context than that of the first proverb in the second situation. Because for Okonkwo his son was not a 'ripe corn' despite being 'not too young'.

We want to conclude this chapter by stating that no matter how important the vehicle interpretation of a proverb is for decoding its denotation, the context is of paramount importance for the reader to grasp the right denotation, and even the connotation of proverbs.

## Conclusions

We think the idea defended and mentioned in the Introduction has been validated. Chinua Achebe is a 'realist who spoke in his own words' and in proverbs. Because his own words are proverbs, because his own words are those of his people.

Examining the proverbs used in Things Fall Apart is like watching an exhibition of African visual arts. Proverbs are a treasure in Nigeria, a treasure shared by the rich and the poor- maybe the only such valued treasure shared by both social layers.

The three pillars present in every people's identity, according to Senegalese anthropologist Cheik Anta Diop, can be found in the proverbs of the Ibo society.

The analysis of a literary work should be a root-and-branch one, and this is the idea behind the semiotic-paremiological perspective proposed. Taking a look at the tropes, no matter how deep it might be, at the characters, setting and plot does not suffice. The semiotic approach we suggest allows the reader cast a look at the extra-linguistic reality to which the text belongs and at people's worldview as well.

This paper is also a way to honor Chinua Achebe, no doubt a great of contemporary world literature. He was 'a chick that grew into a cock', into a well-singing and virile cock. And for that singing and that proverbial African virility, Thank you, Achebe!

## References:

- Achebe, Chinua (2001), Things Fall Apart, Penguin Books Ltd., Registered Offices: 80 Strand, London WC2R 0RL, England.
- Bhuvaneshwar, Chilukuri (2002), "Exploring Semantics. Proverbs as Metaphors as Proverbs: Rethinking SFL as Karmik SFL", Australian Systemic Functional Linguistics Conference, Sydney, Australia.
- Diop Cheik Anta, mayo-junio (1986). "Los tres pilares de la identidad". El Correo de la UNESCO.
- Drachler, Jacob (1963), African Heritage, The Crowell-Collier Publishing Company.
- Emerson, Ralph W., "Compensation" apud [http:// www.rwe.org/works/Essays-1st Series 03 Compensation.htm](http://www.rwe.org/works/Essays-1st Series 03 Compensation.htm), 2006-05-09, 11.20.
- Hernadi, Paul and Francis Steen, "The Tropical Landscapes of Proverbiality": A Cross-disciplinary Travelogue" apud [http:// cogweb.ucla.edu/Culture/Hernadi Steen 99.html](http://cogweb.ucla.edu/Culture/Hernadi Steen 99.html), 2006-05-27, 9:30.
- <http://mb-soft.com/believe/txs/proverbs.htm>, 2006-06-06, 22:18.
- <http://www.afriprov.org/resources/dailyproverbs.htm>, 2006-04-14, 14:30.
- <http://www.scholars.nus.edu.sg/landow/post/achebe/jura01.html>, 2006-05-23, 10:20.
- <http://www.scholars.nus.edu.sg/landow/post/achebe/language.html>, 2006-05-24, 10:40.
- Palmer, Eustace (1972), An Introduction to the African Novel, Heinemann Educational Books Ltd, London.
- The Penguin English Dictionary (2003), Penguin Books Ltd, London. 2<sup>nd</sup> edition.

## MIRRORING THE “OTHER”: ORIENTALISM, NOMADS AND ETHNOMASQUERADING IN LAWRENCE’S *SEVEN PILLARS OF WISDOM*

*Sara Corrizzato, PhD in English Studies*  
*Giada Goracci, PhD Student in English Studies*  
University of Verona, Italy

---

### Abstract

Postcolonial theory is mainly concerned with the concept of “otherness”. This term implies complexities to its definition in that it might include other concepts, such as doubleness, identity, responsibility, alter ego and enigma to and of the self. As a complex and multifarious term, Otherness conventionally evokes another pivotal aspect of the theory that is “difference”. This article<sup>381</sup> ventures into the way in which Thomas Edward Lawrence, in his masterpiece *Seven Pillars of Wisdom*, sees “the Other” and, secondly, what possible reasons make him partially change his vision of/on the oriental culture. The focus will be especially set on Lawrence’s journey to Arabia as a crucial point to his personal development. Furthermore, the article will take into account Lawrence’s role in the revolt in which he took part and what kind of relationship he had both with his English superiors and with Arab soldiers. Finally, to better understand Lawrence’s interior change, it will be indispensable to analyse three important theories: Orientalism, the concept of “nomad”, and the notion of Ethnomasquerading.

---

**Keywords:** Otherness, identity, ethnomasquerading, lawrence

### Lawrence and the Concept of “Nomad”

One such a concept of “nomad” is necessary entangled with the notion of colonial theory, in that it considers the importance for travellers of wandering in unknown places and open spaces, in order to know themselves and to reconstruct their identity. Nomads, indeed, are rootless and can move whenever they want and change place, home and practises, thus reaching complete freedom from social codes and getting the possibility to know themselves deeply. In this light, this introspection process promotes the separation from the old imperialist European traditions, but also the subsequent insecurity and pain for what the traveller does not know and for what he does not understand.

Lawrence, as an Oxford graduate of history, had been involved in the British archaeological excavations of Carchemish, in Syria, but when the war broke out, he volunteered for service in the Military Intelligence Section of the British Army. During his journey to Arabia Lawrence was obligated to move every day to fight and destroy the railway that ran from Damascus to Medina, through Hejaz region. He and the Arab soldiers passed through important towns like Wejh, Akaba and Jembo and spent a lot of time in depopulated areas and desert spaces. Therefore, he had to interact with a different culture and perform actions such as riding camels, marching under the sun for hours and surviving in high temperatures.

The constant moving on foot or by camel from a place to another allowed Lawrence to form a subjective opinion on Arab tribes and to familiarize with his Arab army:

---

<sup>381</sup> The article has been jointly planned by the two authors: G. Goracci has dealt with sections 1-2, while S. Corrizzato with 3-4-5.

“We marched through the palm-groves which lay like a gordle about the scattered houses of Rabegh village, and then out under the stars along the Tehama, the sandy and featureless strip of desert bordering the western coast of Arabia between sea-beach and littoral hills, for hundred and monotonous miles.” (chapter X)

*And again,*

“The march became rather splendid and barbaric. First rode Feisal in white, then Sharraf at his right in red hed-cloth and henna-dyed tunic and cloak, myself on his left in white and scarlet, behind us three banners of faded crimson silk with gilt spikes, behind them the drummers playing a march, and behind them the wild mass of twelve hundred bouncing camels of bodyguard, packet as closely as they could move, the men in every variety of coloured clothes and the camels nearly as brilliant in their trappings. We filled the valley to its banks our flashing streams.” (chapter XXIII)

As the extracts above testify, the concept of “nomad” is linked with the basilar postcolonial concept of displacement, which generally implies the subject’s psychological disorientation and the following break with the Western traditions. Indeed, the nomad is continuously bombarded by different uses, ways of living and thinking that, eventually, could lead him to a sort of identity crisis. At the very beginning of the nomad’s experience, being in touch with another culture and tradition, makes him feel a sense of strangeness and alienation; as time goes by, the traveller undergoes instead a factual psychological transformation to the point that the homeland survives only in his memories and thoughts.

Moreover, the presence of the desert, as we can read in Pratt (1992), plays a primary role in this theory: in fact, this type of landscape symbolizes the need of surviving and emancipation. Conventionally, the European people sees the desert as an unreal zone that marks what is habitable and what is inhabitable. We can hardly believe that these two important notions break off from the known theories of colonizing European countries where, at first, we found the importance of being someone and feeling superior to the “Other”.

In *Seven Pillars of Wisdom* Lawrence is forced to spend a lot of time in the desert: he has to march, to eat and sleep on the sand. He luckily learns from the Arabs how to survive in this landscape. In some passages, the main character describes the difficulty of living there and of standing the heat without water. However, this difficult life brings him to several important reflections about himself and the new reality he is experiencing. This “process of interior evolution” is testified in the eighth chapter of the book “Lawrence d’Arabie”, written in 1961 by Benoist-Méchin, where he, talking about Lawrence’s previous travels in the Middle East, writes: “Pour la première fois, il goûtait cette ivresse par la dématérialisation dont il se solerait plus tard dans ses longs séjours au désert.”

### **Lawrence’s View of “the Other”**

As we have observed in the previous lines, the work *Seven Pillar of Wisdom* is a problematic representation of an identity crisis, which begins with Lawrence’s arrival in Arabia and goes on during his permanence with the Arabs. Yet, as such, it consists of private accounts based on memoirs that, to a closer analysis, entail a subtext of “cultural and ethnical relationships”, which is revealed through a series of personal reckonings.

The most fundamental problem is the relationship with “the Other”. Needless to say that, in the light of the historical and political circumstances in which Lawrence found himself involved, the cultural encounter he experienced with others was not, initially, one of respect and recognition, but an epitome of discriminated “otherness”. Who is, then, “the Other” for Lawrence? He/she represents to him the person who, according to his imperial principles, is savage and uncivilized.

When Lawrence arrives, the Arabs “feel” undoubtedly his different roots: indeed, he tends to confront English and Arab military organization and to analyse the Arabs not in terms of people that he meets but only as “subject of study”. He inquiries into Arabs’ history and

costumes and his investigation brings him to classify them according to the different areas in which they live. He describes the Oriental area as “a rough parallelogram”, localizing the biggest rivers, mountains, desert spaces and Arab tribes.

“A first difficulty of the Arab movement was to say who the Arabs were. Being a manufactured people, their name was changing in sense slowly years by years. Once it meant an Arabian. There was a country called Arabia; but this was nothing to the point.” (chapter II) As we can observe, in the first period of his stay in Arabia he is wary and tends to study and analyse the people he meets. That happens for two principal reasons: on the one hand, he is naturally still bound to his homeland and, on the other hand, he observes Arabs with a colonizer’s eyes: he feels automatically superior to these people, who are so different from him for the colour of their skin, the clothes they wear, the language they speak and their religion. On this matter, it is worth mentioning Edward Said’s theory<sup>382</sup> of Orientalism: with this word he meant a typical attitude of the European society in the nineteenth and twentieth century that consisted in seeing the Oriental people as inferior beings. Thus, he defined “Oriental” the person represented by such a stereotype, unmodified in Western citizens’ minds. On the same evidence, oriental places are seen as separate, backward, eccentric and passive. This racist attitude involved the necessity to know the conquered people, so the Orient became the core subject of analysis, “the observed, the object”. According to this theory, by analysing Lawrence’s initial behaviour, it is possible to gather thoughts and attitudes that really testify the so-called “latent orientalism”; as a matter of fact, in the first pages of the book, some reflections on the Arabs are entirely the result of an imperialist observation. He sustains that these people are incapable to rationalize reality, they are without any type of moral or material organization and they are incapable to appreciate what is materialistic (chapter III). He goes on arguing that the Arabs do not feel any duty for the state but they are mainly lovers of their houses and domestic easements. (chapter XIII)

There is another fundamental aspect to consider: Lawrence, as the English leader who has to win the war, is forced to understand the Arab soldiers, in order to consider their positive and negative features and to prepare a winning strategy. The following extract highlights Lawrence’s “plan”:

*“I concluded that tribes men were good for defence only. Their acquisitive recklessness made them keep on booty, and whetted them to tear up railways, plunder caravans, and steal camels [...]”* (chapter XV)

According to Lawrence’s reflection, the Oriental troops were less trained than the European army; Lawrence also noticed that Arabs were divided in several groups and still bound to old uses, that were considered ridiculous by him. From his accounts, for instance, emerges a sharp sense of otherness that, sometimes, goes beyond mere stereotyping racism and verges on ethnic prejudices against the Arab tribes in form of denigration and mockery:

*“The actual contingents were continually shifting, in obedience to the role of flesh. A family would own rifle, and the sons serve in turn for a few days each. Married men alternated between camp and wife, and sometimes a whole clan bored and take a rest.”* (chapter XV)

Lawrence’s racism is not merely associated with language, skin colour or linguistic difference in that it intrinsically relates to ethnic personality and genetics (cf. Ackermann, 21-22). When he was in the battlefield, he disguised his prejudice against the Arabs and pretended to “assimilate” to their habits in order to suppress his own sense of otherness. The following lines clearly show this feeling of “I versus them”:

*“I was sent to these Arabs as a stranger, unable to think their thoughts or subscribe their beliefs, but charged by duty to lead them forward and to develop to the highest any movement of theirs profitable to England in her war. If I could not assume their character, I*

<sup>382</sup> Cf. <http://www.lehigh.edu/~amsp/2004/09/introduction-to-edward-said.html>

*could at least conceal my own, and pass among them without evident friction, neither a discord nor a critic but an unnoticed influence. Since I was their fellow, I will not be their apologist or advocate” (pp. 28-29)*

### **Lawrence’s Re-Construction of Self**

In order to understand the quality of Lawrence’s interpersonal evolution, it is important to consider his previous training and experiences. In fact, being an archaeologist, in the years before the Arab Revolt, he devoted himself to research in the Middle East. Surely, this period in foreign places has helped him to approach Oriental people. He began his journeys in 1910 and he stopped in Jbail, where he studied Arabic; he then went to work in the excavations at Carchemish, in the Northern of Syria in 1910 and in 1911. In the following years he continued to make trips to the Middle East until the outbreak of First World War. On these travels Benoist-Méchin writes: “Voyageant à pays, il prit l’habitude de longer chez l’habitant”. In 1914, Lawrence worked as an archaeologist for the British Army on the Sinai peninsula and he visited Aqaba e Petra. It is important to consider that his extensive travels through Arabia, his excursions, often on foot or by camel, living with Arabs, wearing their clothes, learning their language and their local dialects, in a second time, helped Lawrence to see Arabs as people and not only as “colonized”.

This difficult process of “understanding the *other* culture” is narrated in the work *Seven Pillars of Wisdom* in which Lawrence records his inner change. He breaks off from his own cultural, racial and social heritage and begins to live together with the Arabs, “accepting” their traditions. He learns to live as the Arab soldiers and to understand their feelings and their way of thinking. This process will eventually lead him to point of rejecting his “Britishness”. The evolution that characterizes his denial of the original traditions and customs can be clearly seen by analyzing the passages where Lawrence reports the soldiers’ life.

The first periods that Lawrence spent with the Arab Soldiers show that his sense of alienation seems to derive from the fact that he feels himself as a “stranger in the group”. As we can read in the following lines, he tends to notice the difference between English soldiers and the Oriental army:

*“This people was black and white, not only in vision, but by inmost furnishing black and white not merely in clarity, but in apposition. Their thoughts were at ease only I extremes.” (chapter III)*

*To an Arabian essential part of the triumph of victory was wear the clothes of an enemy: and next day we saw our force transformed (as to the upper half) into Turkish force [...].” (chapter LIV)*

Embarking on a slow “stream of evolution”, Lawrence’s way of thinking changes. Living together with these men, so different from him, he is able to establish a deep relationship between him and them. What unites the Arabs are the experiences that they share, but above all, the spare time that they spend together. In the twentieth chapter of Benoist-Méchin’s book, we read: “il se sent tenu de défendre ses compagnons d’armes non seulement contre l’ennemi, mais contre les critiques de ses compatriotes, même lorsqu’elles sont fondées.” He shows sights of Arab nationalism, he learns to love his companions-in-arms and to admire two of the most charismatic Arab figures: Emir Feysal and Auda Abu Tayi, who are both leaders of the revolt. He considered the first as a sort of prophet, from whom, he says, he learns a lot of things about the Oriental people and their politics (chapter XIII); and he defines the second as the warrior’s essence (chapter XXXVIII). Lawrence recognizes in these two men the purity of the soul and the nobility of actions. During his journey through Arabia, he succeeds in overcoming his Occidental imperial perspective and principles to really appreciate and respect the Oriental mentality. In the first chapter, Lawrence describes the difference between his people and the Arabs in the camps: he underlines the English general discontent

and their usual idea of superiority, while he praises Oriental people for their tenacity and their respect for the enemy.

*“We were surviving a common ideal, without tribal emulation, and so could not hope for esprit de corps. Ordinary soldiers were made a caste either great rewards in pay, dress and privilege [...]” (chapter LIX)*

Moreover, in several passages, Lawrence describes the Arab soldiers’ behaviours, presumably shocking to the eyes of the European readers, without showing any critical or ironical vein.

For instance, in the forty-sixth chapter (chapter XLVI), he accurately portrays an Arab typical dinner in an important leader’s tent. All men are all sitting on the floor and they eat mutton and rice. They have only a glass of tee and one dented bowl; they cut pieces of meal from the animal with the sword and eat with their hands. At the end of the dinner, men move outside from the tent and sit down under the stars. Lawrence also eats in this way and, by reading the passage, we understand that he is an integral part of this ritual.

In another passage, in the thirty-second chapter (chapter XXXII) Lawrence, describing a moment in which he is ill, praises the Arabs’ hospitality and includes the description of an evening passed in a tent with fleas and louses.

After these fulfilling experiences, the Arabs become for him people with clear and noble ideals, different from the English people. He is convinced that no English man would have fought without any profit. Lawrence understands that Europeans are not superior to Oriental people and he confirms his opinion with these words:

*“there was no excuse or reason, except our laziness and ignorance, whereby we could call them inscrutable or Oriental, or leave them misunderstood.” (chapter XXXVII)*

### **Ethnomasquerading**

*Ethnomasquerading is defined by post-colonial scholars as the performance of an ethnic identity through the mimicking of clothes, gestures, appearance, language, cultural codes, or other components of identity formation. This phenomenon, observable above all in women travel writers in the eighteenth and nineteenth century during the colonial period, implies the subject’s identification with “the Other”.*

*As far as we know from the book and pictures passed on to us, Lawrence also wore local clothes. Indeed, after few weeks spent in Arabia, he decided to wear a typical Arab headgear. He reported to have put on the hat in order to protect himself from the sun; afterwards, he adds that an English superior to him disapproves of this choice (chapter XVI). After some lines, he also recounts that during his previous stay in Syria, he got used to wearing Oriental clothes. His total change of garments arrives in the twentieth chapter, in which Feisal asks Lawrence if he would have liked to wear the same Arab clothes. Lawrence accepts with pleasure and justifies his choice with two reasons: on the one hand, these clothes are surely more suitable and, on the other hand, he knows that the Arab army would have accepted him as “one of them”.*

*This involvement in the new culture implies the Occidental subject’s identification with the new traditions and customs. Thus, Lawrence’s change of identity also happens because he, wearing the new clothes, undergoes a transformation that is physically visible, but that is also interior:*

*“[...] I should find it better for my own part, since it was a comfortable dress in which to live Arab-fashion as we must do. Besides, the tribesmen would then understand how to take me.” (chapter XX)*

*What comes out in reading these lines is a sense of “de-westernization” and a patent manifestation of Lawrence’s “ethnic inclusion” in a world that, at the beginning of his experience, he did not accept. Progressively, Lawrence seems to cross the boundaries between “him” and “them”, “here” and “there”, “Occident” and “Orient”.*

## Conclusion

*In recent years, postcolonial studies have brought under scrutiny the relationships that have characterized, and still do influence, colonizers and colonized people. As we have noticed above, Lawrence, at the beginning of his experience, "distorts" the society with which he came into contact, thus inscribing the so-called "inferiority" of the people he met. As his behaviour changed towards the colonized people, he felt as if he were split into two identities: indeed, even though he "accepted" the Arab culture, he did not totally abandon his imperialistic heritage. As a matter of fact, we can find in Lawrence's personality a constant binary opposition between old formation and new identity. As we can read at the beginning of the book, in the first chapter, he declared that through his two years with the Arabs, he lost his English way of thinking and he saw Europe under another light. However, he also adds that he was not able to become an Arab in every aspect. Besides, he says:*

*"In my case, the efforts for these years to live in the dress of Arabs, and to imitate their mental foundation, quitted me of English self, and let me look at the West and its conventions with new eyes. [...] At the same time I could not sincerely take on the Arab skin: it was an affection only easily was a man made an infidel, but hardly might he be converted to another faith". (cap. I)*

This shows how the Western concept of the Oriental seems to be based on the Manichean allegory according to which the world is divided into mutually excluding opposites therefore, if the Occident is ordered, rational, masculine and good, the Orient is considered as chaotic, irrational, feminine and evil. This notwithstanding, Lawrence represents one of the most important figures of the post-colonial period in that he was able to "partially" cross the cultural boundaries existing between Occident and Orient, even if it is clear that he also maintained traces of Englishness. That brings us to a further question: "Do self and other inevitably express the dichotomy "us" and "them"?"

## References:

- Ackermann, Robert John, *Heterogeneities: Race, Gender, Class, Nation, and State*. Amherst: Massachusetts, 1996.
- Bhabha, Homi K., *The Location of Culture*. London: Routledge, 1994.
- Benoit-Méchin, Jacques, *Lawrence d'Arabie ou le Rêve Fracassé*. La Guilde du Livre et Clairefontaine: Lausanne, 1961.
- Duncan, James and Ley, David, *Place/Culture/Representation*. London: Routledge, 1993.
- Helmreich, William B., *The Things They Say Behind Your Back: Stereotypes and the Myths Behind Them*. New Brunswick: Transaction, 1984.
- Kaplan, Caren, *Question of Travel: Postmodern Discourse of Displacement*. Durham: Duke University Press, 1996.
- Lawrence, Thomas E., *Seven Pillars of Wisdom: A Triumph*. London: Penguin, 1962.
- Pratt, Mary L., *Imperial Eyes-Travel Writing and Transculturation*. London: Routledge, 1992.
- <http://www.lehigh.edu/~amsp/2004/09/introduction-to-edward-said.html>. Last accessed 20 February 2014.

## ETHICAL AWARENESS AND FAIRNESS IN LANGUAGE TESTING

*Jana Bérešová, assoc. prof. PhDr., PhD*  
Trnava University/Faculty of Education, Slovakia

---

### Abstract

The submitted paper outlines the impact of political decisions on language testing, predominantly on test scores of the tested population, test design and item-writing. Results from research referring to the comparison of test-takers' performances in the years 2011-2013 reveal a necessity to be sensitive and aware of ethics and fairness in language testing. The research is focused on the professional decision of test developers, item writers and administrators to avoid negative impact and maximize positive washback. The paper focuses on the construct which underlies the B2 English test to provide information about abilities that the test is designed to measure. Testing grammar and vocabulary was supported by using multiple linear regression analysis. The new conditions for test takers in 2012 are analyzed and evaluated in three areas the number of the students applying for tests in English B2, the total scores of students and their grouped distributions and the scores achieved in productive skills and language in use. We conclude by examining the ethical implications of the new conditions for test takers and by demonstrating the effect the ethical dimension had on item writers in their design of subsequent tests. Fairness plays an important yet hard to implement role in test design, and it is often up to the administrators and test designers to cope with external obstacles in promoting this.

---

**Keywords:** Communicative language testing, CEFR level B2, ethics, fairness

### Introduction

A new theory of language and language use significantly influenced language teaching in the early 1970s, and a decade later, testing as well. The basic idea underlying communicative teaching is that language is used for the purpose of communication, in a particular situation and for a particular purpose, and the important thing is not what a person knows about the language, nor how grammatically correct they are, but if they can use it to communicate in the target language use situation, the real-world situation in which the language will be used (Hymes, 1972). This teaching is to be reflected in testing and therefore communicative tests need to test use of the language rather than usage.

The document, which has increased a communicative view of language in language learning/teaching as well as language testing, *the Common European Framework of Reference for Languages: Learning, teaching, assessment (CEFR)*, offers language test designers and item writers the possibility of moving collectively towards a shared language testing system, which conforms to European and international standards of test production.

Since 2001, when *the CEFR* was officially published in English, and 2009, when *the Manual: Relating language examinations to the Common European Framework of Reference for Languages: Learning, teaching, assessment (CEFR)* and a set of accompanying tools emerged, supported by the Council of Europe, many European countries have re-evaluated their systems of language assessment and designed new national tests, mostly focusing on testing language competence achieved at school-leaving examinations in target languages.

In Slovakia, the reform of the school-leaving examination in English started in 1997, and the new way of assessing language competence was officially recognized by the Slovak

Ministry of Education in 2005. The reform was based on the CEFR perspective which extends the previously narrow linguistic range by focusing on competences either general or communicative. The CEFR became a basis for the elaboration of new English syllabi, describing what language learners have to learn to do in order to use a language for communication and what knowledge and skills they have to develop so as to be able to act effectively at B1 or B2 levels. In the beginning, learners who were to complete their secondary school studies could choose the level of the test, however, in 2012, the Ministry of Education required that all the students studying at secondary grammar schools, which are considered preparatory schools for university studies, were obliged to sit for a B2 test.

### **The English Language Examination at CEFR Level B2**

The B2 examination in English comprises five sections, out of which three parts (80 items) are guaranteed by the Ministry of Education, whereas students' performances in two sections (based on testing productive skills) are assessed by appointed English teachers, directly at schools. The test, provided completely externally, consists of these sections:

Listening Comprehension (three tasks/20 items) – 20% of total

Language in Use (three tasks/40 items) – 20% of total

Reading Comprehension (three tasks/20 items) – 20% of total

The test-takers receive their scores in percentage and percentile in an official report. In spite of the action-oriented approach, adopted by the CEFR, which takes into account the cognitive, emotional and volitional resources and the full range of abilities specific to and applied by the individual as a social agent, English grammar and vocabulary is tested directly in the Language in Use section and indirectly in testing writing or speaking.

Productive skills are tested as follows:

Writing (one task) – 20% of total

Speaking (three tasks) – 20% of total

Although the topics of writing are announced officially, the papers are marked at schools, by two assessors using the official marking schemes, provided by the Ministry of Education. The speaking part is still in the hands of the teachers; however, the examination papers are agreed upon and recognised by officially appointed professionals. The examination board consists of three professionals who assess the performances using marking criteria for oral assessment.

An action-oriented approach, adopted by the CEFR, focuses on language ability where language is seen as a tool to perform communicative actions in a social context. The descriptors, which are presented in the CEFR, concerns language skills and linguistic competence defined as knowledge of, and ability to use, the formal resources from which a well-formed, meaningful message may be assembled and formulated (CEFR, 2001:109). Practitioners are recommended to use their frame of reference, identifying the theory, tradition or practice they are following. In the Slovak context, a new look at the assessment of grammar, which emphasises that grammar cannot be treated as an isolated component of knowledge and must be assessed in the larger context of language in communication. In the language in use section, grammatical forms and functions, and vocabulary are tested in context-based texts. In writing and reading sections, a communication-based perspective of language, which views grammar as a set of linguistic norms, preferences and expectations that a test-taker uses to convey pragmatic meanings, which are appropriate, acceptable and natural depending on the situation, prevails. From a communication perspective, Halliday (1994) emphasises that although language can be used to express meaning for a number of social purposes, the language system itself can be reduced to a small set of language functions such as experiential, interpersonal and textual functions in oral and written texts. Cohesion theory focuses on how certain words link grammatical forms to meaning and contextual use. These cohesive ties may be used through grammatical cohesive devices on a sentential level. As far

as vocabulary testing is concerned, the emphasis is put on context-dependent testing which assesses the test-takers' ability to take account of contextual information in order to produce the expected response. The notion of context is included into whole texts as contextualisation means to what extent the test-takers are being assessed on the basis of their ability to engage with the context provided in the test.

The idea to test grammar and vocabulary in the language in use section was based on our research, in which the coefficient of correlation between language in use scores and their total scores was above 0.9 in 2008 and 2012, which can be described as strong. This was discovered while the relationship between one dependent variable (total score) and several independent variables (listening scores, language in use scores and reading scores) was being studied, using multiple linear models in a regression analysis.

### Radical Changes and Ethical Awareness

Before 2012, secondary-school leavers were expected to sit a test in one foreign language (English, German, French, Russian, Spanish and Italian) according to their preferences and CEFR levels (B1 or B2) due to their language proficiency. The students were responsible for their options and future professional orientations.

Since 2012, according to a decision made by the Ministry of Education secondary-grammar-school students have been obliged to select a language they want to be tested on, but exclusively at level B2. Since English has become a more and more popular language, replacing German, the expected consequences has been primarily seen in three areas:

the number of the students applying for tests in English B2

the total scores of students

the scores in skills and language in use

The first issue to discuss is a change in the number of applicants for English B2. While in 2011, the number of the students who chose to be tested in English B2 was only 3,268, the decision to sit for a language test at level B2 increased the number of test-takers being tested in English fourfold (15,651). When students were made to choose a higher proficiency level, the number of applicants for each language became logically higher. The preference for English has grown from 83.84% out of all tested population in 2011 to 85.98% in 2013.

Table 1 *Language selection of students applying for level B2 in 2011, 2012, 2013*

Language	2011	2012	2013
English	3,268	15,651	14,819
German	530	2,304	2,033
French	34	59	80
Russian	47	293	265
Spanish	17	27	28
Italian	2	5	5

The second issue which has to be raised is the statistical analysis of the total scores, achieved in English B2. Comparing the achieved total scores in the three-year term revealed that in 2012 a radical change in the mandated language proficiency caused a significant decrease of successful students. While in 2011 the percentage of unsuccessful students was 1.44% (47 students), in the year of the radical change it was tenfold – 10.9% (1,700 students). Nevertheless, it is important to mention that item writers felt all the ministerial changes sensitively, and in order to enhance fairness, they made the test suitable for various competency-equipped students. This approach resulted in positive washback in the year 2013, when the number of unsuccessful students tested in English B2 fell by 4.1% (602 students).

Table 2 Comparison of achieved scores in the years 2011-2013 in English B2

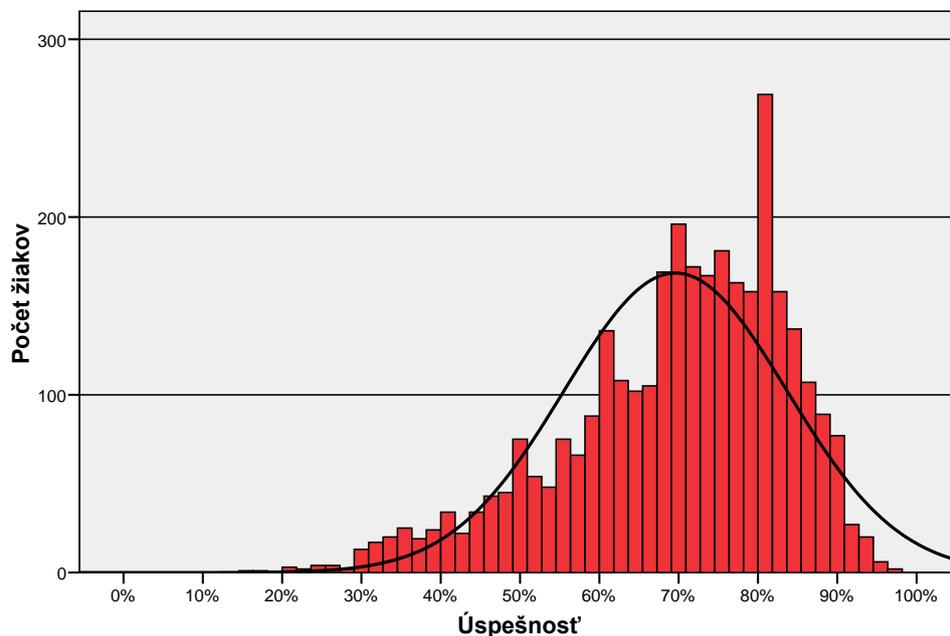
The year	2011	2012	2013
Total scores	69.6	55.4	63.2
Listening	76.7	55.8	70.8
Language in Use	62.1	52.7	54.3
Reading	70.1	57.6	64.5

The mentioned process is clearly seen in the following histograms, which display the grouped distribution of total scores achieved by students in the previous three years.

Analyzing the particular sections of the test, it can be summarized that the difference in achieved score in 2012 and 2011 is more visible in testing productive skills rather than grammar. On the other hand, it should be mentioned that the level of language competence was higher in all three sections in 2013.

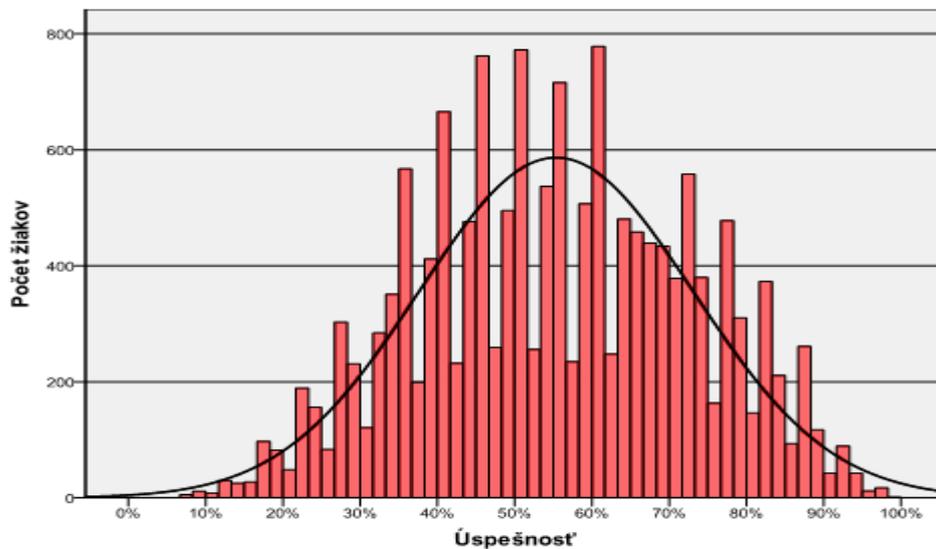
Figure 1 Histogram of frequency distribution of the scores achieved in English test B2 in 2011

**Anglický jazyk úroveň B2 2011 - histogram úspěšnosti**



The above score distribution (Figure 1) reveals that the achievements of students were quite consistent. The highest score 97.5% was achieved only by one student and 2.264% (74 students) of total test-takers achieved scores in the range from 90.1 to 100 (Urbanová, Ringlerová, 2011). The score of 75.8 was achieved by the highest number of students - 101 (3.09%).

Figure 2 Histogram of frequency distribution of the scores achieved in English test B2 in 2012



Obr. 1 Výsledný histogram úspešnosti

As we mentioned before, item writers sensitively responded to the decision of the Ministry of Education and the impact of their approach to ethics and fairness is seen in the histogram displayed in Figure 2 (Mišová, Mrva, 2012). One of the tested students achieved 100% of total score and the range from 90.1% to 100% was achieved by 203 students (1.297%). The distribution of scores is less consistent as poorer students who considered their English to be more suitably tested at level B1 had to sit for level B2.

Figure 3 Histogram of frequency distribution of the scores achieved in English test B2 in 2013

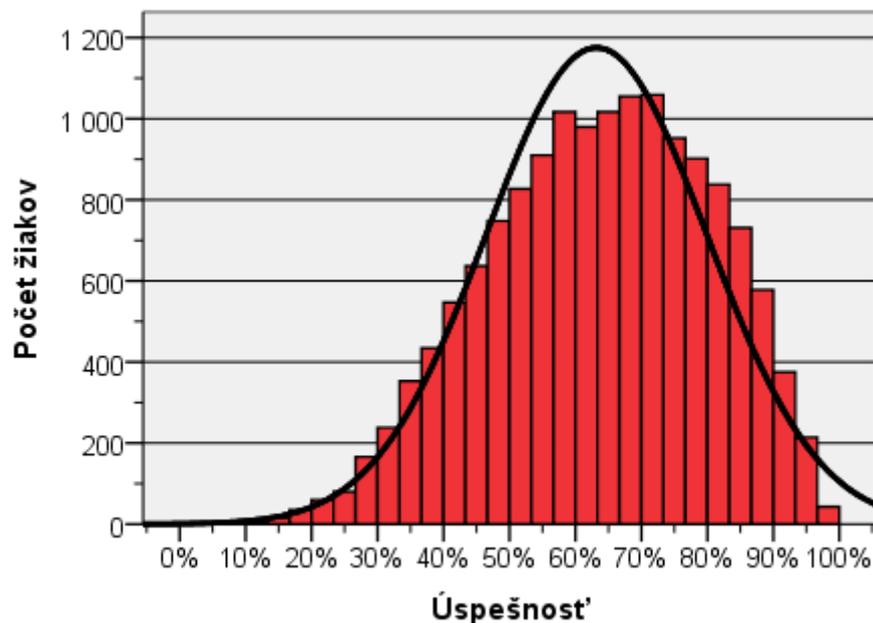


Figure 3 displays the histogram of the grouped score distribution from English test B2, conducted in 2013 (Mišová, 2013). A positive washback of the sensitive approach of item writers from the previous year is reflected in the achievements of the students. One student achieved the score of 99.2, seven students that of 98.3 and nine students 97.5, followed by twenty-six students achieving 96.7. The range from 90.1 to 100 was achieved by 530 students (3.58%). The score distribution is consistent and total grouped scores are proportionally distributed.

Analyzing achieved scores in single sections of the test, it was discovered that in the years when the students could choose their proficiency level to be tested on, the scores

achieved in Listening and Reading Sections were rather comparable. The following years (2012, 2013) reading scores were lower due to a number of left-out items. As the Reading Section is the last section of the national test, we might conclude this phenomenon that poorer students have not developed their reading skills in English so well and need more time for tasks achievement. Surprisingly, the students deal with the language in use items constantly. A strong emphasis put on grammar and vocabulary in teaching English in Slovakia seems to be fruitful. As we mentioned before, the correlation of the total scores and language in use scores is so strong that despite the action-oriented approach of the CEFR, the country adopted the parameters and categories useful for the description of linguistic content in the national curriculum.

### Conclusion

The ethical concerns that are discussed in language testing are essential. Decisions made about a person on the basis of a test score can have serious and far-reaching consequences. Ethics in language testing is very important. Spolsky (1977) supported the approach to language testing that requires full justification of all statements based on tests. He pointed out that language testers must be as concerned with the prevention of bad testing as with developing new tests, and that they must be sensitive to the possible educational, social and political consequences of testing. As tests have impact on the lives of test takers, any decision should be done professionally. In our case, the students, who were expected to complete their secondary-school studies, should have been officially informed that they would have to sit for B2 language tests in the first year of their secondary studies. This information would have influenced their approach to language learning and reduced the negative impact on their lives.

On the other hand, item-writers tried to soften the possible consequences and worked consciously in test design and item writing to maximize the possibility of positive washback. This reflected in the following year when the achievements of the students were better and the score grouped distribution was more consistent. The sensitive approach of the administrators, test designers and item writers confirmed the well-known statement that practices must be just and tests must be primarily just and fair for all.

### References:

- Common European Framework of Reference for Languages: Learning, teaching, assessment. Cambridge: Cambridge University Press, 2001.
- Hymes, D. H. On communicative competence. In J. B. Pride and J. Holmes, eds. *Sociolinguistics*. Harmondsworth: Penguin, 1972.
- Manual. Relating language examinations to the Common European Framework of Reference for Languages: Learning, teaching, assessment (CEFR). Strasbourg: Language Policy Division, January 2009.
- Mišová, M. *Správa o výsledkoch externej časti a písomnej formy internej časti maturitnej skúšky z anglického jazyka úroveň B2*. Bratislava: NÚCEM, 2013
- Mišová, M., Mrva, M. *Správa o výsledkoch externej časti a písomnej formy internej časti maturitnej skúšky z anglického jazyka úroveň B2*. Bratislava: NÚCEM, 2012.
- Spolsky, B. 'Language Testing: Art or Science?' In *Proceedings of the Fourth International Congress of Applied Linguistics*, Stuttgart: Hochschulverlag, 1977, pp.7-28.
- Urbanová, M., Ringlerová, V. *Správa o výsledkoch externej časti a písomnej formy internej časti maturitnej skúšky z anglického jazyka úroveň B2*. Bratislava: NÚCEM, 2011

# RESEARCH UPTAKE: THE VALUE OF EFFECTIVELY COMMUNICATING RESEARCH TO YOUR AUDIENCE

*Dori Nguyen, MCRP, LEED Green Associate*

Institute for Environment & Sanitation Studies (IESS), University of Ghana, Legon, Ghana

---

## Abstract

The field of research uptake is an emerging, yet imperative area of ‘meta’ research – insight into different approaches on disseminating and using research is continually surfacing. These include strategies on how to catch, maintain and sustain the attention of target audiences, ensure that knowledge is appropriately transferred to policymakers, practitioners and other end users, and monitoring its impact. Extensive literature, coupled by a variety of tools, both generic and topic-specific, exists dedicated to helping the researcher research and integrate dissemination plans into their work. These often aim to increase communication and understanding across disciplines and appropriately affect policy, society, culture and environment. This paper attempts to define some key terminology, provide a brief introduction to ongoing efforts and explore some main motivations and justifications for integrating uptake into research.

---

**Keywords:** research uptake, dissemination, communication

## INTRODUCTION

While the collective history of research uptake, dissemination and communication (subtly differentiated below) is neither a long-winded nor complex one, the concepts have been promoted and practiced in a variety of fields, for quite some time. However, the bulk of published research and guidance documents have mainly been limited to public health and medicine uptake, with a small yet budding body of works on international development. As an overarching topic that applies to all fields, research uptake seeks to challenge researchers and practitioners to critically examine their accumulated knowledge and data, from the outset through to the follow-up, for their relevance and utility to existing applied models. Here, it is also stressed that this process is not a one-way stream; rather there should also be a continuous feedback loop back from practitioners to researchers.

The purpose of this paper is three-fold – to begin or continue the dialogue amongst students, researchers, academics and practitioners about how research uptake can be:

- 1) *Integrated* into your own research, ideally at the point of conception, before beginning the project, and
- 2) *Used* – who is the intended audience? How can you make it accessible and communicate it effectively to them? What will they do with this information?

Thirdly, this serves as a brief primer on research uptake as a field currently and its varying methodologies, objectives and potential outcomes. Itself aimed at a diverse audience, the paper speaks through a general lens, rather than to one specific field, and thus, intends to spur academics and researchers to curate their own respective processes to effective research uptake.<sup>383</sup>

---

<sup>383</sup> Due to relatively new developments in research uptake and related fields, and in an attempt to maintain accessibility of information, many of the sources come from emerging publications, citations from relevant experts, and other open access literature – both informal and formal.

## WHAT IS RESEARCH UPTAKE?

### History

The evolution of research dissemination approaches, while sometimes quite inherent in the nature of research, did not become quite as apparent until the last few decades. When the terminology surfaced to describe the practice, was when it became more widely recognized as a credible approach. Initially, researchers presumed that undertaking the research itself, followed by results and analysis in writing, was enough to eventually diffuse it into the wider world, to be used by those who found merit within it. The common measure of impact was the amount of references the paper and author received by other peer-reviewed articles and publications (Carter & Paulus, 2010). This method of 'research dissemination' focused more heavily on what the field calls the 'supply side' – that is, the researchers themselves. However, eventually the proactive idea of purposefully and strategically directing research became known as 'research communication'. According to Knezovich:

This approach assumed a dynamic and negotiated balance between the supply and the demand of research, and promoted an iterative process of dialogue among key stakeholders to inform the selection of appropriate research questions and programme design as well as engagement throughout the research process (Knezovich, 2012)

Particularly in application of research into medical/health policy and international development practice did this tactic begin to emerge as crucial and worthy of funding. What followed was a stronger push to link research to its intended, or target, audiences, engaging all relevant end users with the knowledge to promote its application.

### Terminology

There are several terms that have been used in varying fields and at different stages of research uptake. Some of the most commonly used terms and their differentiation follow.

*Research dissemination* | Processes that ensure the widest reach of the research to potentially relevant audiences. Dissemination usually occurs once research results are obtained, such as through conferences, academic or online publications and other channels (Shaxson, 2010).

*Research communication* | The process of interpreting or translating complex research findings into a language, format and context that non-experts can understand...beyond the mere dissemination of research results...involves a network of participants and beneficiaries (Carter & Paulus, 2010).

*Research uptake* | Focused mainly on the demand side of the coin, working to stimulate an enabling environment among end users of research to commission and find appropriate information to support their own policy processes (Knezovich, 2012). The process of becoming aware of and accessing research outputs and the institutions, policies, systems and mechanisms supporting this process (Adolph et al, 2010).

*Target audience* | The person or group of people whose specific needs are being addressed. Targeting is the process of involving specific potential users of research throughout the research process (particularly in its initial scoping and planning) in an effort to promote its relevance, usefulness and therefore uptake and use. Target audience for research communication differs from the dissemination audience, which is the broad group of people to whom this process is directed (ibid).

*Knowledge intermediary (KI)* | Also known as knowledge broker in international development, a KI can be a person or organization that links research or evidence to policy. Traditionally journalists and librarians have been considered...KI but now this term is understood to have a wider inclusion of activities and occupations (Gwyn, 2010). They may be individuals, groups within organizations, or organizations focused on knowledge sharing, who carry the skills to analyze and critique research findings, and process them for specific or

general end users (Carter & Paulus, 2010)

Within research uptake itself, the International Water Management Institute (IWMI) distinguishes two complementary and essential strategies:

- *Broad-Macro* efforts focus on the ease of access and availability of research information to as wide, and global, of an audience as possible, and
- *Targeted-Micro* efforts involve developing a strategy for the uptake of research results to targeted audiences. This will include having an uptake strategy built in to the project as well as feeding project results and activities into a regional uptake strategy (Kane-Potaka, 2009).

While there are those who practice some level of communications through information briefs, community outreach and other media outlets, IWMI find that the problem lies in the idea that there is often no ‘strategy’ – one that includes the participation of all intended users at research conception and throughout the duration of the project, which would in turn increase the likelihood of effective uptake.

### **WHY RESEARCH UPTAKE?**

The inherent responsibility of researchers, as gatherers and wielders of information and data, is to ensure its utmost quality, utility, and ultimately increase the capacity of practitioners, a concept Lubchenco (1998) calls the scientific community’s ‘social contract’. In order to do this, there must be a clear and precise objective to each project that empowers end users with substantiated data and comprehensible methodology to back it up. According to the UK’s Department for International Development (DFID), researchers are ‘suppliers’ of research but they also themselves need to use research and in some cases carry out activities to build the capacity of other user groups (DFID, 2013). This implies an obligation to their target audiences to keep an inclusive and, where possible, participatory, process. Through early and consistent consultations with users such as focus groups, surveys and other involvement activities, researchers can improve their understanding of their ‘needs and contexts’ (Carter & Paulus, 2010).

### **Demand side**

While researchers, as suppliers of information, often possess the skills and resources to carry out a study, the ultimate users, who set the demand for knowledge, contribute a different set of insight to the process, and their integration into the project at conception and beyond can not only improve the quality and applicability of the end results, but also ensure a seamless and fruitful transition from research to uptake.

If there is no channel that allows targeted information users to relay both feedback and demands on existing and proposed research, the two supply and demand sides will become much more autonomous, further separating information discovery from knowledge application. Thus, “unless users are involved in defining the research agenda, there is a risk that research is not relevant, in which case even the best communication strategy will not be able to trigger wide scale use” (Adolph, 2009). Carter and Paulus (2010) agree, observing that to “ensure that the questions the research seeks to investigate and answer are the questions that users want answered” helps to communicate “findings seen as relevant and timely [which] brings the greatest impact”. Furthermore, “developing a dissemination plan ensures that research is distributed to and understood by those who need it most” (University of Regina, 2011), ideally supporting collaboration between research partners to identify valuable information-sharing strategies.

### **Research Value**

Effectively communicating the purpose of research results are equally as important as the initial steps of increasing their accessibility and awareness – that is, the problem or

opportunity that the research confronts, and how addressing it is valuable and crucial to existing conditions. Following, to implement changes, the end users would need to understand how it benefits them, in addition to possessing the skills and resources necessary to employ the research. The latter couple steps tend to fall more on the onus of the change-makers – policy- and other decision-makers. However, to influence and initiate a productive cycle, researchers need to consider the process in its entirety – not stopping at research results – and provide a resource that speaks to this understanding of its eventual application into policy and practice.

### **Researcher benefits**

Beyond the potentially altruistic outcomes of applying quality research and increasing the capacity of policymakers and practitioners, there are several distinct advantages for researchers to engage in integration of uptake. In an effort to implement her findings and raise awareness on the issue, a researcher at the Regional Institute for Population Studies (RIPS), at the University of Ghana, proactively sought out funding from the university's Office of Research, Innovation and Development (ORID) to conduct a meeting of key stakeholders in the field of public health to present and discuss her results. ORID was supportive and the meeting was productive, with recommendations and insight from the audience contributing to a follow-up report on the research, and with ORID maintaining contact with the actors to monitor the progress of research integration into policy and practice.

Creating a space for research dialogue | A key element to creating a productive cycle of research, policy and practice is to encourage and fuel dialogues around knowledge, whether new or existing. By making research results accessible and comprehensible to the target audience, it can create a space and point of entry for the involved actors to participate and contribute to the body of work. This not only connects researchers to each other, but also to wider networks of professionals working in similar fields, in varying capacities – relationships that could lead to future partnerships.

Improved general knowledge | Whether through their own means or knowledge intermediaries, researchers who more widely and effectively disseminate their findings hold the potential to impact on a larger scale, future research and current conditions. With an expanded reach, there is potential for the general public to gain from the information and boost their understanding of the issues, which supports the researcher's aim of increasing awareness and affecting change.

Transparency and accountability | As research has become at once more diluted and concentrated, with the number of publications and topic-specific journals consistently increasing, it is difficult to track the credibility of methodologies employed. Projects that integrate uptake and communication strategies not only seek to clearly convey their techniques, but they can also earn a level of accountability through the willingness to discuss and share information with involved partners (throughout the research process), which also boosts their transparency.

Promotion of holistic approaches | Research can sometimes be associated with a highly niche and even insulated environment, a necessary component to the level of rigor it demands. Collaboration and productive interchanges with partners can open up the process, all the while maintaining its relevance to uptake and application.

Multi-way discourse | Involving relevant actors in the process of researching would serve to increase awareness for, stimulate interest in and encourage insight into the topic or project. In a multi-stakeholder group formed to assist shea producer cooperatives in Mali get access to credit, as part of the Convergence of Sciences – Strengthening Innovation Systems (CoS-SIS) project, the team formed a sub-group to tackle the issue of soliciting the support of financial organizations:

[The group] formed a team of five people...and asked one of the women

members (the representative of the Ministry for Women) to phone each financial organization to request an interview. This took advantage of a feature of Malian culture: it is not polite to reject a request if it comes from a woman. That opened the doors. The team met with each of the four financial organizations and presented the...business plan and explored the conditions for a loan. Each of the financiers stated they were ready to offer a loan, and listed their conditions...(Nederlof & Pyburn, 2012)

Furthermore, it is beneficial for scientists and researchers to understand how their efforts function to integrate and disseminate appropriately their work to the target audience (and who the target audience may be). That is, a multi-way discourse encourages feedback to the researcher on the communication strategy being used, whether or not they are directly involved, and how it can be adjusted to appropriately address the target audience.

### **HOW TO DO RESEARCH UPTAKE?**

While some may choose not to lead the communication and uptake strategy, researchers maintaining a solid understanding of the main components of an effective uptake plan understand its importance and potential impact, and possess a greater aptitude to integrate them into their personal and professional interactions. Awareness of these key elements to decrease barriers in communicating research helps to shape productive conversations, avoid misunderstandings and increase subsequent knowledge sharing.

### **‘The Power of Plain Language’**

Scientific publications and formal, technical papers have a tendency to be written in a vocabulary and prose that is familiar to its respective field, whereas dissemination focuses on its accessibility to both the specific end users (target-micro) and general audience (broad-macro). The Center for Plain Language differentiates audiences in their definition of plain language:

Plain language is information that is focused on readers. When you write in plain language, you create information that works well for the people who use it, whether online or in print...measure of plain language is behavioral: Can the people who are the audience for the material quickly and easily:

- find what they need
- understand what they find
- act appropriately on that understanding

This means that the definition of “plain” depends on the audience (Center for Plain Language).

Plain language for a general audience is different than plain language that is specifically targeted to policymakers, for example, and a careful appraisal of the terminology, tone and context is necessary to grab and maintain their attentions, and accurately communicate information.

### **Multidisciplinary design of dissemination**

Researchers are not expected to be natural communicators, or able to designate the time and energy necessary to properly disseminate their work. Where possible, they can work with their design, communications, public relations, marketing and other related colleagues to help curate an effective dissemination strategy. Involving a multidisciplinary team in curating a plan can also boost its ultimate applicability, creativity and reach. The German Development Corporation (GTZ) has outlined ten steps for Strategic Communication for Sustainable Development, amongst which is the

The participation of strategic groups is such a crucial element in the [environmental communication] strategy because people will not change their

environmentally relevant practices if they do not have a say in planning, implementing and evaluating the action for change...[it is] not a one-shot effort. The keyword here is ownership. Ownership should be taken literally in terms of media products and communication processes not for or about people but with and by the people themselves (Willner, 2006).

Through involvement of a wider range of actors, the plan will take into account varying perspectives, involve more segments of the population, and ensure that the message speaks to them.

### Basics of visual communications

Graphic design and layout can have an astounding impact on how affectively information is understood, improving its accessibility and communicability. While the field in itself is wide-ranging and has specialties for specific types of information design, it is helpful to understand the basics of translating data and knowledge into an aesthetically appealing *infographic*. According to the Canadian Open Government initiative:

An infographic diagram is a visual explanation of a concept or data.

Infographics generally take two forms - a visual story, or a visualization of data. Some infographics use both elements. (British Columbia)

Infographics and other related visual communications tools can secure an understanding of ideas explained in text, complementarily speaking to visual learners. Robert Lane and Dr. Stephen Kosslyn reason that visuals are more effective due to the way in which the brain processes an image as one symbol, whereas text is received sequentially, requiring more effort to understand completely (Smiciklas, 2012). Further, infographics can also help expand upon and justify written concepts. According to Jen Christiansen, art director of information graphics at *Scientific American*,

Graphics can often communicate scientific concepts more efficiently than words, for any audience. Visuals that are developed for a science savvy but non-specialist audience...can help make scientific findings accessible to broader audiences. By removing barriers (such as technical jargon), and providing context...the information is presented in an immediately intuitive and engaging manner (Jackson, 2014).

Useful as a tool to apply to a range of audiences, infographics can reach places that the text and findings may not.

When disseminating to specific audiences, the type of visual tool employed and an assessment of how it speaks or relates to the ultimate end users is necessary. A targeted-micro effort should look at how their specific segment(s) of the population may perceive certain elements of graphics, particularly if they are associated with a local community, with a distinct culture and sets of societal norms and perceptions.

For researchers intent on getting hands-on with and seeking more ownership of communicating their information, there is a wealth of open-source and free software out there that combine many of the essential elements of information communication, some accompanied by technical support and help forums<sup>384</sup>.

### Science and media

If there is an existing relationship, whether positive or negative, with local, regional or international journalists, it is important to ensure they receive and interpret the information accurately. Furthermore, following an extensive consultation of scientists and media specialists for the formation and mission of the Science Media Centre in the UK, a report produced the findings, amongst which were the persisting ideas that a “key cause of the

<sup>384</sup> For starters, a helpful list of some open-access and free resources and tools can be found at: [www.visualisingadvocacy.org/resources/visualisationtools](http://www.visualisingadvocacy.org/resources/visualisationtools) and <http://selection.datavisualization.ch/>

crisis facing science is the lack of understanding among journalists and the public about the way science works,” as well as the perception that the “rising criticism of science [is] the direct result of a fundamental misconception about what science can offer” (Science Media Centre, 2002). It is important to not only have basic knowledge of the media and communications world, but also to build lasting and solid relationships with journalists in order to work against misinformed coverage and misinterpreted research results.

**Building capacity for increased uptake**

Laying the foundation for awareness and realization of the importance of research communication involves enabling its different actors to put it on the agenda, and closer to the top. There are many entry points at which uptake can be supported, however there is some consensus that there are three main levels (further elaborated in Figure 1 below):

*Systems* | According to the Overseas Development Institute (ODI)’s RAPID programme (ODI, 2009), there are incompatible timelines and views on evidence-based results between research and policy, with diverging priorities in terms of deliverables and methods of justification of recommendations.

*Institutional* | Establishing an environment that is conducive to integration of research communication as a core function, awareness-building and identification of communications, funding and collaboration streams, and planning budgets accordingly are all areas where institutional shortcomings often arise.

*Individual* | With the focus often on the supply-leaning side of the equation researchers face pressures to continually produce high-quality work, without the time, energy or motivation to syphon off to liaising with policy and practice, amongst many other barriers.

The CRU Scoping Report recommends these three distinct levels of interventions and suggests some entry points.

**FIGURE 1 | RECOMMENDATIONS ON A FIVE-YEAR INTERVENTION TO DEVELOP THE CAPACITY OF SUB-SAHARAN AFRICAN UNIVERSITIES IN RESEARCH COMMUNICATION**

To achieve measurable and effective outcomes the intervention should build from current capacity, promote alignment and improvement of resource and investment plans and develop a professional culture at three levels:		
<b>Systems</b>	<b>Institutional</b>	<b>Individual</b>
1) Ensure universities’ and institutes’ improved research communication capacity widely used by donors, governments, etc. 2) Liaise and work with regional associations and networks to promote research communication, ‘piggy-back’ on their regular events and activities	Enroll research institutions in planned change strategy to embed research communication technical expertise and adoption of measures to monitor, evaluate, benchmark and share good management practice	Design, accreditation and delivery of professional development training that within a specified time frame, e.g. five years, becomes a self-sustaining programme and a qualification that is internationally recognised.

*Adapted from Kirkland et al. 2010.*

The path of research dissemination and use is, in theory, a clear one, whereas in practice, leaves much to be desired. Enrique Mendizabel suggests that not all research uptake is ‘up’ – flowing directly to the policymakers – rather it can be ‘sidetake’ to fellow researchers, or ‘downtake’ to the public and practitioners (Mendizabel, 2013). Being cognizant of these various directions and end users of information would help to further gear

them to their correct and more responsive audiences. However, implicit in this idea is the notion of a hierarchy when it comes to information production and usage. In order to effectively address the demand side to appropriately shape the supply side, all actors and insight should be valued (whether or not they are ‘out of order’) – where information and input from all parties are continuously fed into the process, at all stages.

### **Understanding policy development**

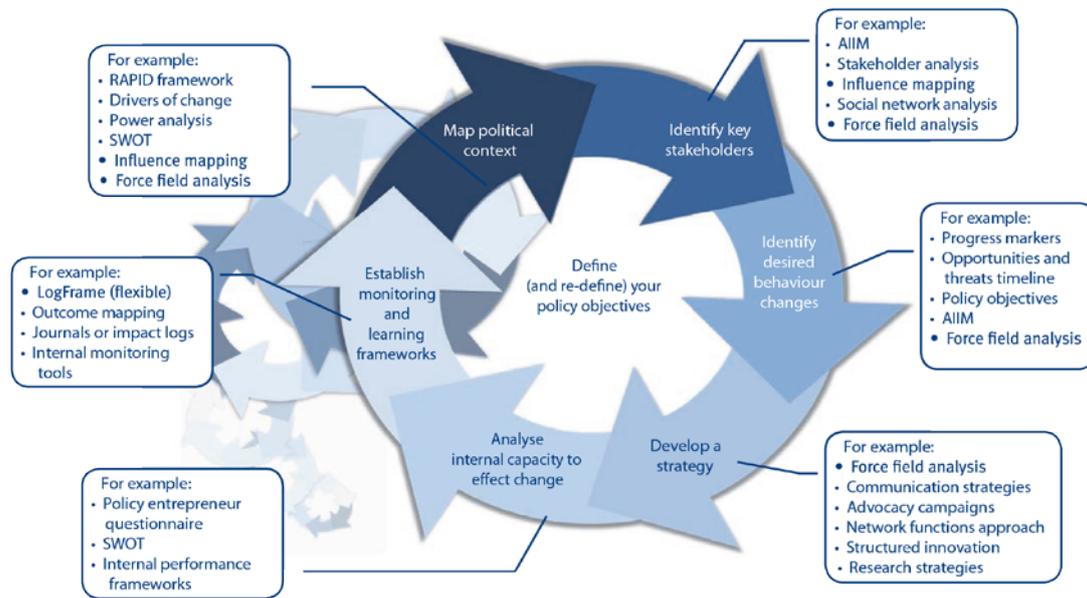
Further to the discussion of translating research into a digestible format, a glimpse into the process of policy-making would assist in tailoring the appropriateness of content, structure and timing in research communication.

Vincent Cable, a Member of Parliament, in a 2003 presentation at ODI, articulated what he perceived to be the main differences, and obstacles, between policy and research. He summarized the political world into Five S’s:

- 1) *Speed* | The timeliness of decisions is extremely important, and can sometimes compromise the quality of the choice made when, for the sake meeting a deadline, research-based evidence is overlooked or ‘forgotten’.
- 2) *Superficiality* | With a wide array of topics under their umbrellas, many will not be able to consider all factors and sides, and rather need to rely on a few advisory specialists, whose competence and integrity are crucial to the eventual policy outcome.
- 3) *Spin* | The heavy reliance on how information is presented frequently emerges in the political world, where ‘perception is often more important than the substance’, and thus how data, or lack thereof, is presented deeply sways the audience.
- 4) *Secrecy* | While there can be evidence-based policy, that data and other justifications for policy decisions may not be accessible to the public, and thus cannot be tested for quality and accountability.
- 5) *Scientific ignorance* | Political decisions are swayed by public opinion and pressures, and if there are perceptions circulating about an issue that is opposed by scientific evidence, the politician will tend to side with the public (ODI, 2004).

Evidently, the policy process is intricate, even thorny, and impacted by many internal and external factors. As such, for researchers working to impact policy, whether actively or indirectly, an equally multidimensional approach is required.

In a briefing paper published in 2009, the ODI recounted six lessons from five-years of cumulative studies on making research policy-relevant. Amongst the most important lessons are that policy processes are complex, and thus rarely linear or logical, and that policy ‘entrepreneurs’, or researchers working in policy, need to have a holistic, contextual understanding, acquire additional skills, and be committed to the work (ODI, 2009). Complementary to these lessons is an eight-step strategy they devised to assist policy entrepreneurs, or researchers working to expand the impact of their knowledge on policy, in a method they have termed the RAPID Outcome Mapping Approach (ROMA) (Figure 2).

**FIGURE 2 | THE RAPID OUTCOME MAPPING APPROACH (ROMA)**

*Adapted from ODI, 2009.*

The ROMA was conceived and aimed as a tool for researchers to systematically take stock of the context and enable more informed decision-making, increasing their sensitivity to and awareness of ‘unexpected policy windows and opportunities for change’ (ibid).

#### WHAT ARE POTENTIAL NEXT STEPS?

In a study of the UK’s Department for International Development (DFID) research communication programs and their methods and priorities, Triple Line Consulting Ltd observed the following relevant strategies:

- 73% of organisations used workshops and conferences;
- 73% supported networks and coalitions that bring together research users and research generators;
- 73% used training courses and training events;
- 54% noted the use of mentoring of key individuals; and
- 43% provided specific advice to policy makers and funders to target their end users (Proctor et al, 2009).

Most of these methods involve in-person meetings and events, underscoring the need to gather relevant actors to ensure they comprehend the research, its results and potential effects on current policy and practice. However, not all events are equal. The promotion of productive, innovative and ‘leading’ – that is, it leads into other productive activities, is a purposeful step in the process, and efforts do not end at the adjournment – events is crucial to not unnecessarily spend resources on ineffective meetings that fall short of accomplishing tangible and inclusive goals.

There are many sources that outline different types of research communication events, from training to implementation, some with guidelines and advice on organization. Effectively using these documents and literature depend on the number and types of participants involved, the capacity of the organizers, and objectives, duration and projected outcomes of the event.

Development Research Uptake in Sub-Saharan Africa (DRUSSA), a five-year DFID-funded project to increase institutional capacity of universities to implement research

uptake, recently published a document, Platform2013, in print and digital form, which compiled twenty evidence-based development research articles. They also challenged researchers to condense their papers into two-page information briefs that clearly state the objective, methodology, results and relevance to policy or practice. In order to encourage and guide a similar institutional process, they have also published many resources, particularly a toolkit on how to carry out a 'research uptake campaign'.

The CoS-SIS project carried out a series of forums, called Concertation and Innovation Groups (CIGs) facilitated by local research associates, in three different countries, Mali, Benin and Ghana. Through these forums, they addressed key issues within each country, forming the working groups with multi-level and multidisciplinary stakeholders, all invested in development progress, 'The idea is that these forums create space for interaction, hopefully leading to institutional change, and so creating realistic opportunities for smallholders and increasing food security' (CoS-SIS, 2012). The project uses the emerging multi-stakeholder approach to further explore capacity and development of research dissemination and uptake to policy and practice.

Even researchers interested in directly engaging in the communication and uptake process can face issues of limited time and resources. Rather than continuing to reinvent the wheel and put more hands into the cookie jar, undertaking efforts such as teaming up with other researchers doing similar, perhaps complementary work (in the same or a complementary field) to execute a joint uptake strategy may enhance coverage, leverage as well as credibility.

## CONCLUSION

The awareness of research uptake is slowly on the rise, particularly in academia. However, its validity does not hinge on its strength as a field on its own, rather the propensity of the research communities to integrate uptake into their research design, implementation and evaluation, including participatory dissemination of results. There are many entry points, as outlined here, to begin affecting change, and the appropriate strategy should be designed at a multidisciplinary, multi-level, institution-wide, context-appropriate and accessible table.

As a final note, Enrique Mendizabal offers an alternative view of uptake – that replication and inspiration are uptake as well:

There is also an element of inter-generational transfer of skills that must be taken into account when we consider research uptake. Much of the research that goes on in universities and think tanks has the purpose of helping to train new generations of researchers. If all research and all communication efforts are targeted policymakers' immediate needs what will be taught to students? Writing a macroeconomics textbook, a new introduction to sociology book, or similar efforts should be seen as important as putting together a policy brief. More important, in fact (Mendizabal, 2013).

While there should be substantial efforts to support existing researchers and scientists to promote research utilization, there is substantially more positive outcome if students and young researchers are trained to alter their thinking and approach in a way that measures their accomplishment by its impact on policy and practice, rather than the quantity of publications with their bylines.

## RESOURCES

Adolph, B. Proctor, F.J., van der Gaag N., Davies, J. and E. Carlile (2009). *Learning lessons on research uptake and use: Donor review on research communication*. Triple Line Consulting Ltd, UK: 2009, 65. Report prepared for UK DFID.

- Adolph, B., Herbert-Jones, S., Proctor F.J., Raven, E. and M. Myers (2010). *Learning lessons on research communication and uptake. A review of DFID's Research and Evidence Division's human development (health and education) and agriculture portfolios and their contribution to the 30% policy*. Part 1 Final report. Triple Line Consulting Ltd, UK: 2010, 142. Report prepared for UK DFID
- British Columbia. *Deliverables and Communicating your research: Infographics*. UX Toolbox: Better Web for Citizens, Open Government, British Columbia, Canada: 2014. Available here.
- Carter, I. and K. Paulus (eds) (2010). *Research Communication: Insights from practice*. A report produced for DFID's Research Communication Strategy Group, UK: 2010.
- Center for Plain Language. *What is Plain Language?* Center for Plain Language, Virginia, USA. Available here.
- Gwyn, Elin (2010). *Guest Blog: Improving the impact of development research through better communication and uptake*. Foreign & Commonwealth Office (FCO), Science & Innovation Network, Canada: 22 December 2010. Web blog entry. Available here.
- Jackson, Alex (2014). *The Power of using Infographics to Communicate Science*. Nature.com: Of schemes and memes. Nature Publishing Group/Macmillan Publishers Limited, 20 January 2014. Available here.
- Kirkland, J., Mouton, J. and D. Coates (2010). *Final Report of the CRU Scoping Study 2010: Specialist professional and institutional capacity building in sub-Saharan Africa*. Communicating Research for Utilisation (CRU), South Africa: 2010, 24. Report prepared for UK DFID
- Knezovich, Jeff (2012). *The challenges of Research Uptake Part I: Systemic, institutional and individual barriers*. Development Research Uptake in Sub-Saharan Africa (DRUSSA), South Africa: 2012. Available here.
- Mendizabal, Enrique (2013). *Research uptake: what is it and can it be measured?* On think tanks: Independent research, ideas and advice, UK: 21 January 2013. Available here.
- Lubchenco, Jane (1998). *Entering the century of the environment: A new social contract for science*. Science 279 (5350): 491-7.
- Nederlof, E.S. and R. Pyburn (eds) (2012). *One finger cannot lift a rock: Facilitating innovation platforms to trigger institutional change in West Africa*. KIT Publishers, Amsterdam: 2012, 132.
- Overseas Development Institute (ODI) (2004). *Research and Policy in Development: Does Evidence Matter? Meeting Series*. ODI Meeting Series, UK: 2004, 168.
- Overseas Development Institute (ODI) (2009). *Helping Researchers become policy entrepreneurs: How to develop engagement strategies for evidence-based policy-making*. Briefing Paper: 53, London: 2009, 4.
- Proctor, F. J., Adolph B., Atampugre, N., Carlile, L., Davies, J., van der Gaag, N., and M. Myers (2009). *Learning lessons on research uptake and use: A review of DFID's research communication programmes*. Part 2 – Resources. Triple Line Consulting Ltd, UK: 2009, 238. A study undertaken for DFID
- Science Media Centre (2002). *Consultation Report: March 2002*. Science Media Centre, UK: March 2002, 36.
- Shaxson, Louise (2010). *Improving the impact of development research through better research communications and uptake*. Background paper for the AusAID, DFID and UKCDS funded workshop: London, November 29<sup>th</sup> and 30<sup>th</sup>, 2010. Delta Partnership, UK: 2010. Report prepared for workshop
- Smiciklas, Mark (2012). *The Power of Infographics: Using pictures to communicate and connect with your audiences*. Pearson Education: 15 June 2012, 224.
- University of Regina (2011). *Exchanging Knowledge: A research dissemination toolkit*. Community Research Unit, Faculty of Arts, University of Regina, Canada: August 2011, 12.

Willner, Susanne (Ed) (2006). *Strategic Communication for Sustainable Development: A conceptual overview*. GTZ Rioplus: Environmental Policy & Promotion of Strategies for Sustainable Development. Schneller, Druck, Reutlingen, Eshborn: 2006, 61.

**Online tools and resources on research uptake**

Overseas Development Institute (ODI). Planning tools: how to write a communications strategy. <http://www.odi.org.uk/resources/details.asp?id=5186&title=communications-strategy-planning>

Local Government Improvement & Development. <http://www.idea.gov.uk/idk/core/page.do?pageId=8179255>

KnowHowNonProfit. <http://knowhownonprofit.org/campaigns/communications/effective-communications-1/communications-strategy>

The Development Communication Sourcebook. [http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2008/07/09/000020953\\_20080709145627/Rendered/PDF/446360Dev0Comm1ns0handbook01PUBLIC1.pdf](http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2008/07/09/000020953_20080709145627/Rendered/PDF/446360Dev0Comm1ns0handbook01PUBLIC1.pdf)

German Development Corporation (GIZ). Strategic communication for sustainable development. [http://www.cbd.int/cepa/toolkit/2008/doc/strategic communication for sustainable development.pdf](http://www.cbd.int/cepa/toolkit/2008/doc/strategic_communication_for_sustainable_development.pdf)

UNICEF. Writing a Communication Strategy for Development Programmes. [http://www.unicef.org/cbsc/files/Writing\\_a\\_Comm\\_Strategy\\_for\\_Dev\\_Progs.pdf](http://www.unicef.org/cbsc/files/Writing_a_Comm_Strategy_for_Dev_Progs.pdf)

Development Research Uptake in Sub-Saharan Africa (DRUSSA). <http://www.drussa.net/index.php>

# CREATING THE SYSTEM OF PROTECTION OF INTELLECTUAL PROPERTY AT UNIVERSITIES

*Jozef Zajac, Prof., PhD, MA*  
*Vladimir Modrak, Prof., PhD, MA*  
*Jan Pitel, Assoc. Prof., PhD, MA*  
*Pavel Kokula, MA*

Technical University of Kosice, Faculty of Manufacturing Technologies, Slovakia

---

## Abstract

The article presents possibilities of intellectual property protection by internal institutionalization of universities. Most Central European universities do not have any systemic institutes of intellectual property protection and this issue is dealt with by various branches of the institution non-systemically. The article illustrates the internal structure of university centers to ensure effective action to ensure the protection of copyright and industrial property rights and licensing of knowledge. Furthermore, interactions within the conceived system and input-output information are elaborated.

---

**Keywords:** Copyrights, industrial property rights, center of technology transfer

## Introduction:

Not only technical but also humanities oriented universities have wide-ranging contacts and the cooperation in education, research and development with various institutions at home and abroad. Their activities cover a wide range of educational needs not only for the particular region of Slovakia but in many fields they are the only centers of science, research and education not only in Slovakia but also in Central-European region.

The mission stated under the Act no. 131/2002 Coll. should be conducted by universities by innovative research related to projects within the European Research Area and excellent education in all scientific fields of faculties of university. Permanent development of university and its mission are supported continuously by updated visions and strategies. Creating a vision of each organization (not only educational and research institutions) is an integral part of managerial work of top management of an organization. As an example, a vision of the Technical University of Kosice is provided, which declares the following resolutions [1]:

To be

- a leading technical university at national level,
- a recognized technical university at international level,
- with a strong element of autonomy,
- developing scientific knowledge
- on the basis of its own initial results, providing excellent education at all three levels of university studies
- quality lifelong learning,
- with sufficiently diversified financial resources,
- accessible to the widest range of candidates
- by its research fulfilling expected needs of industry, region and society
- significantly engaged in providing services to the general public.

The structure of university management is based on and respecting the Act no. 131/2002 Coll. on Higher Education. Within the legal space a structure for flexible distributed system of university management is created and organized. In management system a clear procedure for initialization, preparation, implementation and evaluation of RDI (Research, Development and Innovation) projects is defined, which supports the creation of both vertical research teams as well as horizontal research teams. The appropriate procedure for the research area takes the specifics of the contractual RDI projects for commercial practice into account (i.e. the contract cooperation with the practice of large as well as small and medium enterprises) with links to address the protection of copyright and industrial property rights (IPR - Intellectual Property Right).

Although in the current structure most universities do not have any systemic institutes of intellectual property protection this issue is addressed by various branches of the institution non-systemically. In devising long-term goals of institutions engaged in research and development activities it would be advisable to create workplace for protection of institution's intellectual property where the main focus will be given on the following activities connected to:

- copyright and licensing,
- legislative support in terms of patents for inventions and utility models,
- use of the university brand,
- topography, industrial proposals and designs,
- know-how of the institution,
- the access to the publications of European specialists in matters of knowledge society and research projects,
- information services on trainings in the field of intellectual property

### Creating university centers

Process and project thinking in creative work need to be used in determining strategic objectives in the area of development and making the cooperation of university with the social and economic practice more effective. From this perspective, the strategy of the university must clearly declare the essential feature, namely to be an internationally recognized research university with an important feature of the ongoing continuous development of an active and mutually beneficial (“win-win”) cooperation with experience in research and innovation.

Active cooperation with practice has two important implications:

- ✓ **research university guarantees** a high innovative potential of its research and development projects. Innovative potential of research results is then the foundation and guarantee of developing and ensuring positive cooperation of university with practice in joint applied research, innovation projects and knowledge transfer or technologies transfer projects. The cooperation conceived in this manner in the area of university functioning contributes to increasing competitiveness and sustained growth of the cooperating organizations from the industrial and social practice as well as in the field of innovative small and medium enterprises.
- ✓ **active and effective cooperation of university with practice**, on the other hand, in the form of feedback through suggestions, ideas and requirements inspirationally contributes to the rise of scientific level, quality (effectiveness) of research and development and innovation activities of the university. The indicated positive feedback of practice helps the university to maintain and develop its image of a nationally and internationally recognized scientific university. On the other side, however, current experience of universities shows that ensuring the indicated “win-win” cooperation with practice cannot

be successfully managed without a radical change in the organizational, legal and management principles and institutes across the overall university structure.

Strategic objective in the creation of the institute of intellectual property indicates and on the basis of partial verification partly confirms that the university has a real effort and managerial support to successfully manage such radical change in providing creative and innovative collaboration with practice and set out the principles and concepts of solutions respecting and promoting the fulfillment of the global objective whose outputs will contribute to the continued growth of scientific research outputs and thereby improve the conditions of the educational process at universities through the secondary transfer of knowledge of the employees actively involved in the processes of primary and secondary education.

In creating the institute of intellectual property protection can be proceeded as follows:

To create the network-conceived University Centre for Transfer of Innovation, Transfer of Technology, Knowledge and Intellectual Property Protection (UC). The key principle in the concept of the UC's mission is to provide support for the sustainable development of active, effective and mutually beneficial cooperation between the university and partner research and development institutions with expertise in open market space and mutually beneficial and mutually rewarding cooperation with social organizations and managerial units at UNIT I, II. I of regional character which means level III. (Technical University of Kosice has already created UCITT – the University Center for Transfer of Technology and Intellectual Property Protection).

The essence of effective cooperation of research institutes with practice is the capability of research to fulfill the identified requirements and expectations with knowledge and innovations which enable the knowledge growth, strengthening and the increase of competitiveness of the university in social and economic practices. The outlined concepts of the mission of the UC are only possible through the processing of flexible and open organizational, management and competence structure that will guarantee functionality, availability and effectiveness of services supporting:

- the preparation and implementation of research, development and innovation projects (RDI) and the dissemination and exploitation of their output (dissemination, exploitation).
- the identification, preparation and securing of the projects of the contractual research and development collaboration with practice, innovative projects and activities of transfer of knowledge and technologies into practice.
- complex security of intellectual property protection.
- marketing services of UC, RDI projects and providing effective dissemination, brokerage and matching and publicity supporting the development of research and effective cooperation with practice.

Open access to services and products provided by UC under its “virtual” space of action will be supported by relevant information and communication infrastructure available through the Project Information Portal (PIP) which can be continuously developed as the portal of UC.

The outlined concepts of creating UC fulfill the following objectives:

- the support of the research oriented towards the results' real use
- creating and the support of the transfer of newly acquired knowledge and technologies into practice
- the support of management of intellectual property rights in research organizations

## **CREATING AN ORGANIZATIONAL AND MANAGEMENT STRUCTURE AND RELEVANT GEOGRAPHIC AND INFORMATION INFRASTRUCTURE FOR EFFECTIVE PROVISION OF UC MISSION**

Creating an organizational and management structure and relevant geographic and information infrastructure for effective provision of UC mission is based on a comprehensive analysis and evaluation of the current state of knowledge, methods (procedures), benefits and experience of management with innovative cooperation with practice.

The inputs of analysis are completed by the outputs from the analysis of the current state of knowledge (State of Art) in the management of innovation and technology transfer and the protection of intellectual property of institutions (IaTT). They are used in the processing of the mission, role and responsibility of UC within the structure of university and within the external (regional, national and international) area of its operation. Based on the analysis of these conceptual materials and modern synthesis of the outcomes a network-conceived distributed organizational and management structure and the status of UC can be created and consequently approved by relevant procedures at university level under the current legislation of the institution.

The organizational and management system of UC approved in this way will enable to responsibly specify requirements and procurement of:

- supporting information and communication infrastructure,
- relevant spatial infrastructure, equipment and information requirements of UC departments.

The creation and implementation of the content and scope for the identified services and support monitoring system in accordance with the mission and identified competencies of UC are primarily designed to process the content and scope of customer services which will present UC to its internal and external environment.

Addressing comprehensive providing of services UC generates within the proposal of creating the Institute of protection of intellectual property of institutions and using the innovative value-added outputs.

Effective provision of services is not possible without the corresponding specific (to the needs of UC services) information support which can be provided by two support monitoring systems built on the basis of document and content management (Document and Content Management - DCM):

- “Input Monitoring System” aimed at monitoring RDI university projects
- “Output Monitoring System” – monitoring projects and cooperation activities with practice initiated via UC.

Both monitoring systems are designed to be integrated and accessible through the project information portal - PIP.

The concentration in the processing of integrated services aimed at complex support of the management of intellectual property rights is implemented as a service and is in the concept of integrated UC services provided under a separate organizational unit “**PODV - promote the protection of intellectual property**”.

The results of research and development representing one of the most precious values created by university staff absolutely need legal protection system. By focusing on the needs while the conception of competences it is absolutely necessary to direct the attention to:

- the specification of the structure and the content orientation of the services
- the specification of the scope and responsibilities of providing and performance of the services
- relevant support to ensure the commercialization of research and development (a bond between service “Marketing” and PAVITT),
- the methodology of providing activities of services PODV.

- the identification and providing contractual relationships with relevant national and international organizations, institutions and associations from the field of legal power over the Protection of Intellectual Property (external contractual relations significantly support flexibility, scale and the impact of created service).
- specification of information and cognitive resources needed to provide services and the specification of requirements for adequate means of ICT.

Methodologically solutions should be primarily based on the agreement and cooperation of universities with UPV (Institute of Industrial Property) which is a guarantee of adequate expert external assistance and audit while processing the outputs of corresponding rights.

The mission and the status of UC in the role of an initiator and a “manager” for effective and mutually beneficial cooperation of academic research with domestic and foreign practice can be guaranteed only if the activity is supported by relevant ICT applications and its management is implemented in accordance with the recommendations of Standards Collection STN EN ISO 9000 respectively other management and in particular recognized systems (e.g. CAF, EFQM model...). In this respect, the research team which conceives such workplaces has the following advantages:

- since the defined year there has been a certified Quality Management System (QMS) according to EN ISO 9001:2008, respectively CAF, EFQM or it uses a similar system of managing the quality in their workplaces.
- it has a well-managed communication infrastructure (university intranet) with a standardized and safety interface.
- it uses a powerful knot of academic network SANET and academic network CANET that connect all academic institutions, departments of SAV and departmental research facilities.

In addressing the concept of the workplace it is appropriate to draw attention from the viewpoint of ICT to:

A. The design, deployment and operation of project information portal – PIP, which will be operated and updated as UC portal once the project is over. During the project open and flexible architecture of the portal (formulated on the basis of methodology "Service Oriented Architecture - SOA") will be promoted by:

- providing, administration and ongoing development of UC services
- the access to and administration of information systems for monitoring RDI projects and the projects of cooperation with the practice initiated through UC and activities related to innovations, transfer of knowledge and technologies into practice.
- the access to knowledge bases (e.g. methodology of services), information and educational resources under UC administration respectively available through its contractual partnerships.
- effective support of UC marketing efforts.

B. Especially in terms of ensuring the effectiveness of marketing services and administration of data and knowledge sources it is significant to introduce standards and manuals for presentations, publicity, communications, documentation and also the “dissemination”, expert, mediation (brokering) and contractual actions.

C. Processing, documenting and deploying SMK UC in accordance with the established SMK. The establishment of SMK UC needs to be addressed:

- Processing of Quality Manual and supporting documentation of SMK UC.
- Harmonization of documents and management competencies with SMK of university.

- Creating a plan and the implementation of internal audit. The effectiveness of internal audit will be supported by the expertise of renowned quality auditors in the field of "innovation and transfer of technology and intellectual property protection."
- The review of audit and ensuring corrective actions and system amendments.

The key principle of creating of SMK UC must be "customers" satisfied with the services, activities or actions provided by UC.

## Conclusion

An important feature of a university (as an institution) is a close and effective cooperation with partner universities, SAV institutes and the cultural, social, managerial and industrial background of the region and overall Slovakia. In recent years, a very good cooperation with the public authorities and relevant organizations in the field of small and medium enterprises the importance culminates importantly. These activities are reflected in university initiatives aimed at creating associations, respectively clusters associating research institutes with the public sector and the business sector enabling the efficient development of innovations in the field of social and economic practice.

At universities, an intensive research activity continues; however, the results in the form of filed patents and utility models are not adequately balanced with this effort. It is possible to ask: "Why is it like that?"

Firstly, it is due to very low awareness of researchers of the institution. Secondly, it should be noted that universities and SAV are conservative institutions not quite flexible while infiltrating new procedures from the perspective of "administrative process" and the last but not least, it's not exactly the best-structured evaluation of the outcomes in different Grant Agencies (VEGA, KEGA and APVV) and especially currently commonly discussed SCI citations and CC publications. The public opinion is dominated by (after many cases) the idea that "copyright purity" in higher education is not the best.

Many institutions are no longer able to finance 5%-share of the so-called "other sources" to ensure the flow of the means from the structural funds. These funds can also be obtained through the sale of research output.

For the above mentioned reasons, it is wise to intensively build strong university centers to ensure the purity of the outputs, sale of licenses and know-how as well as increased efficiency of outputs.

## References:

- LAVRIN, A., and ZELKO, M.. Moving toward the digital factory in raw material resources area. *Acta Montanistica Slovaca* 15.3 (2010): 225.
- SCHUMPETER, J.A.: *Theorie der wirtschaftlichen Entwicklung*. Leipzig. 1911.
- CLUSTER OBSERVATORY: Priority Sector report: Knowledge Intensive Business Services. In: Center for Strategy and Competitiveness, Stockholm School of Economics, Sweden, 2009,
- Technology Platforms – From Definition to Implementation of Common Research Agenda, EUR 21265,9/2004
- LAPORTE, B.: *Turning Crisis into Opportunity, Critical Role of Engineering Skills and Innovation*. , St.Peterburg, 2009.
- MIHOK, J a kol.: *Popdpora inovácií*, CITR, 2009,
- KOVÁČ, M. a kol.: *Technological Knowledge Business Intensive Services – T KIBS*. Košice, 2008
- Dlhodobá vízia rozvoja slovenskej spoločnosti, Ekonomický ústav Slovenskej akadémie vied, Bratislava 2008,
- MONKA P. , ZAJAC J.: *Education in Slovak technical universities environment*, Nitra, 2008.

- SINAY, J., et al. "Nástroje zlepšovania kvality." *TU SjF, Košice* (2007).
- MARKULIK, Š., SINAY, J., ZAJAC, J.: Systém manažérstva kvality ako súčasť riadiacich činností vo verejnej vysokej škole „Academia. Bratislava, 2009.
- Univerzitné centrum inovácií, transferu technológií a ochrany duševného vlastníctva, 2009.
- ZGODAVOVA, K.: "Modelling of the new production launch curve." *Quality–Innovation–Prosperity. Q-Impuls 1.2001* (2001)
- NENADÁL, .. Komparativní studie hodnocení kvality dle norem ISO a metodiky komplexního hodnocení kvality. (2006).

# METHODOLOGY FOR THE IDENTIFICATION OF INTERNAL AND EXTERNAL COMPETENCY RELATIONS IN THE FIELD OF INTELLECTUAL PROPERTY PROTECTION

*Jozef Zajac, Prof., PhD, MA*  
*Michal Hatala, Prof, PhD, MA*  
*Lubomir Olexa, MA*  
*Jan Zajac, MA*

Technical University of Kosice, Faculty of Manufacturing Technologies, Slovakia

---

## Abstract

The article presents the experience with the introduction of “System of Quality Management” in TU in Kosice (TUKE) according to ISO 9001. It describes the system of managing quality including all competency relations and the philosophy of implementation of the system into real conditions of research and educational institution in terms of intellectual property rights.

---

**Keywords:** Quality, system of quality management, IPR

## Introduction:

In all areas of human activity but especially in the industrial and commercial sector words such as quality, quality control, quality improvement, quality assurance, quality assessment, etc. have recently been inflected continuously. Everyday life convinces us that it is the product quality and service quality which decide about the success of the company in a free competitive environment. With the growing number of public universities, private universities and private educational institutions offering training (retraining) in highly specialized fields and their desire to get as many quality applicants for the studies as possible, all these institutions in Slovakia are getting into the competitive environment. Taking the students from abroad into account, we find ourselves in a global competitive environment, which got even stronger after the accession of the Slovak Republic to the EU.

Therefore, it is essential to pay close attention to the aspects of quality at the Technical University in Kosice. Moreover, in the long-term intention of the TU, if we tend to apply for the complex accreditation for the university, respectively the research university, it will be necessary to objectively demonstrate and prove quality and the level of quality as well as to constantly strive to improve the quality of all our activities.

## The System of Quality Management at TU:

In order to achieve a complex accreditation for the university, respectively the research university as well as other reasons or motives which are listed below it is necessary to address these issues in terms of "Integrated System of Quality Management" from the position of building at least the following subsystems:

- the quality of educational process at TU
- the quality of research activities at TU,
- the quality of administrative-service activities and services at TU.

Given the linkages between these three subsystems it is not possible to implement improvement activities of TU if we do not pay careful attention to each of them.

What are the good reasons for us to deal with quality more than before, or what is our motivation? In particular:

- To maintain and build up the reputation of TU.
- To be competitive on the national level and internationally.
- To overcome the rigidity of classical approaches already obsolete.
- To improve the students' contentment.
- To improve the employees' contentment.
- To improve the contentment of the public and industry with the alumni of TU.
- To increase the quality, performance and economic efficiency of the process at TU.

To respond to changing conditions:

- the increasing number and activity of private universities and educational institutions.
- a large number of low-quality applicants for study at TU.
- the deteriorating ratio of the number of students / number of teachers.
- a lack of quality young teachers.

The identification of internal and external competence relations in the field of intellectual property protection can be presented from two fundamental perspectives:

- a) **Primary** - identifying and providing links between the Department of Intellectual Property Rights at UC and national and international competence institutions in the field of intellectual property rights (ODV Ochrana Duševného Vlastníctva - IPR Intellectual Property Rights)
- b) **Secondary** - the creation of the concept of a coherent system of legal assistance for the protection of copyright and other proprietary rights of university employees.

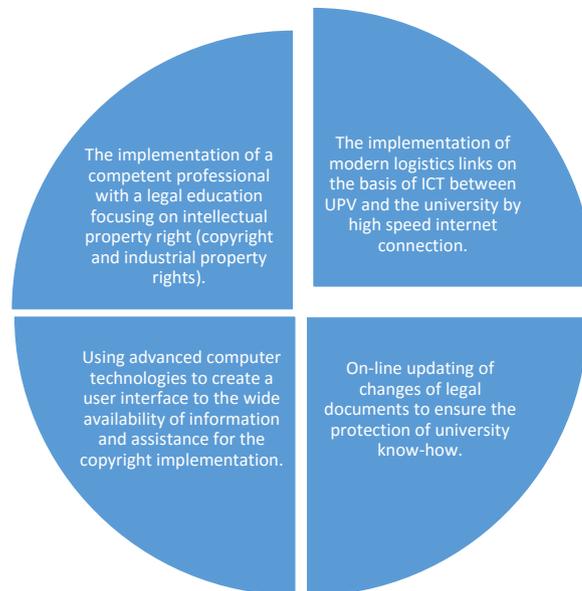
Primary	Secondary
<p>• <i>Interconnection will guarantee the access to public but also non-public (member) information and knowledge resources which significantly support the processing of tasks connected to services aimed at: filling in the applications for patent protection, trademarks, industrial designs, layout and design etc. The essential input will be the analysis of possible relations between UC and WIPO (World International Property Organization), IPR portal etc. It creates a good starting framework for complex provision of services in IPR as well as for provision of complex information and knowledge on intellectual property.</i></p>	<p>• <i>The creation of the concept of a coherent system of legal assistance for the protection of copyright and other proprietary rights of university employees.</i></p>

Picture 1 The identification of internal and external competence relations in the field of intellectual property rights

From the methodological point of view, the methods of approach to the following concepts defined above can be further subdivided into these basic patterns:

- a) The implementation of modern logistics links on the basis of ICT between UPV and the university by high speed internet connection.

- b) On-line updating of changes of legal documents to ensure the protection of university know-how.
- c) Using advanced computer technologies to create a user interface to the wide availability of information and assistance for the copyright implementation.
- d) The implementation of a competent professional with a legal education focusing on intellectual property right (copyright and industrial property rights).



*Picture 2 Methodology of creating the internal and external competence relations in the field of intellectual property rights*

Expected outputs and profits in particular, can be summarized as:

- Ensured open negotiated cooperation with the UPV and an active connection to the service "IPR-Helpdesk" respectively "European Patent Office" etc.
- Provided accessibility to the guidance and information sources from reputable international institutions in the field of IPR and their subsequent processing respectively brokerage services through ODV in the information portal ITT
- Processing of the concept of an open integrated ODV system for university employees as well as for other users of ITT services

### **Conclusion:**

Expected outputs and profits in particular, can be summarized as:

- Ensured open negotiated cooperation with the UPV and an active connection to the service "IPR-Helpdesk" respectively "European Patent Office" etc.
- Provided accessibility to the guidance and information sources from reputable international institutions in the field of IPR and their subsequent processing respectively brokerage services through ODV in the information portal ITT
- Processing of the concept of an open integrated ODV system for university employees as well as for other users of ITT services

### **References:**

SINAY, J, et al. : Experiences with E-learning implementation at the Technical University of Kosice." Information Technology Based Higher Education and Training, 2004. ITHET 2004. Proceedings of the Fifth International Conference on. IEEE, 2004., J.A.: Theorie der wirtschaftlichen Entwicklung. Leipzig. 1911.

CLUSTER OBSERVATORY: Priority Sector report: Knowledge Intensive Business Services. In: Center for Strategy and Competitiveness, Stockholm School of Economics, Sweden, 2009,  
Technology Platforms – From Definition to Implementation of Common Research Agenda, EUR 21265,9/2004  
LAPORTE, B.: Turning Crisis into Opportunity, Critical Role of Engineering Skills and Innovation. , St. Peterburg, 2009.  
MIHOK, J a kol.: Podpora inovácií, CITR, 2009,  
KOVÁČ, M. a kol.: Technological Knowledge Business Intensive Services – T KIBS. Košice, 2008  
Dlhodobá viziya rozvoja slovenskej spoločnosti, Ekonomický ústav Slovenskej akadémie vied, Bratislava 2008,  
MONKA P. , ZAJAC J.: Education in Slovak technical universities environment, Nitra, 2008.  
ZAJAC, J.: Inovatívne myšlienky do výroby, Transfer, Bratislava , 2009.  
KOMÁREK, J.: Kvalita a otevřenost–aktuální výzva vývoje vysokoškolského vzdělávání." Periodica Academica (2010)