Managing ERP Projects Implementation: Multidimensional Analysis of Failure Causes

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Abstract

Due to the persistence of failure to conduct information systems implementation projects, and because of the lack of researchers' consultation on the key factors of project management success, it is advisable to broaden the reflection on the main factors of failure and success, taking into account the contexts specific to each project. This paper lies within an exploratory approach, trying to identify the success factors of managing ERP implementation projects within companies, and proving the existence of strong interactions between the three project phases. It also tries to explain that project management should not be executed independently of the initial business plan. The methodological approach applied in this research is not part of a linear approach that investigates a phenomenon known in advance; it aims at building knowledge based on qualitative and empirical data. It is a combination of Maxwell's qualitative and empirical research' foundations, as well as the principles of grounded theory used in qualitative analyses in which the studied sample's size is not known in advance. The article showed that the success of ERP implementation is not as obvious, it should not be perceived separately from the study and exploitation's stages. In fact, it is the outcome of an appropriate preparation during the pre-project stage, optimized implementation during the project's conducting stage, as well as satisfaction of final users. This complexity requires the involvement of all stakeholders as well as agility at all levels. Thus, the stakeholders are required to take into account all events and possibilities that may affect the course of the software

implementation project. At this level, defining a management approach and setting up a structure dedicated to that project becomes a must.

Keywords: Project management, ERP, Performances, Projects Success Factors Keys, Failed projects

Introduction

Information Systems provide the required information for companies[11] to ensure efficient operation and keep a step ahead of competitors. These systems (Challande & Lequeux, 2009) are composed of databases, Integrated Management Software packages (ERP[12]), Customer-Relationship Management software packages (CRM) as well as, Computer-aided[13] Production management tools.

The decision to set up an ERP within a company either can be justified by the need to reform the existing functional systems, improve interaction with customers and suppliers, Systems standardization or can be part of a global Strategy of the company.

With the evolution of agile management methods, many researches and organizations are aiming to set up procedures and best practices for an optimal management. Yet, many ERP projects either drift from their initial objectives or are simply abandoned.

Therefore, it is advisable to give more thought on the context of specific failed projects, in order to identify the failure factors. Moreover, since these factors are not entirely defined, this brings us to raise questions about the possible factors that could lead to understand the reasons behind deriving from initial objectives, or failure of the entire project. Thus, we have decided to examine9 projects cases, using a questionnaire and an interview guide.

1. Project Management failure factors and Presentation of the questionnaire

1.1 Key factors to project success

In order to assess a project success, we can measure to which degree, time and cost constraints were respected. The success is conditioned by the simultaneous respect of the entire objectives. However, the decision-makers could prioritize a component to the detriment of another, taking into account the particularity of each field of activity.

In parallel to these three components, other aspects could be taken into account, such as the complexity level, and customer satisfaction. To that end,

[11] All organizations regardless their activity nature, public administrations…

[12] Enterprise Resource Planning

[13] In addition to security systems to assure data-flow integrity in the company

we should differentiate between project management constraints and projects objectives such as the stakeholders' satisfaction, which is hard to assess.

In 1998, Clinton and Beth carried out a survey among a group of 150 IT[14] managers, which proved that ERP projects are harder to manage, but that technology is far away from being the main cause of failure. Failures are often related to poor management, changes of business priorities, as well as lack of functional managers' support.

In the same vein, some authors have tried to define the key factors of a project management success, thus, (Belassi and Tukel 1996), classified them into four dimensions in relation to the covered area, the project team, organization of interaction within the project, as well as the external factors impact.

The Terry Cooke-Davies' study entitled "The real' success factors on projects ", proved in 2002, that in addition to deadline, cost and quality constraints, the complexity and appropriate positioning as final customer or project-manager, are other elements that enable us defining these factors.

These researchers have tried to bring out the aspect of the research about projects' success. The main critique presented was that projects management success was not founded on solid theoretical and conceptual basis and suggests instead, a general theory that can apply to all projects, regardless what their nature is.

This general (Dvir & al, 1998) or universal approach, pertaining to the research on projects management practices, is based on the existence of a similarity between projects, in relation to organization, environment, or other factors. Project Management Institute (PMI) and Office of Government Commerce (OGC), both support this new state of affairs to confirm that projects management can be applied to different fields.

Thus, these researchers suggested some exhaustive lists of these key factors of success. Factors like planning; human resources, communication and executives' support appear to be universal. However, it is worth mentioning that these elements are not identical in every project.

In the same line of researches (Westerveld, 2003), (Judev and Muller, 2005) presented the key-factors of success history (16th Strategic Management international Conference, 2007), and proved the existence of different lists and models about project management since the 1980's. The most known list belongs to (Slevin and pinto, 1986), who suggest a ten-factor model that consist of: project mission, top management support, planning and schedule, listening to clients, personnel, technical tasks, client acceptance, steering& feedback, communication and troubleshooting.

[14] Information Technology

Likewise, literature analysis revealed that the work of (Parr and Al, 1999) defined and classified these factors of success according to four main categories:

- The first category is related to the project success determinants, like the users role, skilled resources availability, a sponsor appointment and executives support;
- The second category is pertaining to success determinants, as executives' commitments, installation process optimization, strict project management and software choice criterion.
- The third one concerning the management techniques of ERP implementation, such as: planning, project team qualification, communication and strict monitoring of work progress.
- The last category is about ERP's implementation, such as ERP's commissioning impact on the structure and on business process reengineering, and the end-users involvement.

1.2 Methodology and questionnaire presentation.

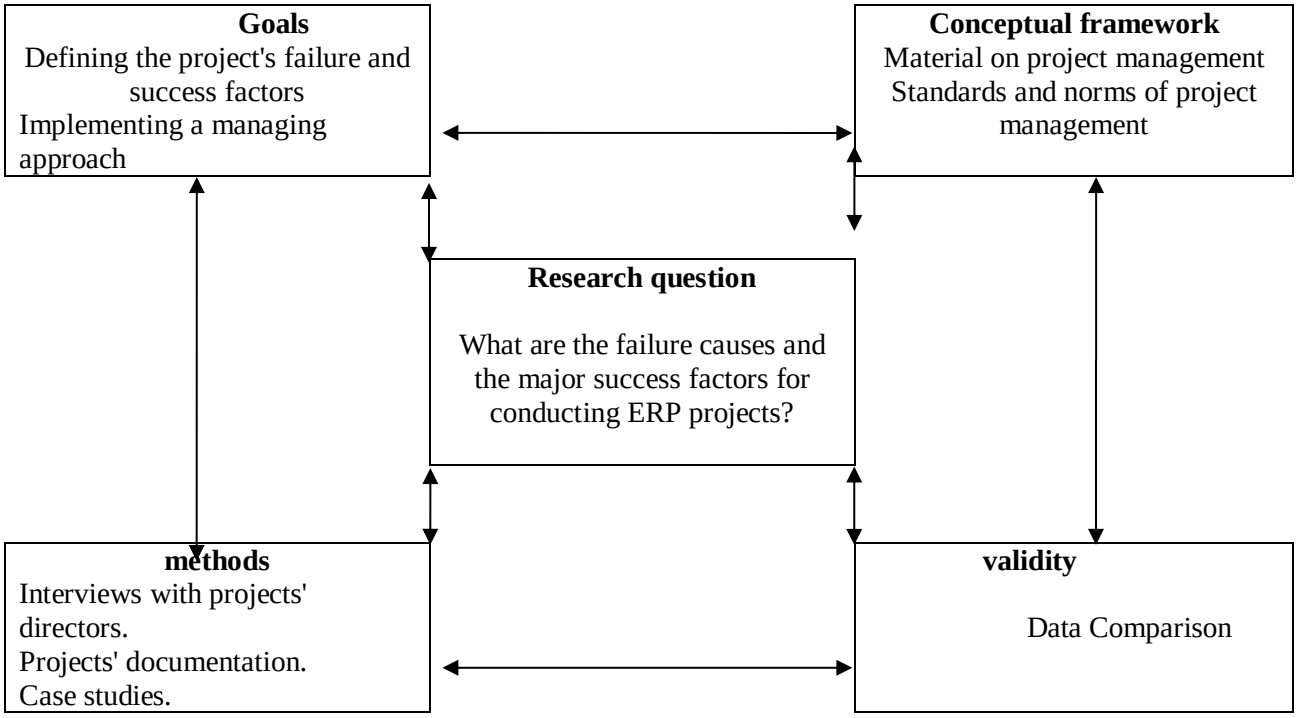
1.2.1 Questionnaire presentation :

A: The methodological approach

The methodological approach used in this paper is composed of 3 parts, based on the foundations of Maxwell's qualitative and empirical research:

1- The first part focusing on the environment and structures where all stakeholders are working at;
2- The second part is exploratory suggesting a descriptive approach;
3- And the last one is an inductive approach based on concepts, hypothesis and theories implementation as a result of the data acquired from all stakeholders.

The following figure presents Maxwell's research design.



The research strategy will revolve around three main dimensions:

- Time dimension: In fact, project management is an old discipline that has emerged in the last few years, and which is arousing increasing interest within companies.
- Research questions about "Who", "How", "when" and "Why", which will help giving a better visibility about the different techniques and methods used to manage information systems' projects.
- A dimension related to the forms of data gathering, in fact; several sources of data gathering are considered.

The consolidation of these three elements' results will enable us to refine the analysis of the different dimensions related to ERP project management practices.

In order to explore new emerging ideas, we opted for the grounded theory[15] approach, which is based on gathering qualitative data to facilitate the results' interpretation for a specific category.

The approach adopted in this research is a combination of a case study and the Grounded theory, with the aim of supporting the approach used in the case study against the element categorization component.

At this level, the qualitative analysis approach adopted requires the consideration of several criteria related to the company, such as the size, organization layout, management mode, field of activity, reasons behind the choices made, as well as the interactions' nature between the different stakeholders.

Qualitative analysis is an activity that aims at transforming a significant amount of raw data[16] into a description and a thorough analysis of a given phenomenon. During this activity, a long work of interpretation through a series of specific processes is applied.

The Grounded theory analysis method is an empirical and inductive theory developed in 1967 by Glaser and Strauss. It is used in qualitative analyses and characterized by the fact that the size of the sample reviewed is not known in advance, and will be limited only after the saturation of redundant data.

This method relates to the data gathered during a qualitative research, which is mainly characterized by the simultaneity of data gathering and analysis. During this analysis, the researcher tries to better understand, identify, explain and theorize the phenomenon being studied (whether in data or in the field).

To that effect, it should be made clear that theorizing does not necessarily mean developing a great theory; it is rather a question of identifying an event's meaning, linking various elements of a situation and understanding a phenomenon from a different perspective. Theorizing can be therefore perceived as much more of a process than a result.

The analysis' result must be firmly grounded in the empirical data gathered. Thus, the concept of sampling should be separated from that of "person" or "subject".

In fact, we first sample events and phenomena rather than people, the analysis should be gradually evolving.

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[15] The Grounded Theory was developed in the 1960s to avoid the paradigm advocating hypothetico-deductive quantitative studies. The founding work of this general analysis methodology entitled "The Discovery of Grounded Theory" (Glaser and Strauss, 1967) indicates that this method should allow the researcher to suggest new scientific knowledge in logic of discovery.

16 Field notes, various documents…

B: Information gathering:

Information gathering was based on individual interviews with project managers, project directors and individuals who participated in the management of ERP projects in Morocco-based and overseas companies.

The interviewees are experts in information systems implementation regarding preliminary studies, expression of needs, processes' formalization, development, change management, implementation and support.

Interviewees worked for several companies specializing in implementing information system solutions. Since the method used in this research does not meet the requirements of sampling and population representativeness' principle, meetings were limited to project managers or directors of projects in the examined companies. The choice of companies was dictated by several variables such as the project's size, complexity and the managers' availability.

According to Yin, Great value is attached to the quality and relevance of the empirical data collected than to the sample's size; as a result, the interviews conducted primarily focused on the main determining dimensions of project management.

C: Criteria for selecting companies:

In order to define the scope of the study, the selection of the projects' sample was based on four variables: The project management practices and culture development within the company, data accessibility, nature of the system implemented as well as the geographical location.

The first variable used to select the projects is the existence of a project management culture within the company. In fact, many companies are aware of the advantages of developing a project management culture for all their staff, by providing them with appropriate training or certification in order to involve them in future projects and help them mastering their acquired skills. These training courses focus mainly on the techniques, methods and skills required for project management. As far as this research is concerned, the activities of the selected companies are mainly related to services and processes of customer service as well as industrial activities.

The second variable relates to the data and projects documentation accessibility. In fact, many companies are implementing ERP projects. However, some entities integrate information management within the framework of information security protection, and thus, consider these projects information as confidential.

It is worth mentioning, that some companies and project managers were reluctant to contribute to this study because of their firms' policies.

The third variable relates to the nature of the system and processes to be implemented. In order to master the rules of process management that will

be integrated into the targeted system, it was necessary to define the activity nature. For instance, the processes supported by a logistics ERP do not obey to the same managing rules for industrial production ERP or banking services.

The last variable is about the geographic location of the ERP implementation. Indeed, in order not to link the success or failure's causes of implementing ERP projects to the country level of the development, it was mandatory for us to include overseas companies in our sample.

1.2.2 Questionnaire content :

Nine projects were examined, which allowed determining ERP projects management practices in different sectors, like: banking, telecoms, industrial production, insurance and mining industry.

In order to afford raw data for the research, we interviewed separately several project managers, project directors and other people who interfered in ERP's projects management. A questionnaire was then prepared, based on the vicissitudes that influenced the entire stages of the project. Half-opened questions were used to broaden the perimeter of discussions.

In this paper, we consider as "success", the fact of operating an ERP, claiming to be satisfied using it, and observing that the entire users and system actors share these claims. In case of non-unanimity, we describe this situation as "half-failure". At last, we call it "failure", in case of deficiency or major dissatisfaction expressed by users or system actors, or in case of project abandonment.

The questionnaire is composed of four parts: The Company's context and structure, project preparation, project achievement and the preparation to change. The questions used are half-opened, to initiate a debate[17] with the interviewee and allow him to bring to light new elements with the purpose of defining some dimensions in the results' analysis (Creswell, 1998).

To attach more importance to each element of the questionnaire, and gather significant indicators, the following grid was applied:

[17] At this level, it is about the developing process and new categories identification.

A. Company context and structure

The first part of this questionnaire aims to give an overview of the company:

Status	Done	Not done
Value	1	0
Specification sheet		
Sleeping /silent partner		
Contracting authority		
Prime contractor		
Project site(s)		
Initial overall budget		
Estimated completion time		
Official date of the project start		

B. Project preparation

The second part of the questionnaire, examines the actions implemented to secure the project's prerequisites. It handles the following elements:

Element	Weight
Project feasibility	7
Project preparation	9
Project manager appointment	9
Managing methodology	10
Setting objectives	11
Total	46

C. Project running

The third part of this questionnaire is about the techniques used to start ERP producing. During this stage, interactions rate increases among all stakeholders and decisions are made as work proceeds. The weight of the elements making up this part is as follow:

Element	Weight
Concept note	11
Project concept note validation	14
Project planning	24
Planning update	20
Monitoring and feedback	21
Project communication	19
Project costs	16
Project risks	17
Project team	9
Project quality	11
Project supply	4
Total	166

D. Change management

The fourth part of this questionnaire examines the steps taken within the company, to drive change, with respect to the users' psychological preparation to the acceptance of the new system and to the radical change of processes. The weight of the elements making up this part is as follow:

Element	Weight
Project documentation	6
Project summary and closure	13
Total	19

2. Projects presentation

The nine projects studied in this paper, are implementing the managing techniques and practices in the following sectors: banking, telecoms, industrial production, insurance and mining industry. The covered processes in this study are logistics management, Insurance, normal banking transactions and production process. The sample analyzed is mentioned in the following table:

	Failure	Half-failure	Total
Banking sector	1	1	2
Insurances	1	1	2
Industry	1	1	2
Mining industry	-	1	1
Telecoms	1	1	2
Total	4	5	9

Failed projects					
Line of business	**Project's name**	**Company**	**Field**	**Observation**	**Budget**
Banking	GPDL	E2	Banking transactions	The project never came out	DH 40 million
Insurance	CNGP	E5	Social Security provisions	deadline exceeded by 36 months	DH 15 million
Industry	OPM	E6	Production line	Project cancelled 4 months after launch	DH 14 million
Telecoms	TSR	E10	Business transactions	3 years delay after rejecting the prime contractor's deliverables	DH 5 million
Half-failed projects					
Banking	PGB	E3	Normal banking transactions	Budget overrun of DH 1.5 million	DH 20 million
Insurance	GAOS	E4	Insurance services	deadline excess of 18 months in addition to several losses	€ 1 million
Industry	GPNM	E7	Microelectronic industry	3 months delay Budget exceeded by 30%	DH 4 million
Mining	GPAOI	E8	Production line	Loss of more than 500,000 MAD	DH 8 million
Telecoms	Identif	E12	Customers operations	Significant drift related to cost and deadlines.	DH 3 million

a) GPDL project:

This project is about improving the processes and harmonizing all software used by a bank account manager, in one ERP.

The bank had two options: either purchase a standard solution with a higher cost, or develop the targeted solution with the help of an integrator. The Bank Chief Information Officer (CIO) opted for the choice of developing the ERP software by the bank IT Department, using an integrator, and sells[18] it afterwards with the goal of generating huge profits.

Since he had succeeded such projects before, and regarding his importance in the bank executive committee, the CIO managed to impose the second alternative, he also convinced the executive committee that once the ERP is ready, they could sell it and get a Return Of Investment (ROI) in record time. He established the project organization and assigned its management to a team he himself appointed[19]. This project was not a part of the bank's guidelines, therefore, the pre-project phase was carried out in rush.

Difficulties started to mushroom as work proceeded, and the stakeholders observed sings of failure. To that purpose, a decision to stop the project was made in order to contain the damage. This project never came out, and the consequences were disastrous on the organizational level.

b) CNGP project

In order to afford transparency to their transactions, and a meticulous follow-up of their customers' files, a social security service company decided to merge all of its databases together in a unique ERP that will allow the following processes to be fulfilled:

- Monitoring contributions of members;
- Indemnities allowance;
- Penalties application;
- Body management control.

Given the high number of problems they faced, the sponsor asked to stop working on the project and take more time to prepare it. The idea of the project was later abandoned for good.

c) OPM project

A plastic items producing company, was contacted by a company specialized on operational research suggesting ERP software, as well as a production improvement, thanks to operational research techniques[20]solution.

[18] This activity is far from bank's area of business.

[19] The managing team must be an independent entity in charge of monitoring the IT activity and reporting to the executive committee.

[20] By reducing production's waste

The company accepted the offer. The overall project consisted of evaluating the existent resources, process mapping, optimizing the source material consumption by reducing waste products, operating the project and ensuring post-project support. So, the sponsor allocated significant human and financial resources to this project and launched it without being part of the company's guidelines.

During the first workshops led by the contracting authority, he noticed that the processes used in the company were running for about thirty years and were mastered by the whole staff. This situation caused a problem in terms of change driving management. In fact, the staff rejected the new solution and asked that it be adapted 100% to their working approach.

In addition, the contracting authority faced some problems on different levels, related to: the lack of a negotiator specialized in projects management on the customers' side, complete lack of collaboration on behalf of the plant's heads of business lines, as well as some conflicts opposing the sponsor to the directors, causing them to sabotage the project.

Thus, the contracting authority asked the sponsor for a meeting in order to expose the problems they are facing and try to come to an agreement. So, the two parties agreed on starting the first stage of the project to include all the processes it could support, and go for arbitration about the other functions[21].

The plant's directors considered the ERP implementation as a limitation to their decision-making margin and a radical change of all their working approaches. The sponsor asked to shut the project, which caused the delegated contracting authority to go to court and ask for compensation, as the decision to stop the project was one-sided.

d) TSR Project

With the aim of mastering, the quality of service they are offering and guarantee the end-users satisfaction, the company works on numerous internal industrialization processes related to: provisioning, management of incidents and interventions.

To assist this industrialization, the company decided to implement a full software of services management in order to: meet the expectations of internal and external customers in a better way, ensure optimized ticket management by standardizing inputs points, allow consulting & monitoring tickets processing progress, assure a better communication between the participants, as well as establishing a monitoring indicator to measure the processing effectiveness.

After the start of the project in 2007, the company was confronted to the constraint of competition, despite the limits of the systems used. The

[21] Either integrate them in the ERP or keep them manual

technical department had to solve incidents and problems they received via basic application. The ERP commissioning was significantly delayed, and the budget cost was high. Several projects managers succeeded vainly to that project.

e) PGB Project

Following organizational changes at the bank, and with the aim of improving the daily management tasks, it was decided to regroup the entire procedures in a standard model and put it in a system accessible to all the bank users. The project management was assigned to the director of "quality/organization".

Given the size of the issues that arose, the company agreed with the provider to hand the project to another prime contractor. The project was then, redesigned according to the applicable standards, which put an end to the issues initially observed.

f) GAOS Project

An insurance company based in France noticed that operations conducted in its offices were not mastered at the central level, and that the decision-making process is delayed due to issues in data consolidation. This caused fraud cases to increase significantly.

To bring a solution to that issue, the company made a decision to implement an ERP solution that would automate the entire processes, allow monitoring all transactions meticulously and get a better traceability.

Throughout the project driving stage, the steering committee has not regularly met and the project manager had not set in advance the follow-up frequency and procedures. The project was recovered thanks to the appointment of a new sponsor, setting of a follow-up authority and change of the integrator.

g) GPNM Project

After its establishment, accompany specialized in microelectronic items producing and marketing, decided to automate their managing procedures in order to allow a better follow up and optimal decision-making.

The envisaged solution should cover business processes related to: supplying, stock management, monitoring suppliers invoicing, turnover monitoring, performances monitoring and HR management.

The project drifted considerably due to personal benefits dominance. However, the prime contractor did not want the project to fail, in order to avoid causing harm to his reputation. He was seeking to be a reference in the market.

In fact, the project manager on the integrator side, managed to save the project, thanks to his experience. He suggested alternative solutions to the

reservations expressed during the analysis stage, and the customer had no choice, but to apply them.

h) GPAOI Project

A mineral extraction and export company, based in different cities in Morocco, noticed that the manufacturing management flows, are not completely mastered and that the extraction sites do not work using the same processes.

To address this situation, The Company decided to implement ERP software and deploy it in different sites, in order to manage the manufacturing process. Therefore, it asked for the expertise of a firm with international reputation, having a branch in morocco in order to manage the project starting from the existing resources evaluation phase, up to the post-project support stage. The sponsor insisted on the use of the internal managing methods.

Many difficulties emerged, such as: the full dependence of the sponsor to the supplier, lack of a clear strategy for risk management on the sponsor's side, project content not defined, as well as political issues that arose among the sponsor and the sites managers while developing the final process. However, the situation was solved, thanks to the partnership spirit between the supplier and his client.

i) IDENTIF Project

After a regulatory legislation that the provisions should be applicable in six months, the Company had to make its customers' database reliable. The main objective was to be able to identify each client by having on hand information related to the conditions of purchase[22].

This project drifted from its original path, because of the appointment of two managers, the project objectives were not well assimilated at first, loss of control of the project due to the multitude of stakeholders; lack of action synchronization, personal benefits predominance, lack of a clear vision and failure to develop a functional post-production support mechanism. The project was saved thanks to the executive board support and the significance of the budget allocated.

3. The questionnaire results and definition of failure variables.

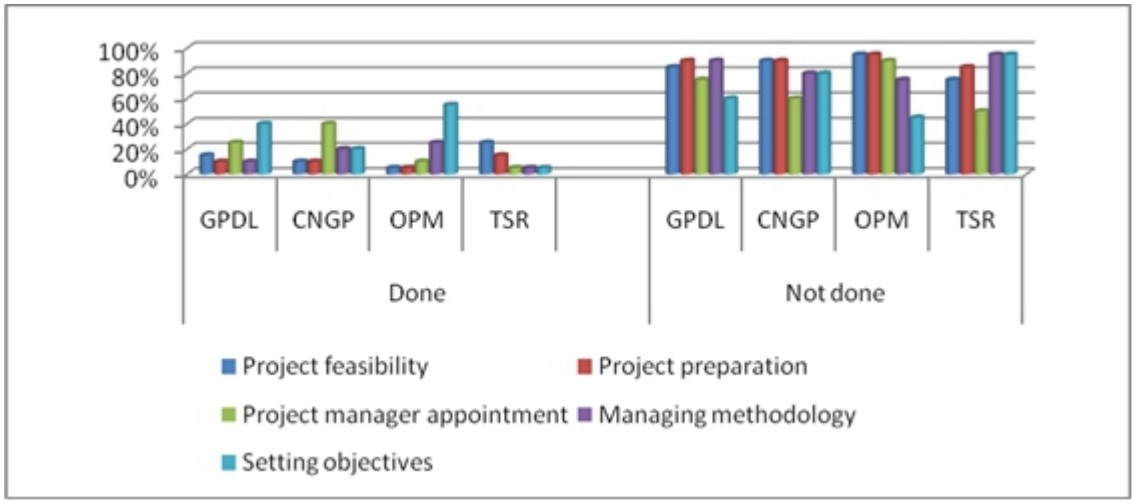
3.1 Results[23] of failed projects

Questionnaire results are gathered in the tables below:

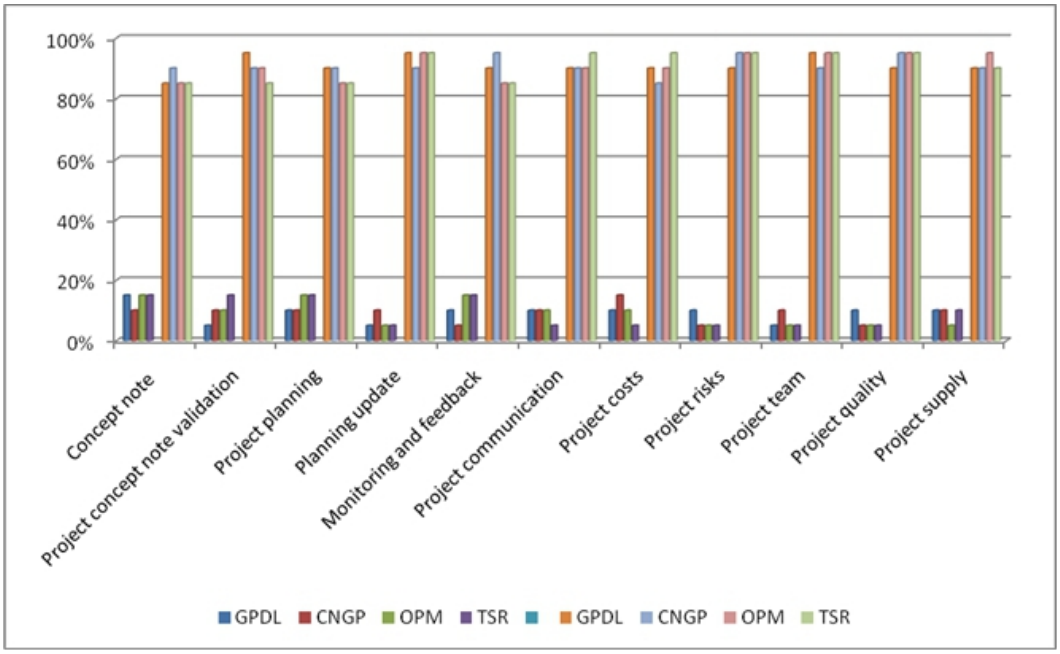
[22] Place and date of purchase, selling agency

[23] The results are indicated in percentage

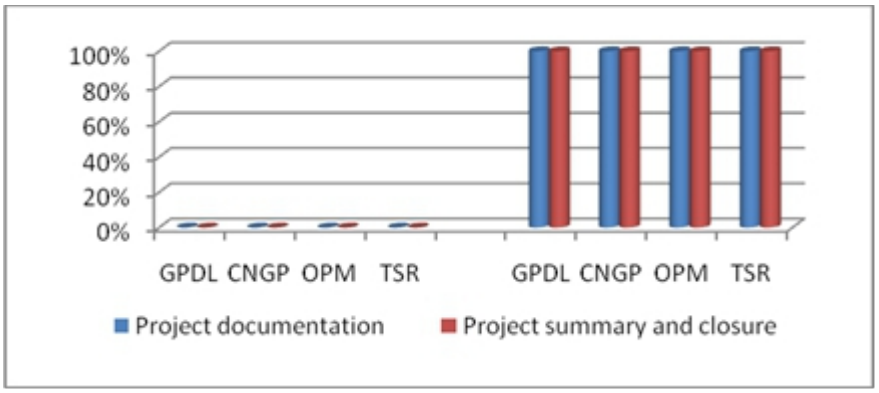
	Done				Not done			
	GPDL	CNGP	OPM	TSR	GPDL	CNGP	OPM	TSR
Project feasibility	15	10	5	25	85	90	95	75
Project preparation	10	10	5	15	90	90	95	85
Project manager appointment	25	40	10	50	75	60	90	50
Managing methodology	10	20	25	5	90	80	75	95
Setting objectives	40	20	55	5	60	80	45	95



	Done				Not done			
	GPDL	CNGP	OPM	TSR	GPDL	CNGP	OPM	TSR
Concept note	15	10	15	15	85	90	85	85
Project concept note validation	5	10	10	15	95	90	90	85
Project planning	10	10	15	15	90	90	85	85
Planning update	5	10	5	5	95	90	95	95
Monitoring and feedback	10	5	15	15	90	95	85	85
Project communication	10	10	10	5	90	90	90	95
Project costs	10	15	10	5	90	85	90	95
Project risks	10	5	5	5	90	95	95	95
Project team	5	10	5	5	95	90	95	95
Project quality	10	5	5	5	90	95	95	95
Project supply	10	10	5	10	90	90	95	90

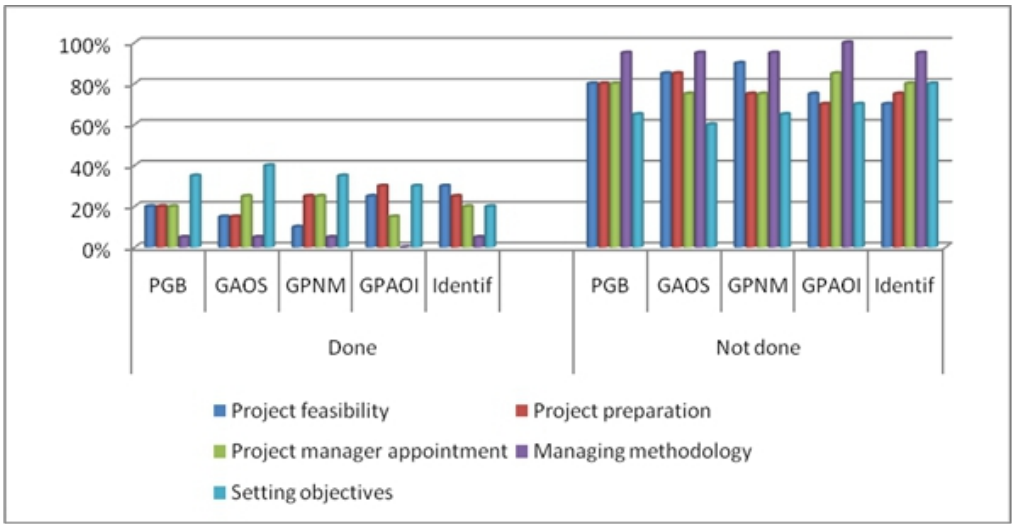


	Done					Not done			
	GPDL	CNGP	OPM	TSR		GPDL	CNGP	OPM	TSR
Project documentation	0	0	0	0		100	100	100	100
Project summary and closure	0	0	0	0		100	100	100	100

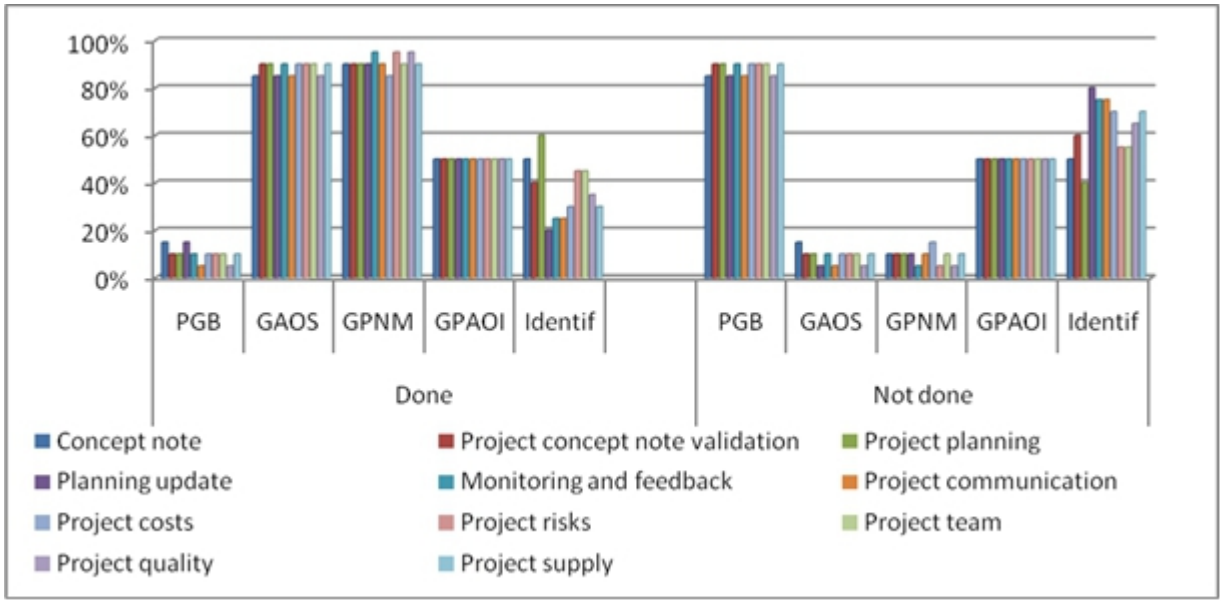


3.2 Half-failed projects results

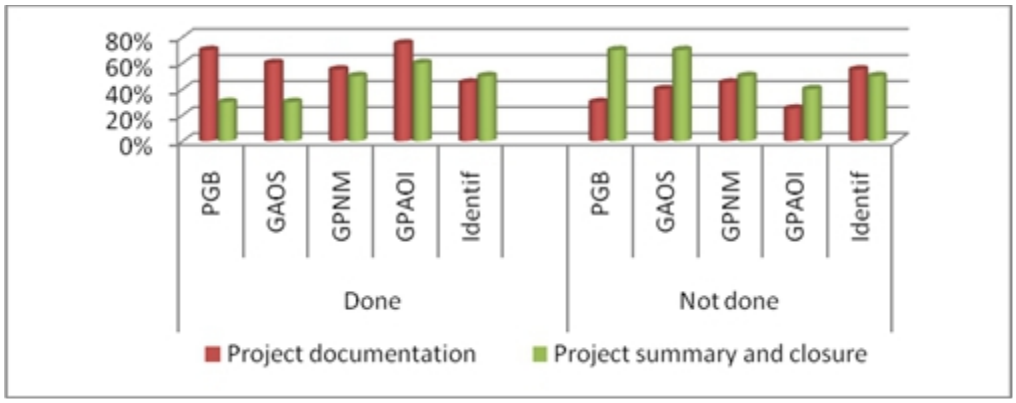
	Done					Not done				
	PGB	GAOS	GPNM	GPAOI	Identif	PGB	GAOS	GPNM	GPAOI	Identif
Project feasibility	20	15	10	25	30	80	85	90	75	70
Project preparation	20	15	25	30	25	80	85	75	70	75
Project manager appointment	20	25	25	15	20	80	75	75	85	80
Managing methodology	5	5	5	0	5	95	95	95	100	95
Setting objectives	35	40	35	30	20	65	60	65	70	80



	Done					Not done				
	PGB	GAOS	GPNM	GPAOI	Identif	PGB	GAOS	GPNM	GPAOI	Identif
Concept note	15	85	90	50	50	85	15	10	50	50
Project concept note validation	10	90	90	50	40	90	10	10	50	60
Project planning	10	90	90	50	60	90	10	10	50	40
Planning update	15	85	90	50	20	85	5	10	50	80
Monitoring and feedback	10	90	95	50	25	90	10	5	50	75
Project communication	5	85	90	50	25	85	5	10	50	75
Project costs	10	90	85	50	30	90	10	15	50	70
Project risks	10	90	95	50	45	90	10	5	50	55
Project team	10	90	90	50	45	90	10	10	50	55
Project quality	5	85	95	50	35	85	5	5	50	65
Project supply	10	90	90	50	30	90	10	10	50	70



	Done						Not done				
	PGB	GAOS	GPNM	GPAOI	Identif		PGB	GAOS	GPNM	GPAOI	Identif
Project documentation	70	60	55	75	45		30	40	45	25	55
Project summary and closure	30	30	50	60	50		70	70	50	40	50



We will examine all factors that contributed to the project management failure. They will later be grouped into dimensions in order to bring out the most significant variables.

3. Definition of Failure variables

a) GPDL Project:

The most influent variables that contributed the project failure are:

- The bank engagement in an activity that is not related to the core of its business and placed out of the bank's area of expertise.

- Appointment of the management team members by the CIO, which questions the neutrality that should govern this team's work.
- Failure to carry out an audit of the existent, with respect to the technical, human, and functional prerequisites during the project feasibility stage.
- The integrator's affiliation to the company disengaged him from the constraint of planning respect, which had a significant impact on the budget.
- The project preparation stage was rushed, and the organization set, was very limited as for defining the scope of responsibility.

This case study enables us to come through the following variables:

i. A functional variable related to the business itself;
ii. Organizational variable attached to the role and missions definition;
iii. Strategic variable pertaining to pre-project reflection time.

b) CNGP Project:

As for this project, several factors correlated and caused its failure:

- The project was assigned to internal collaborators, without any great expertise on ERP projects management,
- The project team organization was not appropriate to the project perimeter;
- Lack of a clear view about project directing, due to the absence of the project manager;
- Lack of the sponsor's support;
- Lack of involvement and empowerment of actors and end users, regarding the project significance to the Company;
- The decision of ERP implementation was rushed;
- The sponsor had a reputation of a bad payer, thus, expert prime contractors did not take part in that project.

Four significant variables could be observed in this case:

i. Interpersonal qualitative variable linked to the stakeholders skills;
ii. Financial variable related to the budget resources allocated, as well as to the sponsor's payment process rigidity;
iii. Organizational variable pertaining to roles and responsibilities definition and to monitoring and feedback mechanisms;

iv. Managerial variable, linked to top management role, in the engagement and involvement of all stakeholders to the project success.

c) OPM Project:

Cumulative factors that caused the project failure are as follow:

- Project launch by the sponsor without considering the long term objectives, and without being included in the company guidelines;
- Lack of follow-up terms and mechanisms;
- Lack of collaboration on behalf of the company directors, who considered the ERP implementation as a possible source of their operations and decision-making power loss;
- Strong collaborators reluctance towards change, which interpreted any decision or change made as a sign of job termination;
- Negative feedbacks on the project outcome, all over the its processing, which increased the resistance to change;
- The initial needs were not properly defined and not fixed from the start;
- Lack of projects culture, manifested in an almost full dependence of the sponsor towards the delegated contracting authority, as well as a lack of a steering committee.

These factors bring out five main variables:

i. A visionary and strategic variable pertaining to the solution utility in long term;
ii. A socio-cultural variable relating to the managers and collaborators relationship, as well as to the type of culture in the company;
iii. Change driving variable regarding the establishment of a body in charge of change driving in consultation with stakeholders;
iv. Organizational variable concerning the establishing of a strong management structure, as well allowing sufficient time for a good preparatory work;
v. A collaborative variable between the delegated contracting authority and the sponsor.

d) TSR Project:

The main failure causes of this project are related to the following elements:

- The project was not prioritized by top-management;
- Complexity of the needs expressed by users, who were too demanding compared to the deliverables content;
- Change of the project content after start, which had a major impact on all modules, and caused extra time and budget consumption;
- Ambiguity concerning the solution's choice criteria;
- Multiple project managers shift;
- Users' reluctance, because of the software's ergonomics complexity.

These factors resulted in the following five variables:

i. Strategic variable about projects prioritization in the company;
ii. Ethical variable pertaining to transparency during the solution choice stage;
iii. Organizational variable concerning the management mechanism to establish;
iv. Change driving variable related to a change driving policy to which all stakeholders take part in;
v. Qualitative variable about the ERP software simplicity of use.

e) PGB Project:

The issues raised at the project level are as follow:

- Budget undervaluation by the sponsor and the prime contractor;
- Insufficient size of project teams;
- Failure to check the work process alignment to the suggested solution, because of the insufficient covered components during the project preliminary study;
- Change of work methods while driving the project;
- Change of the projects team stakeholders.

Following the ERP producing start, several defects emerged; the end-users manifested their dissatisfaction to the software and claim to shut the ERP increased. However, for strategic reasons, the top management enforced the software retention, and ordered establishing a crisis unit, whose mission was fixing anomalies and redressing the situation.

This case brings out four main variables:

i. Financial variable pertaining to the estimation of costs norms : a poor cost estimation will put the project at risk;
ii. Methodological variable relative to the use of management methods;
iii. Interpersonal variable about projects managers who are supposed to have the appropriate qualities and skills to perform their duty;
iv. Organizational variable concerning teams sizing.

f) GAOS Project:

Issues faced are structured around the following points:

- Lack of the delegated contracting authority impartiality which results in information unreliability;
- Lack of top management constant monitoring, via the steering committee;
- Lack of sponsor's support and non-involvement of the project actors;
- Improper size of the project teams;
- The project backer failure to report slippage alerts;
- Absence of the project's sponsor.

These failure factors bring out four variables:

i. Organizational variable pertaining to the project actors sizing;
ii. Strategic variable related to top management support and projects prioritization in the framework of the company's guidelines;
iii. Cultural variable concerning the belonging spirit to the company, and to building trust in senior executives;
iv. Managerial variable regarding the lack of a constant monitoring.

g) GPNM Project:

The main factors that almost caused the project failure are:

- The selected solution complexity, which was not adapted to the company needs and not supporting additional settings;
- Emergence of conflicts between the project team and the one that selected the solution;
- Limited experience of the project manager in ERP projects management;
- Predominance of personal interests over the company benefits;
- Insufficient customers' involvement while holding workshops.

The project was almost abandoned. However, the prime contractor established solutions that allowed recovering the project; he aimed to be a reference on the market.

Four variables emerge in this project:

i. A collaborative variable related to the customer and prime contractor, The project success should be the main objective of all stakeholders;
ii. A technical variable, pertaining to the selection of the software to implement; technical specification study should be assigned to experts;
iii. Interpersonal variable, concerning the project manager competence;
iv. Cultural variable, related to the enterprise culture. Indeed, the interests of the company should be above those of individuals.

h) GPAOI Project:

The main factors of failure identified are:

- The project content was not fixed before the project management start, several changes were made during the project progress;
- Delegation of authority to the prime contractor;
- Failure to set a clear strategy for risks management;
- Appointment of a project manager, who considered the objectives as "not realistic";
- The working procedures were not homogeneous throughout different sites;
- Predominance of personal interests at the stakeholders level;
- Lack of involvement and responsiveness of the project actors, on the customer side;

Despite the variety of challenges faced, the project could be redressed, thanks to the fair financial resources allocated, and to the broad expertise of the prime contractor.

This case brings out a correlation of eight significant variables:

i. Collaborative variable, between the client and the supplier, based on a strong partnership;
ii. Human variable, that places the human being at the heart of project management;
iii. Organizational variable, pertaining to a strong organization based on a clear definition of roles and responsibilities;
iv. Financial variable, related to significant financial resources allocation;
v. Technical variable, relative to selecting the right solution;

vi. Strategic variable, attached to the support and awareness of top management about the impact of the project success on the company;
vii. Cultural variable, regarding the existence of a firm culture, that prevails the company interests over the staff benefits;
viii. Interpersonal variable linked to the project managers' qualities and skills.

i) Identif Project:

The main factors of failure identified are:

- Appointment of two pilots for the same project;
- Significant delay on decision-making;
- Although, the project pilots were directors, they had no influence to back their vision.
- Project content not clearly defined,
- Relatively high turnover rate;
- Lack of monitoring and feedback measures;
- Failure to prepare post-project support system.

The project was redressed thanks to the executives' strong involvement, which had to honor their engagements towards the regulation authorities.

Four important variables emerge at this level:

i. Organizational variable about the appointment of one project pilot;
ii. Qualitative variable pertaining to the project perimeter delimitation;
iii. Interpersonal variable related to the project manager qualities and skills;
iv. Human variable regarding the project actors backing and motivating

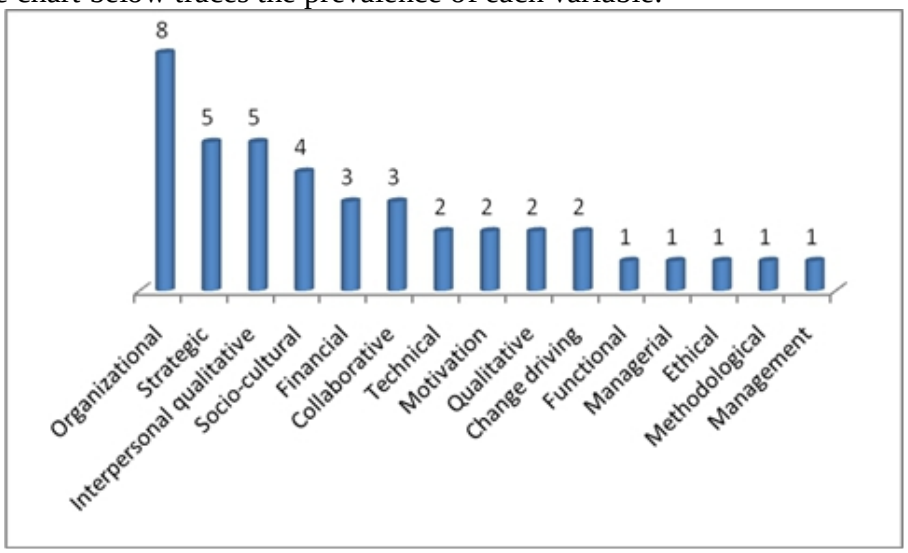
4. Global interpretation of the results and definition of failure's dimension

In order to avoid the threat of analysis elements' invalidity, several techniques have been used, namely: interviews scoping, connecting different situations, deep analysis of explanations and answers given by the interviewees, as well as, linking documents and information sources.

The project's failure variables examined are gathered in the table below:

	GPDL	CNGP	OPM	TSR	PGB	GAOS	GPNM	GPAOI	Identif	Total
Functional	■									1
Organizational	■	■	■	■	■	■		■	■	8
Strategic	■		■	■		■		■		5
Interpersonal qualitative		■			■		■	■	■	5
Managerial		■								1
Financial		■			■			■		3
Socio-cultural			■			■	■	■		4
Change driving			■	■						2
Collaborative			■				■	■		3
Ethical				■						1
Qualitative				■						2
Methodological					■					1
Management						■				1
Technical							■	■		2
Motivation								■	■	2
Total	3	4	5	5	4	4	4	8	4	41

The chart below traces the prevalence of each variable:



The significance of each variable is justified based on the following elements:

1. **Functional variable** related to the heart of business: The Company should remain focused on the core of its business as well as on strong income-generating activities. Getting involved in ERP development and integration, may only increase the risks of the software failure, and may even cause huge financial loss to the company.

2. **Organizational variable** pertaining to roles and missions definition: Failure to clearly define roles and responsibilities, may negatively affect the project driving. Conflicts of interests may prevail on the project's interest and on the smooth running of all the company projects. In the same vein, the project team sizing decision should be made based on a deep reflection.
3. **Strategic variable** regarding the required time to prepare, drive and commission the system. In fact, each company should evaluate the ERP's impact on its global performance, before proceeding on its implementation. The firm should also evaluate the required time to each stage in a proper way, and should have a strategy and long-term vision.
4. **Interpersonal qualitative** variable, regarding the stakeholders' competence in project management: considering the global cost of ERP implementing project, the projects managers' expertise should be significant enough to reduce the margin of errors. A code of best practices should be implemented. Projects managers have to be selected based on the previous projects to which they took part.
5. **Financial variable**, concerning the budgetary resources allocated as well as to the rigidity of the sponsor's payment process: Starting ERP implementation without having a good financial forecast about the solution cost, might worsen the company financial situation. In case of budgetary slippage, the company will be forced to either continue on the project by allocating additional budgetary resources, or simply abandon it.
6. **Managerial variable** concerning the role of top management in the involvement and engagement of all stakeholders to the project success: The success of ERP implementation should be part of the top management priorities; all the stakeholders must join efforts and keep committed to the project's success. Appointment of a sponsor[24] can be of a great value to ensure success.
7. **Socio-cultural variable**, pertaining to the type of relationship between the management and collaborators and to the type of the company culture that prevails. In fact, a good manager should be able to inform all the stakeholders about the project significance to the company. They should consider the project as their own and commit to make it succeed. The company culture turns out to be crucial, throughout hierarchical barriers removal, as well as, honesty and proximity values sharing.

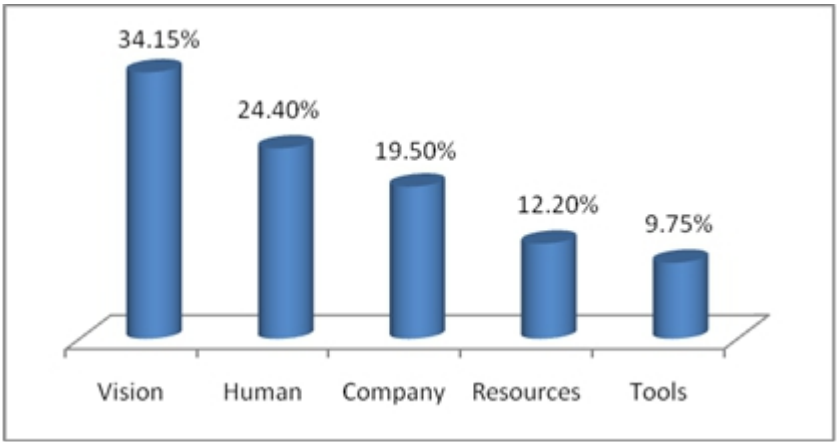
[24] As project guarantor, he has a strong authority

8. **Change driving variable**, concerning the establishment of a mechanism able to drive changes in conjunction with all stakeholders. The change should go unnoticed, and the break with old systems and practices should be gradual. The project driving might cause the project failure if it is not properly conducted.
9. **Collaborative variable**; either between the contracting authority and the prime contractor, or between the contracting authority and the delegated contracting authority. The project success should be the main concern of the project team; appeal to contractual penalties in case of difficulties should be the last resort of the contracting authority. Both parties should work together with a partnership spirit and synergy; joint objectives should dominate over personal interests.
10. **Ethical variable** concerning transparency criteria during the technical solution selecting stage, if the choice is based upon criteria that does not respect the company requirements regarding the processes and performances, the project managing and the system usage will provoke several failures. Honesty and thoroughness should be the main ingredients for a good choice.
11. **Qualitative variable**, about the ERP simplicity of use, a better ergonomics will make the end users' handling of the solution much easier, and will consume less time in the transactions processing.
12. **Methodological variable**, regarding the managing methods used, whether it is a question of the company's white papers or international approaches and norms of project management. The lack of a clear and well-examined approach will increase the risks of project management failure. The project's team members should consult each other about the approach to apply.
13. **Managing variable**, related to constant monitoring and alerts reporting on the appropriate time. It is essential to set up monitoring and feedback mechanisms related to the project's deliverables progress, as well as to the project driving structure. Any decision about modifying, improving or cancelling, must be approved unanimously by the structure previously mentioned. In addition, decisions should be made only after studying their impact on the projects foundations.
14. **Technical variable**, concerning the choice of the solution to implement, the technical specifications study should be assigned to experts in order to select the best option that respects the triple constraints: cost-specifications-time frame. In this regard, it is worth mentioning that several companies were confronted to issues regarding the consistency of the selected solution's architectural structure, to the platform used in the company.

15. **Motivation variable**, because the human being is the main element that can make the project success or failure, it would be useless to involve players who do not believe in the project utility, or who are not strongly committed to the project's success.

These variables can be gathered and classified in five dimensions, which enable us to define the weight of each one based on its recurrence:

Dimension	Variables	Recurrence	additional variables included	Weight
Company	4	8	Functional, socio-cultural, managerial and ethical	19.5%
Human	3	10	Interpersonal qualitative, collaborative and motivation	24.4%
Vision	2	14	Strategic, Organizational and qualitative	34.15%
Resources	2	5	Financial, technical	12.20%
Tools	3	4	Methods, change driving management	9.75%



We can conclude that the variables of the dimension "vision" are the main factors of failure, for this purpose, any strategy or organization default might only increase failure risks. Integrated management software implementation is considered as a thorough reviewing of the organization process in a company. That is why the majority of companies seeking to upgrade their management, choose this option.

ERP implementation success is conditioned by the executives' vision about the ERP impact; they mobilize important resources under the responsibility of skilled stakeholders. Hence, the ERP implementation success is mainly based on the top management vision, which should take into account a goal-centered preparing work, expected gains and the operating strategy in short, mid and long-term.

Therefore, although significant tools mobilization is essential to the project success, there is no doubt that the human dimension is surely more

important. Therefore, we can say that a poor managing of the allocated resources will only increase risks of failure.

The application of tools and managing methods does not automatically mean the implementation success; this is because success lies in the interaction level and the decision-making relevance.

The company dimension, made of functional, socio-cultural, managerial and ethical variables can constitute a real source of failure, if the components are not well mastered. The possible negative impact can be avoided thanks to the relevance of actions and decisions of different stakeholders.

Conclusion

ERP implementation is conducted in three time horizons: pre-project, project driving and project operation. The ERP implementation success is not so obvious; it is in fact the result of proper preparing during the pre-project stage, optimized implementation during the driving phase, and effective use during operation stage evidenced by the end-users satisfaction.

However, projects take place in contexts highly affected by external risks, which require all actors' involvement and agility at all levels, in order to reduce their impact.

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