REVIEW OF STUDIES WITH UTAUT AS CONCEPTUAL FRAMEWORK

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Abstract

The main focus of this paper is to contrast and combine results from different studies using the Unified Theory of Acceptance and Use of Technology(UTAUT) and its extensions, in the hope of identifying patterns among studied results, sources of discrepancy among those results, or other existing relationships that may come to light in the context of these study. Studies from which this paper was prepared were basically derived from Emerald, Science Direct, EBSCOhost databases. Out of 20 studies gleaned 4 were on telecommunication, 5 on banking, 12 were on Education and 5 were on Health. Results from these studies are varying. This paper tabulate thematically and chronologically literature where the Unified Theory of Acceptance and Use of Technology have been applied. The review identified the Topic, Author, Sample Size, Location where the study was carried and theoretical model used. It also includes the Statistical techniques applied, the objectives of the study and the results

Keywords: Effort Expectancy, Performance Expectancy, Social Influence, Facilitating Conditions, Behavioural Intention

Introduction

Researchers have conducted technology acceptance studies for over two decades now. They have used various theories and models to carry out these studies in different context with different unit of study. Findings from these researches vary. The authors of UTAUT model unified eight theories and models which include Theory of reason Action (TRA) (Fishbein and Ajzen 1975) , Technology acceptance model (TAM) (Davis 1989), Motivational model (MM) Davis et al., (1992), Theory of planned behaviour (TPB) Ajzen (1991), combined TAM and TPB (C-TAM-TPB) Taylor and Todd (1995), Model of PC Utilization (MPCU) Thompson et al. (1991), Innovation Diffusion Theory (IDT) Rogers (1995) and Social Cognitive

Theory (SCT) Bandura (1986). The unification by the researchers sum up all the constructs from the eight models to four determinants which predicts intentions and usage and four moderators of the key relationships Venkatesh et al.(2003). Figure 1 illustrates the relationships that exist in the UTAUT model. The model has four exogenous variables, effort expectancy, performance expectancy, social influence, and facilitating conditions., two endogenous variables, intention to use technology and use behaviour and four moderators which are gender, age, experience and voluntariness.

Performance expectancy is the degree to which an individual believes that using the system will help him or her to attain gains in job performance. Effort expectancy is the degree of ease associated with the use of the system. Social influence is the degree to which an individual perceives that important others believe he or she should use the new system. Facilitating conditions are defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system.

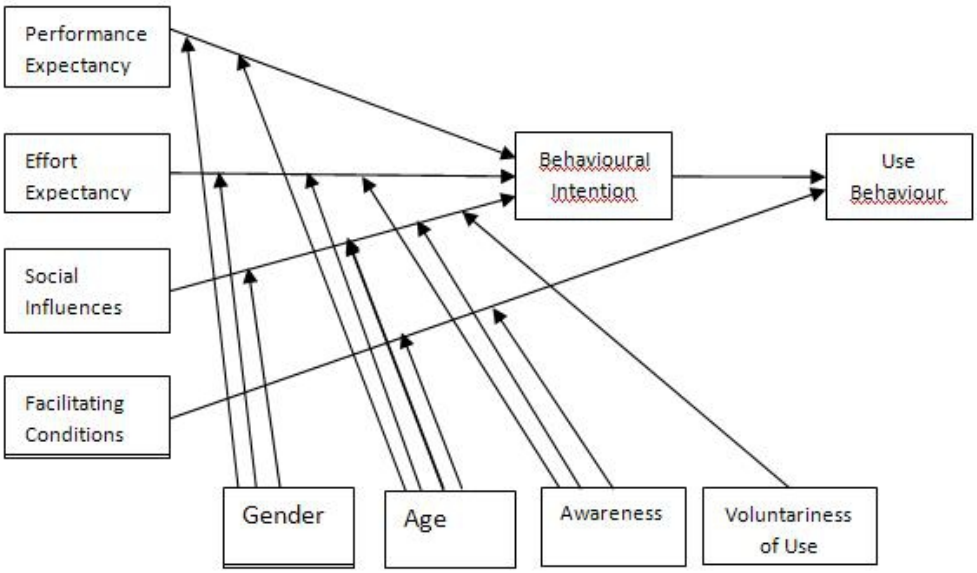

Figure 1 : UTUAT Conceptual Model

The selection of this model for this paper is justified by its global and integrative approach, incorporating a wide variety of explanatory variables from the main theoretical models developed to explain technology acceptance and use. In particular, Venkatesh et al. (2003) carried out an in-depth analysis of literature on this topic and proposed a unified model that integrates the contributions common to the previous theories. Therefore, it is reasonable to expect a theory that integrates the most important contributions from other models to be superior to the previous theories explanation of technology acceptance and use.

Table 1 provides a detailed list of researches conducted under different settings and subject of study. For each study, it provides the title of the paper, the authors and year of publication, sample size, location of the study, theoretical framework which underpins the study, statistical analysis conducted, objective of the study and the results of the study. The studies have been arranged thematically and chronologically, starting with communication, followed by banking, education, health and others

Topic	Author	Sample Size, Location & Model	Statistical Techniques	Objective	Results
3G mobile Communication					
The use of unified theory of acceptance and use of technology to confer the behavioural model of 3G mobile telecommunication users	Yu-Lung Wu, Yu-Hui Tao, Pei-Chi Yang (2008)	394 Taiwan UTAUT	KMO Bartlett's test Cronbach's Alpha SEM	The study is directed on how telecommunication companies design marketing tactics closer to the consumers' need under the dual influences of the decreasing individual's contribution and the low utility rate, as well as how to improve customers' willingness to adopt 3G mobile telecommunication services.	PE has positive influence towards BI and UB FC has positive influence on Bl and UB. Sl has positive influence on Bl and UB. BI has positive influence on UB EE did not influence BI
Behavioral Intention towards the Use of 3G Technology	Sona Mardikyan, Betül Beşiroğlu and Gözde Uzmaya (2012)	150 Turkey UTAUT + TAM	T-test One-way ANOVA Pearson's Correlations Multiple Linear Regression	To examine the factors affecting 3G technology perception and adoption.	PU is a strong determinant of user acceptance, adoption, and UB. Strong relationship between PU and PEOU Variety of services and SQ are influential factors for 3G technology acceptance. SI positively affects the tendencies of 3G usage.
Banking					
Internet banking in Jordan: The unified theory of acceptance and use of technology (UTAUT) perspective	AbuShanab E.and Pearson J. M (2007)	940 Jordan UTAUT	Multiple Regression	To investigate the key determinants of adoption of internet banking in Jordan and also validate the appropriateness of the UTAUT within the context of internet banking	PE,EE, and SI were significant and explained a significant amount of the variance in predicting a customer's intention to adopt internet banking
Integrating TTF and UTAUT to explain mobile banking user adoption	Tao Zhou, Yaobin Lu and Bin Wang (2010)	250 China UTAUT + TTF	CFA Path Analysis.	Explain user adoption from technology perceptions such as perceived usefulness, perceived ease of use, interactivity, and relative advantage	PE, TTF, SI, and FC have significant effects on user adoption. TTF has a significant effect on PE
Factors Affecting Individuals to Adopt Mobile Banking: Empirical Evidence from the UTAUT model	Chian- Son Yu (2012)	441 Taiwan UTAUT + PFC + PSE	AVE CR PLS	To enrich current knowledge about what affects individuals to use mobile banking. Consequently, this study employs the UTAUT to investigate what impacts people to adopt mobile banking	intention to adopt mobile banking was significantly influenced by SI,PFC ,PE, and PC in their order of influencing strength
Understanding the Internet Banking adoption: A Unified theory of acceptance and use of technology and perceived Risk application	Carolina Martins, Tiago Oliveira, and Ale Popovi (2013)	249 Portugal UTAUT + PR	Validity and Reliability Analysis SEM PLS	To combines unified theory of acceptance and Use of technology (UTAUT) with perceived risk to explain behaviour intention and usage behaviour of Internet banking	PE, EE, SI and Risk strongly predicts BI BI predicts usage behaviour of Internet Banking

Topic	Author	Sample Size, Location & Model	Statistical Techniques	Objective	Results
Education					
An Application of the UTAUT Model for Understanding Student Perceptions Using Course Management Software	Marchewka J T, Liu C and Kostiwa K (2007)	132 US UTAUT	Cronbach's Alpha Spearman correlation analysis Descriptive Statistics	To describe student perceptions of using course management software application such as Blackboard® in higher education.	EE and SI influence BI
E-learning motivation and educational portal acceptance in developing countries	Maldonado U. P. T , Khan G. F, Moon J, Rho J. J (2011)	47 Peru UTAUT + e-LM	Partial least square technique	To empirically validate a modified UTAUT model by adding an "e-learning motivation" construct in the South American context	e-LM and SI had a positive influence on BI, while FC had no effect on e-learning portal use. Behaviour had positive influence on e-LM. Also found was the moderating role of "region".
Investigating the effect of duration in educational webcast adoption	Michail N. Giannakos , Panayiotis Vlamos (2011)	176 Greece UTAUT +SCT + TPB	Cronbach alpha Inter-item correlations Factor analysis, PCA Varimax rotation	To investigate the impact of webcast duration on learners' intention to adopt this medium.	Learners who are using longer webcasts have significant higher levels of BI to use it. Social Norms and Perceived Expectancy are influenced by Webcast duration.
An empirical study on determinants of web based question-answer services adoption	Shengli Deng, Yong Liu and Yuanyuan Qi (2011)	169 China UTAUT	Cronbach's alpha CR AVE	To identify the driving factors of web based question-answer services (WBQAS) adoption.	PE and EE are significant predictors of the BI to use WBQAS. BI, and FC significantly influences the actual use of WBQAS. SI has no significant impact on the BI to use the service
The Comparison of Three Major Occupations for User Acceptance of Information Technology: Applying the UTAUT Model	2011, Cheng Y et al	264 Taiwan UTAUT	Descriptive statistical analysis, common method variance, reliability analysis, confirmatory factors analysis, and correlation analysis. SEM	Investigated whether the differences of gender, age, and occupation for m-learning showed significance on the utilization of the mobile devices and to figure out if the variation may influence the PE, EE,SI to the BI and even to the UB	SI has a positive effect on BI to use m-learning, and the influence is high in young females than their male counterparts
Predicting secondary school teachers' acceptance and use of a digital learning environment: A cross-sectional study	Bram Pynoo , Pieter Devolde, Jo Tondeur , Johan van Braak, Wouter Duyck, Philippe Duyck (2011)	72 Belgium UTAUT	Cronbach Alpha. Descriptive statistics Least squares regression. Path analysis fit-measures: normed v2, RMSEA, CFI, and (AGFI)	Examined factors which predict secondary school teachers' acceptance and use of a Digital Learning Environment (DLE)	The main predictors of DLE acceptance are PE and SI by superiors to use the DLE. EE and FC are of minor importance UB predicted by Attitude and BI.
Intention to Use Digital Library based on Modified UTAUT Model: Perspectives of Malaysian Postgraduate Students	Latif A et al,(2011).	534 Malasia UTAUT+	CFA Cronbach's alpha KMO BTS Multiple regression	To investigate factors that are expected to influence the intention of postgraduate students to use digital library based on modified UTAUT model.	PE, EE and IQ are positively related to the BI to use digital library, SQ is negatively related to the BI to use digital library

Topic	Author	Sample Size, Location & Model	Statistical Techniques	Objective	Results
		IQ+ SQ			
ICT Literacy among University Academicians: A Case of Nigerian Public University	Oye, N. D., A.Iahad, N. and Ab. Rahim, N. (2012)	100 Nigeria UTAUT + Anxiety+ SE +ATUT	Regression analysis	To verify the influence of the four constructs of UTAUT (PE,EE,SI, and FC) and other variables outside UTAUT like anxiety, self efficacy ,and attitudes towards use of technology on the BI of the university academicians, towards the acceptance and usage of ICT for teaching and learning.	PE and ATUT are the most influential predictors of academic staff acceptance and use of ICT Computer anxiety which is related to fear of computer (ICT), has positive influence on the BI of the academic staff Study confirms the validity of the UTAUT model in the field context of a developing country's educational system.
A Comparative Study of Acceptance and Use of ICT among University Academic Staff of ADSU and LASU: Nigeria	Oye, N. D., A.Iahad, N. and Ab. Rahim, N. (2012)	100 Nigeria UTAUT + Anxiety + SE + ATUT	Regression analysis	UTAUT model was verified to understand the behavioural intention of ADSU and LASU academic staff to accept and use ICT in their workplace.	PE is most influential Predictor of intention in LASU EE is most influential Predictor of intention in ADSU ATUT influence BI of both ADSU and LASU Study confirms that UTAUT model predict successful acceptance of ICT usage in both universities
Students Acceptance Of Mobile Learning For Higher Education In Saudi Arabia	Ayman Bassam Nassuora(2012)	80 Saudi Arabia UTAUT	Principal Axis Varimax rotations Cronbach's alpha coefficients Pearson product-moment correlation	To examine the possibility of acceptance in mobile learning (m-Learning) and study main factors that affect using m- Learning that focus on higher education students	SI and FC Predicts Attitude PE and EE influence BI Attitude □intention to use
Library mobile applications in university libraries	Chiao-Chen Chang (2013)	363 Taiwan UTAUT + TTF	Measurement model Analysis (Reliability and validity) SEM	To integrate the unified theory of acceptance and usage of technology (UTAUT) with task technology fit to explain users' behavioral intention of using library mobile applications in university libraries	PE, EE, SI, and FC determine users' BI of using library mobile applications. Moderating effect of TTF fit is also significant
Understanding early childhood student teachers' acceptance and use of interactive whiteboard	Kung-Teck Wong, Sharon Russo and Janet McDowall (2013)	112 UTAUT	Analysis(Reliability and Validity) SEM	To understanding early childhood student teachers' self reported acceptance and use of interactive whiteboard (IWB), by employing the Unified Theory of Acceptance and Use of Technology (UTAUT) as the research framework	PE and EE have a direct and statistically significant positive effect on BI The model accounted for 41% of the variance in BI to use IWB among student teachers
Others					
Factors influencing **health** information technology adoption in Thailand's	Kijsanayotin B; Pannarunothai S; Speedie SM	1607 Thailand	PLS - path modelling	To employ a modified **UTAUT** structural model, to understand factors that influence CHC **health** IT adoption in Thailand and	IT acceptance is influenced by PE, EE,SI and voluntariness. **Health** IT use is predicted by

Topic	Author	Sample Size, Location & Model	Statistical Techniques	Objective	Results
community **health** centers: applyi ng the **UTAUT** model	(2009)	UTAUT + Experience		to validate this extant IT adoption model	previous IT, BI to use the system, and FC.
An international comparison of technology adoption:Testing the UTAUT model	Im I et al.(2011)	407 US+ Korea UTAUT	Cronbach's alpha - internal validity CFA Covariance SEM analysis Path analysis	Examined the relationships of the constructs in the UTAUT model to determine how they are affected by culture.	UTAUT model supports the data used very well. The effects of EE on BI and the effects of BI on UB were greater in the U.S. than Korea sample

Key: ADSU - Adamawa State University, AVE- Average Variance Extracted, ATUT - Attitudes Towards Use of Technology , BI - Behavioural Intentions, CFA - confirmatory factor analysis , CR- composite reliability, DLE - Digital Learning Environment, EE- Effort Expectancy, e-LM - *E-learning motivation*, FC-Facilitating Conditions, IQ - Information Quality, IWB-interactive whiteboard ,KMO- *Kaiser-Meyer*-Olkin, LASU - Lagos State University, PC- Perceived Credibility , PE- Performance Expectancy, PFC perceived financial cost, PLS- *Partial Least Squares*, PR- Perceived Risk, PSE- Perceived Self Efficacy, PU- Perceived Usefulness, PEOU- Perceived Ease of Use, SEM - Structural Equation Modeling, SQ- Systems Quality, TTF - Task Technology Fit, SI-Social Influence,UB-Use Behaviour, *WBQAS* - Web Based Question-Answer Services,

Table 1: Studies with UTAUT and its Extensions as Research Model

Conclusion

The review evidently shows that variables that need to be applied to determine users acceptance or adoption of technology varies. Also, results from the reviewed papers do not portray any clear pattern of the predictions although majority of them (results) were consistent with the original postulations of the authors of UTAUT Venkatesh et al (2003). The effect of exogenous variables EE, PE, SI on endogenous variable BI are not consistent across countries, within country, and unit of studies. While in some studies the effect of effort expectancy on behavioural intension is significant and strong Im I et al.(2011) and the effects of the other variables are insignificant, in other studies performance expectancy or social influence Cheng et. al (2011) significantly influence BI. Other studies (AbuShanab E.and Pearson J. M (2007), Kijsanayotin B, Pannarunothai S and Speedie SM (2009), Martins C, Tiago O, and Ale P (2013), Chiao-Chen C (2013)) had all the exogenous variables significantly predicting behavioural intension. Results from a comparative study in Nigeria conducted by Oye et. al (2012) to establish how students accepts and use ICT in two different universities, suggest PE is most influential predictor of students' intention at LASU while EE is the most influential predictor of students' of ADSU intentions to accept ICT. It is therefore prudent for researchers who want to engage the UTAUT model or its extension as research model in future studies to carefully choose the right combination of variables and data analysis method that would yield excellent results.

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