

The applicability of technology acceptance models in the Arab business setting

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Keywords

Technology Acceptance Models, Information Technology, Arab Business Settings.

Abstract

Information Technology acceptance is one of the most advanced streams of Information Systems Research (Venkatesh et al., 2012; Venkatesh and Bala, 2008). Research work indicates that the most important strength of Technology Acceptance Models is their generalizability and applicability across a wide range of technologies and settings. However, the literature lacks research that explains technology adoption and use in developing countries; specifically the Arab business settings. Therefore, the aim of this paper is to review the most recent work on Technology Acceptance Models examined in Arab organizations. It highlights different drivers and impediments to the adoption decision of different information technologies in Arab businesses. The study outcome holds implications and provides recommendations for future research.

1. Introduction

The impact of Davis' original work of the Technology Acceptance Model (TAM) and the extensive technology acceptance research that has followed it stresses the importance of this topic the last two decades. By any measures, TAM has qualified as a remarkable accomplishment, even reaching the status of a paradigm (Bagozzi, 2007). The number of citations of Davis' et al. (1989) alone accounts for more than 1000 citations (Venkatesh et al., 2011). As a result, TAM has been used as a leading model or as an extended applied model in various business contexts (Kouforis, 2003; Hong et al., 2006; Martins et al., 2014). Most of these studies replicated TAM while some of them extended TAM by adding new constructs as predictors of behavior intention to use specific systems. However, TAM has been widely criticized for its questionable heuristic value and limited predictive power (Riffai et al., 2012; Benbasat & Barki, 2007; Bagozzi, 2007).

According to the original model, a potential user's overall attitude towards using a given system is hypothesized to be a major determinant of whether or not he/she actually uses it. The attitude towards using, in turn, is a function of two major beliefs: Perceived usefulness and perceived ease of use. External variables are not theorized to have any direct effect on attitude or behavior (Davis, 1986). However, the final conceptualization of TAM excluded the attitude variable in order to better explain behavioral intention to accept Information Technology.

The intensive use of Technology Acceptance Models attracts the efforts of numerous researchers to illustrate model validity and to conduct systematic meta-analysis approaches. As a result, research work indicates that the most important strength of Technology Acceptance Models has been their generalizability across a wide range of technologies and settings. However, most of the Technology Acceptance Models have been extensively tested in the developed countries. The literature lacks technology models that explain technology adoption, acceptance and usage in the developing countries. More specifically, the literature lacks technology models that explain determinants of technology acceptance in the Arab business settings.

Nowadays the world is experiencing a massive growth and acceleration in the emergence and development of technologies in various fields. This encourages researchers to investigate the technology acceptance and use universally. However, despite the increased growth of technology adoption and use in developed countries, Arab organizations are still classified as late adopters of IT applications (Yaseen, 2008, Al-Sukkar and Hasan, 2005; Abu Shanab et al., 2010). Unfortunately, the literature indicates a limited number of research that examines the use of technologies in Arab organizations (Al-Sukkar and Hasan, 2005; Akour et al., 2005; Dajani, 2011). Thus, the purpose of this research is to develop a rich understanding of the applicability of the Technology Acceptance Models in the Arab business setting and to specify determinants that influence IT acceptance and use in the Arab World. The paper aims to review the most recent efforts on technology acceptance in Arab business settings.

2. Literature review

2.1 Overview of technology acceptance models

Technology Acceptance Models evolved from multidisciplinary fields of knowledge such as psychology, sociology, business and management information systems. Research on the social psychology of IT acceptance and use has been productive compared to other research approaches. Social psychology suggests behavioral intention models as a potential theoretical platform for IT acceptance research. The Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) is a widely studied model from social psychology based on the assumption that a person's intention to perform or not perform a behavior is the immediate determinant of that action. It is a predictive model for behavior attitude and behavioral intention.

Barring unforeseen events, people are expected to act in accordance with their intentions (Ajzen, 1991). According to the TRA, an individual intention is a function of two determinants: The individual's positive or negative attitude towards a specific behavior and an individual's perception of social pressures (subjective norms) to perform the behavior. According to Fishbein and Ajzen (1975), a behavioral intention predicts the user's performance or action unless the intention measure does not meet the behavioral criterion. TRA theory has received considerable attention within the field of business and consumer behavior for its capability to predict the performance of any voluntary act unless intention changes prior to performance or the intention measure does not correspond to the behavioral criterion (Sheppard et al., 1988).

The Theory of Planned Behavior (TPB) is an extension of the Theory of Reasoned Action (Ajzen and Fishbein, 1980). Ajzen (1991) incorporates perceived behavioral control together with behavioral intention to overcome TRA limitation. TPB postulates three conceptual constructs: Attitude towards behavior, subjective norm (perceived social pressure), and perceived behavioral control. According to the TPB, perceived behavioral control refers to the perceived ease or difficulty of performing the behavior and it is assumed to reflect past experiences as well as anticipated obstacles (Ajzen, 1991). Thus, both TAM and TPB models are based on TRA, which proposes that beliefs influence attitudes that in turn lead to intentions and then consequently generate behaviors (Fishbein and Ajzen, 1975; Martins et al., 2013). The Technology Acceptance Model (TAM) introduced by Davis (1986) is an adoption of the TRA model (Fishbein and Ajzen, 1975). Davis (1986) adopted the TRA model as the reference paradigm within which the proposed Technology Acceptance Model is developed (Davis, 1986). The TAM suggests that beliefs, attitudes and intention-behavior explained and predicted technology acceptance among potential users.

TAM posits that two particular beliefs, the perceived usefulness (PU) and the perceived ease of use (PEOU) are major determinants of the user's intention to use IT (Davis et al., 1989). It further theorizes that the influence of external variables will be mediated by Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). However, over the last two decades there has been substantial empirical research supporting TAM (e.g. Adams, et al., 1992; Davis, 1993; Davis & Venkatesh, 2004; Davis et al., 1989; Straub et al., 1997; Venkatesh and Davis, 2000; Venkatesh et al., 2003; Venkatesh and Bala, 2008). Most of the studies that have been using TAM as a reference paradigm focus either on the same TAM constructs or extended TAM by adding new predictive constructs (e.g., Venkatesh et al., 2003; Venkatesh and Bala, 2008).

Venkatesh and Davis (2000) proposed TAM 2 as an extended model of TAM. They identified new determinants of perceived usefulness. These constructs were subjective norm, image, job relevance, output quality, result demonstrability and perceived ease of use. In addition to the two moderators: experience and voluntariness. As a result, they found strong support for TAM 2 in their longitudinal research conducted at four organizations in developed countries.

In a further study, Venkatesh (2000) developed a model of the determinants of perceived ease of use and integrated these determinants with TAM 2. His work resulted in a new model called TAM 3. (TAM 3) is an extension of TAM 2 by identifying and theorizing determinants of perceived ease of use constructs namely; Computer Self-efficacy, Perception of External Control, Computer Anxiety, Computer Playfulness, Perceived Enjoyment, and Objective Usability (Venkatesh, 2000). TAM 3 suggests a complete nomological network of the determinants of IT acceptance and use at the individual adoption level (Venkatesh and Bala, 2008).

Furthermore, Venkatesh et al., (2003) suggested a comprehensive synthesis of eight prominent theories of technology acceptance and derived a unified theory of acceptance and use of Technology (UTAUT). The eight models studied by Venkatesh et al., (2003) were the TRA, the TAM, the Motivational model, the TPB, the Combined TAM with TPB, the Model of PC Utilization, the Innovation Diffusion Theory and the Social Cognitive Theory. In a longitudinal research, the UTAUT explained about 70 percent of the variance in behavioral intention to use a technology and about 50 percent of the variance in technology use (Venkatesh et al., 2003). The UTAUT contains four core constructs: Performance Expectancy (synonymous with perceived usefulness), Effort Expectancy (synonymous with perceived ease of use), Social Influence and Facilitating Conditions each capture user expectation about other significant aspects related to IT use (Venkatesh et al., 2003).

The generalizability of the belief constructs in the UTAUT has been demonstrated by a number of studies on the adoption of different IT systems and tools, either in a business or none-business setting (Venkatesh et al., 2011). However, it is worth noting that most researchers have only studied a subset of the UTAUT constructs. The addition of new constructs could have been helpful to expand the theoretical horizons of the UTAUT (Venkatesh et al., 2012).

The strong generalizability of UTAUT leads to some kind of replications with no substantive theoretical advance in the research paradigm. However, Venkatesh et al., (2012) extended the UTAUT to study users' IT acceptance in consumers' context. The new model is called the UTAUT2 and it incorporates three constructs: Hedonic Motivation, Price Value and Habit (Venkatesh et al., 2012). The UTAUT2 extended the generalizability of the UTAUT from an employee and organizations setting to a consumer context. Prior research has investigated technology acceptance and use in organizational contexts.

It should be noted that each of the original models of technology acceptance has its own advantages with some limitations. For example, the Theory of Reasoned Action is a widely

studied model of social psychology. However, TRA is a general model and, as such, it does not specify the beliefs that are operated for a specific human behavior. The Technology Acceptance Model (TAM) qualifies as a remarkable research paradigm. The stream of research in this original model is impressive in its volume and scope as TAM has been the leading model for nearly two decades (Bagozzi, 2007). However, the behavioral intention of users to accept a specific IT system is more frequently measured than the actual use of the system. Thus, there is a question if the TAM can act as an accurate predictor of the user's intention rather than actual usage. In addition, TAM makes no attempt to incorporate the effect of the social environment on the behavior intention.

Furthermore, the research findings in the literature revealed that the UTAUT constructs were affected by many external determinants across different researches conducted in different environmental settings. This is a relatively surprising result as the UTAUT denoted to be a unified theory created by mapping together various variables from eight well-established models. Thus, there is a need to carry-out rigorous tests of the UTAUT in different contexts and cultures. This is due to the inconsistent findings among the empirical studies testing the UTAUT model (Al-Gahtani et al., 2007; Dajani, 2011). The literature also indicated the scarce application of the UTAUT in the context of the Arab World.

2.2 Technology acceptance models in the Arab business setting

It is widely acknowledged that organizations in the Arab World are late adopters of the Internet and its applications (Sabri, 2004; Yaseen, 2005; Yaseen, 2008). Despite the increased percentage of Internet use, recent studies on IT adoption indicate that Arabs are still reluctant to use and accept IT for various economic and cultural reasons. (Abu Shanab et al., 2010, Al Sukkar and Hasan, 2005; Akour et al., 2005). Thus, it is necessary to understand the factors that affect the adoption of the IT in the Arab World.

Several methods were used to investigate the effect of culture on the acceptance of technology in organizations. Researchers applied the quantitative methodology to find out and measure national cultural dimensions such as the work of Triandis (1982), Hofstede and Hofstede's cultural dimensions (2005) and Straub's (2002) social identity theory. The most frequently used cultural dimensions were the ones introduced by Hofstede (1980, 2001). These cultural dimensions affected the managerial values and human behavior in different cultures (Al-Ghatani et al., 2007)

Rose and Straub (1998) investigated the adoption and use of IT in five Arab countries (Egypt, Sudan, Jordan, Saudi Arabia and Lebanon). They applied the TAM model to assess the diffusion of PC and the modified model explained 40 percent of the actual use. In a further study, Straub et al., (2001) introduced a cultural influence model of IT in their research on Arab countries. Their results indicated that Arab culture and beliefs affect the acceptance and use of IT. In addition, Tingari and Mahmoud (2014) discussed the evolution and the adoption of mobile banking in Sudan. Their study indicated that the banking sector lacks efficient infrastructure and the responsible parties are not aware of the importance of e-banking.

Furthermore, Loch et al., (2003) used TAM to identify cultural factors that affect Internet use in Arab countries. They indicated that social norms and the degree of technological acculturation can affect the organizational adoption of the Internet. This indicates that certain Arab countries are very similar in their culture and beliefs. The Technology Acceptance Models were used in different contexts in the Arab business setting. Arab countries almost encounter and experience the same challenges and opportunities in their technology adoption (Dajani,

2016). Table (1) illustrates prior research on the Technology Acceptance Models and their applications in the Arab World.

Technology Acceptance Model	New Constructs	Context	Notable Results	Moderators	References
UTAUT	Website Quality Perception	Internet banking in Jordan and the UK	The extended UTAUT model is applicable to a non-Western nation with varying degrees of exploratory power	Gender, Age, Income, Education	Al-Qeisi (2009)
UTAUT	-	Internet banking in Jordan	Performance expectancy, effort expectancy, and social influence were significant in predicting customers' intention to adopt Internet banking	UTAUT Moderators: Gender moderated relationships between the three independent variables and the dependent	Abu Shanab & Pearson (2007)
Extended TAM and IDT	Relative Advantage Compatibility	e-marketing adoption in Egypt; Egyptian small tourism organization	Culture, organization size, e-marketing adoption, cost, perceived ease of use are the most important factors on the adoption compatibility and relative advantage	-	El-Gohary, 2012
Revised TAM	Attitudinal intentions, trust, subjective norms, and perceived manageability	Internet banking acceptance in Saudi Arabia	Perceived usefulness and trust fully mediate the impact of subjective norms and perceived manageability on attitudinal intentions	-	AlSajjan, & Dennis, 2010
Extended TAM	-	Adoption of electronic health record systems in Jordan	Perceived threat, social influence, computer self-efficacy, usability, culture organizational support and professional issues	-	Al-Adwan, 2014
UTAUT	Competition and external pressure	e-commerce adoption by Jordanian travel agents	Adapted UTAUT can also explain e-commerce acceptance and use of travel agents	Only effort expectancy was moderated by gender. Age did not moderate the relationship between social influence and BI, Gender moderated this relation	Aldajani, 2011
UTAUT	Cultural and social influences, technical issues	Adoption of e-government in Kuwait	Usefulness, ease of use, reforming bureaucracy, culture and social influences technology issues and lack of awareness	Gender	Al Awadhi & Morris, 2009
UTAUT	Subjective norm	Adoption of IT in Saudi Arabia	Subjective norm positively influences intention	Gender, age, experiences	Al-Gahtani et al., 2007
TAM and TPB	Security and privacy, self-efficacy, government support, technology support	Adoption of Internet banking in Tunisia	The results confirmed with the original TAM. Social norm has significant effect on intention. Security and privacy have positive influence on intention	-	Nasri, & Charfeddin, 2012
UTAUT	Trust, awareness of	Online banking	All constructs contributed to explain intention and use of	-	Riffaie, et al., 2012

	service, output quality, perceived playfulness, web design	adoption in Oman	online banking except social influence moderating effects from UTAUT were not important to explain intention		
TAM2	-	Camera mobile adoption before e-shopping in the Arab World	TAM2 provides limited results. The intention to use CMP is only determined by subjective norms, case of use and camera usefulness	-	Rouibah et al., 2011
TAM	Quality of the Internet connection, self-efficacy, awareness of services, social influence, resistance to change, and trust	Online banking in Saudi Arabia	Qualities of the Internet connection, awareness of services, social influence and self-efficacy have significant effects on the perceived usefulness and perceived ease of use. Education, trust and resistance to change also have significance on the attitude 12.4% of intention explained by the model. Perceived usefulness and perceived ease of use, resistance to change, trust, age, gender, education and income explained 85% of the variance towards online banking use. Attitude towards use explains 83% of the variance in intention.	-	Al-Somali et al., 2009
TAM	Trust, national culture	Adoption of e-government services in Jordan	Citizens' attitude towards using e-government services is the strongest determinant of citizen intention to use e-government services. The attitude construct is in turn determined by perceived public value and perceived ease of use.	-	Al-Hujran et al., 2015

Table (1): Review of Technology Acceptance in the Arab World

Furthermore, it is critical to highlight the vital role of the social media use in the Arab Spring. The use of Tweets and posts in twitter were utilized during the Arab Spring uprisings in Egypt, Tunisia, Bahrain and Libya. The use of social media in these series of events affects the region and the entire world. The social media was used to organize and sustain protests by clicks from local participants and foreign members. Consequently, the government of some Arab countries, such as Egypt shut down access to the Internet (Halverson et al., 2013; Tufekci and Wilson, 2012; Aday et al., 2012).

Further studies discussed the role of technology acceptance and use in the crisis management of Arab Spring societies. Yaseen (2014) aimed to develop a conceptual framework to investigate the determinants of mobile crowdsourcing acceptance and use in the crisis management of Arab Spring societies. The extended model (UTAUT2) incorporated five dimensions (performance expectancy, effort expectancy, subjective norms, hedonic motivations and cultural values) to investigate the acceptance of crowdsourcing in Arab World.

3. Discussion, implications, and future research

It is apparent from the review of literature that most research papers used major theories; namely; Theory of Reasoned Action, Theory of Planned Behavior and Technology Acceptance Model. The most frequently cited models were the TAM, and the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003). For example, Dajani's (2011) study

indicated that the adopted Unified Theory of Acceptance and Use of Technology (UTAUT) which was originally tested in the developed countries can also explain e-commerce acceptance and use of travel agents in Jordan. Al-Qeisi (2009) proposed an extended UTAUT and tested the model in two countries (UK and Jordan) to investigate the viability of the model in different settings. Results found support for the effect of the proposed extension and website quality perceptions on the behavior intention to use Internet banking.

Furthermore, Al-Adwan, (2014) used an extended TAM to understand physicians' adoption of electronic health record systems in Jordan. The results indicated that the proposed research framework provided acceptable power as it explained 64.5 percent of the variance in the physicians' behavioral intention. Al Sajjan & Dennis (2008) argued a revised TAM to measure consumers' acceptance of Internet banking among 618 university students in the United Kingdom and Saudi Arabia.

The results suggested the importance of attitude, such that attitude and behavioral intentions emerge as a single factor, denoted as attitudinal intentions (AI). Structural equation modeling confirms the fit of the model in which perceived usefulness and trust fully mediate the impact of subjective norms and perceived manageability on attitudinal intention.

In a further study, El-Gohary (2012) analyzed the different factors affecting the adoption of e-marketing by Egyptian small tourism organizations. The findings confirmed that the TAM and the Innovation Diffusion Theory (IDT) are valid in illustrating e-marketing adoption by Egyptian tourism organizations. As a result, Technology Acceptance Model has been tested for decades with different technologies in Arab business settings and has been accepted as a successful model in predicting and explaining technology acceptance and use in the Arab World. Furthermore, based on the integration between the TAM and the TPB models, Nasri and Charfeddine (2012) examined factors affecting the adoption of Internet banking in Tunisia. The results of their study validated the original TAM. Their research findings revealed that social norms, security and privacy had significant effect on intention.

Most of the reviewed research replicated Technology Acceptance Models and other extended original models by adding constructs as determinants of the behavior intention. The majority of this research contributed to literature on the basis of context-only, or methodology extension only. This research examined the acceptance of new technologies in different Arab organizations and used almost the same constructs that were used in examining technology acceptance in developed nations. This is a critical issue because using translated constructs and measures does not always reveal the same meaning as the original ones (Lin et al., 2008). This is due to cultural differences between the countries in which the measures were originated and tested. It is apparent from the literature that most of the research that examined the Technology Acceptance Models avoided the integration of cultural values and beliefs. Cultural issues were included in explaining the results of some of this research, such as Al Awadi and Morris (2009) and Dajani (2011) but not examined solely as determinant of technology adoption.

From a methodological perspective, most of the research using TAM and UTAUT in the Arab World did not consider the specific cultural characteristics of the Arab society. However, some of the researchers who did consider the effect of culture on technology acceptance used Hofstede's cultural dimensions which have received some criticisms such as the work of Al-Ghatani et al., (2007), Straub et al., (1997) and Bandyopadhyay and Fraccastoro (2007).

Furthermore, the literature indicated the scarce application of the UTAUT in the context of the Arab World with the exception of the research conducted by Riffaie et al., (2012); Al-Ghatani et al., (2007); Al Awadhi & Morris (2009); Dajani (2011), and Abu Shanab and Pearson (2007). Most of the Technology Acceptance Models have been extensively tested in developed

countries. More specifically, the literature lacks technology models that explain technology acceptance in the Arab World. Furthermore, the review of literature indicates that there is a limited number of studies that test Technology Acceptance Models such as TAM and UTAUT in specific countries (Jordan, Egypt and Kuwait). This implies that additional investigation must be carried out to ensure applicability and robustness of Technology Acceptance Models in the Arab World. The previous discussion suggests that there is a need to carry out rigorous testing of Technology Acceptance Models in different contexts and different Arab cultures. That is because despite the fact that empirical studies applying Technology Acceptance Models have mainly supported the original TAM and UTAUT models, there are inconsistent findings due to the technology being investigated, the methodology of data analyses and the local culture of a specific Arab country.

Little research has examined the role of gender and age in Arab countries. More specifically, future research needs to focus on the interaction between these two demographic variables. This implies that future research may concentrate on identifying the exact age where effects start to appear for certain constructs, such as effort expectancy, or disappear for other constructs, such as performance expectancy. Further studies should also investigate the role of income, gender, age and experience in adopting information technologies in Arab countries.

The majority of Technology Acceptance Models used the behavior intention construct as the decisive factor in explaining use of technologies. Future research should investigate the role of other constructs such as habit (Venkatesh et al., 2000), hedonic motivation (Venkatesh et al., 2012) and behavioral expectations (Warshaw and Davis, 1985). Moreover, further research should consider the effect of good task technology fit, or emphasis should be on the interaction between IT perception and task technology fit within different Arab work settings.

4. Conclusion

Although several previous studies have investigated IT adoption and use, there has been limited research conducted in the Arab World setting. Most research papers have not fully taken into consideration the richness of Arabic cultural values and their vital impact on IT adoption and acceptance. There is a clear need for more cultural oriented research applications in the Arab business context. If the cultural perspective is lost, it is difficult to restore understanding and meaning of the IT adoption and use. Additional avenues for future research might overcome the limitations of the Technology Acceptance Models tested in the Arab World. Transference of the western scales to the Arab context is problematic. As such, further qualitative research is needed to provide greater insights into the intricacies of technology adoption in the Arab business setting. Researchers need to develop new scales for technology adoption in the Arab World taking into consideration the effect of cultural values. Perhaps future research in this field should concentrate on comparative studies between Arab organizations and western organizations.

5. References

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