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Abdullah Baabdullah  
*Swansea University, 685177@swansea.ac.uk*

Yogesh Dwivedi  
*Swansea University, ykdwivedi@gmail.com*

Michael Williams  
*Swansea University, m.d.williams@swansea.ac.uk*

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# ADOPTING AN EXTENDED UTAUT2 TO PREDICT CONSUMER ADOPTION OF M-TECHNOLOGIES IN SAUDI ARABIA

**Abdullah M. Baabdullah**

*Centre for Digital & Social Media, Department of Operations Management and Entrepreneurship, School of Management, Swansea University, Swansea, UK*  
[685177@swansea.ac.uk](mailto:685177@swansea.ac.uk)

**Yogesh K. Dwivedi**

*Centre for Digital & Social Media, Department of Operations Management and Entrepreneurship, School of Management, Swansea University, Swansea, UK*  
[y.k.dwivedi@swansea.ac.uk](mailto:y.k.dwivedi@swansea.ac.uk)

**Michael D. Williams**

*Centre for Digital & Social Media, Department of Operations Management and Entrepreneurship, School of Management, Swansea University, Swansea, UK*  
[m.d.williams@swansea.ac.uk](mailto:m.d.williams@swansea.ac.uk)

## **Abstract**

*M-Internet and M-Government have received a considerable adoption rate among Saudi users. Drawing on the perspectives of the Unified Theory of Acceptance and Use of Technology (UTAUT2), trust, and perceived risk, this research examines the consumer adoption of M-Internet and M-Government. This study will reflect upon a number of studies in different countries that tested UTAUT2 variables in addition to trust and perceived risk. The outcomes show that usage intention is influenced by enablers such as effort expectancy, performance expectancy and trust as well as inhibitors such as perceived risk. The findings of this study provide several important implications for M-Internet and M-Government service providers and researchers in the Kingdom of Saudi Arabia such as rising concerns on trust and perceived risk in order to ease consumer adoption of M-Internet and M-Government.*

**Keywords:** Mobile Internet, Mobile Government, UTAUT2, Trust, Risk

## **Introduction**

M-Internet means utilising mobile devices to access the wireless Internet irrespective of time and place (Wiratmadja et al., 2012), while M-Government allows governments to implement mobile technologies to communicate and offer services to the individuals without the need of having to have a direct physical contact with officers (Althunibat et al., 2011). Expanding the adoption of M-Internet and M-Government will inevitably increase the connection between individuals on the one hand and producers and the government on the other hand. As such, the mobility

which results from using mobile technologies will offer governmental ubiquitous control over citizens who live in remote areas in Saudi Arabia. Moreover, it will enable officers to work efficiently even they are away from their official institutions (Aloudat et al., 2013; Althunibat et al., 2011). The importance of studying M-Internet and M-Government within the context of Saudi Arabia is because it has the biggest and fastest growth of marketplaces in Information and Communication Technologies (ICT) in the Middle East (Alwahaishi and Snášel, 2013a). Moreover, the statistics of using mobile technologies in Saudi Arabia refers to the importance of the emerging technologies, i.e. the number of mobile Internet users in Saudi Arabia who have subscribed to the mobile broadband had reached 11.5 million at the end of 2011 representing 40.5 per cent of the population (Ethos Interactive, 2012). Indeed, it is undeniable that implementing the new developments in ICT such as M-Internet and M-Government will have a positive impact upon the socio-economic development in developing countries (Albirini, 2006). However, this adoption in countries such as Saudi Arabia is a challenging task especially in the business arena due to the strong presence of culture parameters (Aldraehim et al., 2013).

These facts have been translated into a number of studies that aim to raise the user adoption of M-Internet and M-Government such as Abanumy and Mayhew, 2005; Alhussain and Drew, 2010; Alhussain and Drew, 2012; Alhussain et al., 2010; Al-Khalifa, 2011; Almutairi, 2011; Alsenaidy and Ahmad, 2012 and Al-Solbi and Mayhew, 2005 who focused on mobile government technology and Alwahaishi and Snášel (2013a, 2013b) who studied M-Internet technology. For example, Alwahaishi and Snášel (2013a), who based their study on the Unified Theory of Acceptance and Use of Technology (UTAUT), held an online survey and collected data from 238 students in Saudi Arabia and tested users' adoption of M-Internet using the Structural Equation Modelling (SEM) approach. However, the majority were students; therefore, future research may consider other samples such as working professionals in order to generalise the result. Another instance, Alwahaishi and Snášel (2013b) also presented a theoretical framework based on UTAUT to investigate factors that may affect the consumers' acceptance and use of the mobile. The analysis found that performance expectancy and perceived playfulness have the strongest significant influence on behavioural intention toward the use of the mobile Internet. Therefore, service

providers should enhance the mobile Internet users' satisfaction by delivering an enjoyable experience.

Also under the M-Government field in Saudi Arabia, Alhussain et al. (2010) found that successful implementation of biometric technology in M-Government in Saudi Arabia was influenced by the acceptance of the technology by the users. Likewise, Alhussain and Drew (2012) found that the use of the PIN number did not provide high security as it is vulnerable to guessing. They proposed the use of a biometric authentication method to provide a higher security service to citizens. The paper has contributed a lot to the implementation of biometric technology not only in M-Government, but also in various sectors.

Furthermore, it is worth noting that within the Saudi Arabian context, Alhussain et al. (2010) and Alhussain and Drew (2012) adopted theoretical-based studies using a grounded theory methodology, questionnaires and semi-structured interviews in the same way that research will follow. To sum up, after giving an overview about the dominant theories in IS/IT, i.e. Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB) and UTAUT, this study is testing the UTAUT2 for a number of reasons. Firstly, a new theory was found in 2012 that has not been tested yet in the KSA context according to the existing knowledge found. This theory, which was found by Venkatesh et al. (2012) to suit the user context, gave a high prediction of consumers' behavioural intention in Hong Kong within the field of M-Internet. Secondly, it also integrated new constructs and relationships based on the proposed significance of perceived trust and risk within the Saudi Arabian domain to increase the efficiency of predicting consumers' behavioural intention. In addition, an interrelationship, i.e. effort expectancy (EE) towards performance expectancy (PE), is also considered to be a significant path in developing predictability of consumers' behavioural intention. This research will conclude with its contributions, limitations and potential possibilities for future research discussion.

## **Literature review**

By using various online databases and professional MIS research sources such as Web of Knowledge and IEEE Xplore, two issues can be noticed: the first issue is that M-

Internet and M-Government empirical researches have been extensively studied around the world (Hsiao, 2013; Mills et al., 2011). However, there is a scarcity of empirical studies in the Kingdom of Saudi Arabia. The second issue is that although global studying of M-Internet and M-Government have focused on different IT theories, i.e. TAM, TRA, IDT, TPB, SCT, UTAUT, and UTAUT2, only fifteen out of 56 studies have measured M-Internet and M-Government by using UTAUT and/or UTAUT2 (for example, Abdelghaffar and Magdy, 2012; Bouwman et al., 2008) . Yet, in the KSA, all research models (3 studies) have been derived from UTAUT and/or UTAUT2, i.e. (Alhussain and Drew, 2012; Alwahaishi and Snášel, 2013a; Alwahaishi and Snášel, 2013b).

This paper searched 287 studies by using various online databases and professional MIS research sources such as Web of Knowledge and IEEE Xplore. The aim was to identify the theories that have been used in studying M-Internet and M-Government in a number of countries. This paper appointed 56 studies out of 287 that dealt with M-Internet and M-Government and these studies have been included into Table1. However, it is important to note that Table1 should not be used as a basis for generalisations regarding which theory is more common than the other. Thus, under this limitation, it can be noticed that global studying of M-Internet and M-Government have focused on different IT theories, i.e. TAM, TRA, IDT, TPB, SCT, UTAUT, and UTAUT2. Within the Saudi context, all research models (3 studies) have been derived from UTAUT and/or UTAUT2, i.e. (Alhussain and Drew, 2012; Alwahaishi and Snášel, 2013a; Alwahaishi and Snášel, 2013b). In general, M-Internet and M-Government technologies have been studied three times by depending on UTAUT in the Saudi domain and, consequently, studying these mobile data services through UTAUT2 in the Saudi Arabian context will be presented in order to conduct further studies and could lessen the theoretical gaps based on the previous studies' limitations and future research recommendations.

Country	Theory (Tested, Extended or Partly Used)	Technology	Citation
Taiwan	TRA	M-Internet	Hsiao (2013)
Jamaica	TRA, TAM, TPB, IDT	M-Internet Diffusion	Mills et al. (2011)
Malaysia	TRA, TAM,	M-Government	Althunibat et al.

	UTAUT	Services	(2011)
International	TAM	M-Internet Usage Behaviour	Hong et al. (2006)
Korea	TAM	M-Internet Acceptance	Cheong and Park (2005)
Korea	TAM	M-Internet Acceptance	Lee et al. (2002)
Australia	TAM	Consumers' perception of M-Internet	Kurnia et al. (2006)
Thailand	TAM, IDT	Multimedia M-Internet Acceptance	Phuangthong and Malisuwan (2008)
International	TAM	M-Internet Acceptance	Shin (2007)
Singapore	TAM	M-Internet Services	Kim and Kwahk (2007)
Finland	TAM, IDT, UTAUT	M-Internet	Bouwman et al. (2008)
Indonesia	TAM	M-Internet Acceptance	Roostika (2012)
Iran	TAM	Value-based Adoption of M-Internet	Alborz (2010)
India	TAM	M-Internet	Das (2011)
Hong Kong	TAM	M-Internet Services	Thong et al. (2006)
Korea, Hong Kong and Taiwan	TAM	M-Internet	Lee et al. (2007)
International	TAM	M-Internet	Shin et al. (2010)
Korea	TAM	M-Internet	Park (2006)
International	TAM, TPB	M-Internet Services	Kim et al. (2007)
Thailand	TAM	M-Internet Access	Srinuan et al. (2012)
China	TAM	M-Internet	Yang et al. (2012)
Germany	TAM, IDT	M-Internet Acceptance	Gerpott (2011a)
Germany	TAM, IDT	M-Internet Use	Gerpott (2011b)
Germany	TAM, IDT	M-Internet	Gerpott (2010)
Malaysia	TAM	M-Internet	Suki (2012)
China	TAM	M-Internet	Hailin (2010)
Korea and China	TAM	M-Internet Service	Jong Chul Oh et al. (2011)
Malaysia	TAM	M-Internet	Mohd Suki (2011)

Kenya	TAM	M-Internet	Munga (2012)
China	TAM	M-Internet	Chong et al. (2012)
China	TAM	M-Internet	Wang (2011)
International	TAM	M-Internet	Shin et al. (2009)
Portugal	TAM	M-Internet	Damásio et al. (2013)
International	TAM, IDT, UTAUT	SMS-based E-Government Services	Susanto and Goodwin (2010)
Egypt	TAM, IDT, UTAUT	M-Government Services	Abdelghaffar and Magdy (2012)
Saudi Arabia	TAM, IDT, UTAUT	Biometrics in M-Government Applications	Alhussain and Drew (2012)
Oman	TAM, IDT	M-Government Services	Al-Busaidi (2012)
Australia	TAM	Location-based M-Government Services	Aloudat et al. (2013)
Indonesia	TAM, TPB	SMS-based E-Government Services	Susanto and Goodwin (2013)
Norway	TPB	M-Internet Services	Pedersen (2005)
Denmark	TPB	M-Internet	Fogelgren-Pedersen et al. (2003)
Taiwan	TPB	Mobile E-Government Services	Hung et al. (2012)
International	IDT	M-Internet/ Multimedia Message Service (MMS)	Hsu et al. (2007)
Denmark	IDT	M-Internet	Fogelgren-Pedersen (2005)
China	IDT	M-Internet	Liu and Li (2010)
China	SCT	M-Internet/M-Auction	Zhu et al. (2010)
Taiwan	UTAUT	M-Internet	Wang and Wang (2010b)
USA	UTAUT	M-Internet	Jiang (2008)
China	UTAUT	M-Internet	Zhou (2011)
International	UTAUT	M-Internet Diffusion	Alwahaishi and Snášel (2013)
Hong Kong	UTAUT, UTAUT2	M-Internet	Venkatesh et al. (2012)

Saudi Arabia	UTAUT	M-Internet/ Acceptance and Use of Information and Communications Technology	Alwahaishi and Snášel (2013a)
International	UTAUT	M-Internet Services	Lu and Zhu (2011)
Saudi Arabia	UTAUT	M-Internet Adoption	Alwahaishi and Snášel (2013b)
Indonesia	UTAUT	M-Internet	Wiratmadja et al. (2012)
International	UTAUT	M-Government	Yfantis et al. (2013)

**Table1: Selected empirical studies in the M-Internet and M-Government context**

### **Main theories used in M-Internet and M-Government adoption research**

According to Table 1, the analysis of the 56 existing empirical studies relating to M-Internet and M-Government adoption reveals that the Technology Acceptance Model (TAM) is the most commonly used as a core theory with 38 studies. The UTAUT are adapted by 15 studies. The least studies include TRA and TPB with 4 and 6 respectively.

The TRA perceives that consumers are rational in decision-making as established in approaching their creation and subsequent behaviour (Fishbein and Ajzen, 1975). Regarding this research, the Hsiao (2013) study is the lonely one that depends on the TRA model among 56 studies. Regarding the intention to pay for smartphones to use the M-Internet services in Taiwan, Hsiao (2013) asserts on the positive effect of the personal factor, i.e. the attitude on behaviour intention. Yet, this study did not test the other relational constructs, i.e. the subjective norm on the behavioural intentions of the consumers. Indeed, the TRA model can be criticised as being ‘a general model which does not specify beliefs about a particular behaviour’ (Hsiao, 2013). Thus, other researchers measured their M-Government and M-Internet by depending on a broader model such as TPB.

The critical advantage of using TPB is the assertion on external variables on system acceptance (Hung et al. 2006). However, Pedersen (2005) criticises the TPB for ‘not



suggesting ... determinants of attitudes, subjective norm, and to some extent, behavioural control.’ Instead, by depending on the Taylor and Todd (1995) model, Pedersen (2005) focused on the Decomposed Theory of Planned Behaviour (D-TPB) which attempts to explain both actions and behaviour among the users of M-Internet services. According to Table1, Pedersen (2005) proved empirically that the modified and extended D-TPB explained 49 per cent of the variance in the early adopters’ intentions to use the M-Internet in Norway as ‘most of the relevant coefficients were significant at the 1% level.’ Indeed, all the previous theories have not been used widely in testing M-Government and M-Internet.

TAM is the most used model in the context of mobile technology (i.e. Mobile Internet and Mobile Government services) according to Table 1. Indeed, with its various extensions it has been applied in more than 50 per cent of the mentioned studies. Developed by Davis (1989), TAM’s main constructs are perceived usefulness and perceived ease of use. Perceived usefulness reflects the level to which an individual believes that using a new system would improve the task performance, while perceived ease of use shows the degree of belief that a new system does not require much effort to run (Davis, 1989). However, the role of each one of these two mediating factors may not be equal. More specifically, in an empirical study relating to location-based M-Government services in Australia held by Aloudat et al. (2013) for example, they asserted that while perceived usefulness shows a good prediction of behavioural intention, perceived ease of use does not.

TAM has been criticised by Chuttur (2009) who asserts that TAM has ‘a limited explanatory’ and weak ‘predictive power, triviality, and lack of any practical value.’ In order to solve the matter of inaccuracy in predictions with behavioural intention, UTAUT constitutes a suitable substitute model for TAM that neutralises TAM’s desolate side, i.e. lacking future prediction.

Based on the UTAUT which was developed by Venkatesh et al. (2003), three constructs are critical in understanding the use of technology systems. Effort expectancy, social influence and performance expectancy are identified as the attributes that influence individuals in their decisions to use technology systems. Another study about UTAUT is Wiratmadja et al. (2012) who asserted that three

factors of UTAUT, i.e. FC, SI and PE were significant determinants of BI to use the mobile Internet, while the EE-BI path was not significant. This indicates that teenagers who use the M-Internet are feeling a relative easiness in using it compared with adolescent users. Although UTAUT has been studied by different writers in various places showing different results as Table1 outlines, the UTAUT model was not capable to explain the behavioural intention within consumer use context. In detail, UTAUT appoints the determining factors that predict behavioural intention to use technology in the 'organisational context'. This context was not enough to study the influence of variables on the consumer use context which is essential for studying M-Technologies. Indeed, both contexts, i.e. organisational and consumer use, have been included in UTAUT2 that has been found by Venkatesh et al. (2012). As a result, UTAUT2 will be the theoretical model; this study will add new factors to it.

### **Theoretical model selection**

UTAUT has been adopted in order to predict the user of IT in many fields such as M-Internet and M-Government ones. Four determining factors have been identified in UTAUT, i.e. Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI) and Facilitating Conditions (FC) (Venkatesh et al., 2003). Brown and Venkatesh (2005) and Venkatesh et al. (2003) defined PE as 'the degree to which using a technology will provide benefits to consumers in performing certain activities,' they defined EE as 'the degree of ease associated with consumers' use of technology,' and they explained SI as 'the extent to which consumers perceive that important others (e.g. family and friends) believe they should use a particular technology.' FC is also defined as 'facilitating conditions that refer to consumers' perceptions of the resources and support available to perform behaviour' (Venkatesh et al., 2012). Venkatesh et al., 2012 refer that in UTAUT, PE, EE and SI lead BI to adopt a technology, whereas BI and FC locate technology usage.

Extending UTAUT in this research is due to the three issues which have been mentioned by Venkatesh et al. (2012). In other words, it is important to notice that Venkatesh et al. (2012) refer to three types of UTAUT extensions. The first type is suitable for our study and it asserts that there are three causes that support applying an extended UTAUT in the KSA: firstly, we can consider M-Internet and M-Government

as new technologies; secondly, M-Government will be applied among governmental officers; thirdly, the KSA domain represents a specific cultural setting.

In a further step, Venkatesh et al. (2012) expand UTAUT into UTAUT2 by adding new determining factors that help in increasing the predicting capability of the user context. The three factors are: Hedonic Motivation (HM) - 'the fun or pleasure derived from using a technology' (Brown and Venkatesh, 2005); Price Value (PV) - 'users are responsible for the costs and such costs, besides being important, can dominate consumer adoption decisions' (Brown and Venkatesh, 2005) and Habit (HT) - 'habit has a direct effect on technology use and/or habit weakens or limits the strength of the relationship between BI and technology use' (Venkatesh et al., 2012). These factors are responsible for modern mechanisms, i.e. 'effect, monetary constraints, and automaticity' that have not been covered by UTAUT (Venkatesh et al., 2012). Moreover, Venkatesh et al. (2012) refer that applying UTAUT2 will achieve a considerable increase in the 'variance explained in behavioural intention from 56% to 74% and in technology use from 40% to 52%.' Indeed, this study will tackle four issues that constitute the research questions:

- What is the linkage between UTAUT2 and the Saudi user acceptance and use of M-Internet and M-Government?
- What is the influence of new constructs, i.e. perceived risk and trust on BI?
- Moreover, what is the influence of EE on PE as an interrelationship among two main variables of the original UTAUT?
- What are the pros and cons of the research model and the recommendations for applying UTAUT2?

According to Table 1 which distilled 56 studies in M-Internet and M-Government among about 287 studies in the context of mobile technologies, UTAUT has been presented in about 70 studies and 15 studies in M-Government and M-Internet; however, UTAUT2 has been used once in a Mobile Internet study in Hong Kong by Venkatesh et al. (2012). This urges an opportunity to hold a research on UTAUT2 in the KSA in order to contribute to the existing knowledge in this line.

### **Model extension**

An exploratory analysis of the existing M-Internet and M-Government adoption research shows the existence of a considerable amount of importance relationships

between dependent and independent relationships as Table 2 refers. Furthermore, it can be noticed that UTAUT2 implies all of these relations as perceived usefulness and perceived ease of use in TAM but has been replaced by performance expectancy and effort expectancy, respectively, in UTAUT2 (Venkatesh et al., 2003; Chang et al., 2009). Likewise, facilitating conditions in UTAUT2 has been embraced instead of perceived behavioural control in TPB (Chen and Li, 2010). Similarly, hedonic motivation in UTAUT2 is the valence for perceived enjoyment (Venkatesh et al., 2012). Social influence as an original construct in UTAUT2 is similar to other concepts such as subjective norm and family influence as mentioned by Chen and Li (2010) and Venkatesh et al. (2012) respectively. Indeed, it can be noticed from many studies that the seven variables in UTAUT2 capture about 42 different variables that distribute on all previous IS theories and influence directly or indirectly on consumer intention to use in data mobile services such as M-Government and M-Internet (Meeder, 2011; Susanto and Goodwin, 2013). In Table 2, the dependent variables are intention to use and actual usage, while the independent factors are the factors that have been represented in UTAUT2 or in a different model; yet, they influence behavioural intention and actual usage.

Dependent/Independent Variables	Significant	Insignificant
Perceived Enjoyment - Behavioural Intention (BI)	Alkhunaizan and Love (2012); Janssen (2009); Kim et al. (2009); Leong et al. (2013); Nysveen et al. (2005); Zhang et al. (2010); Zhou (2012)	Shin (2009)
Perceived Behavioural Control (PBC) - BI	Hung et al. (2012); Fogelgren-Pedersen et al. (2003); Kim et al. (2007); Mills et al. (2011); Pedersen (2005); Susanto and Goodwin (2013); Xiang et al. (2008)	Pedersen (2001)
Perceived Usefulness (PU) - BI	Aloudat et al. (2013); Cheong and Park (2005); Dyna and Purwo Adi (2012); Hong et al. (2006); Kim et al. (2009); Lee et al. (2002); Mohd Suki (2011)	Qiantori et al. (2010); Shin (2009)
Perceived Ease of Use (PEOU) - BI	Hong et al. (2006); Kim (2008); Lee et al. (2002); Mohd Suki (2011); Suki (2011); Susanto and Goodwin (2010); Xiang et al. (2008)	Mardikyan et al. (2012)
Attitude (ATT) - BI	Aloudat et al. (2013); Cheong and Park (2005); Hung et al. (2012); Lee et al. (2002); Mohd Suki (2011); Pedersen (2002); Susanto and Goodwin (2013)	Babae (2010)
Trust - BI	Babae (2010); Deng et al. (2008); Lu et al. (2004); Zhang et al. (2010); Zhou (2012)	Li and Yen (2009)

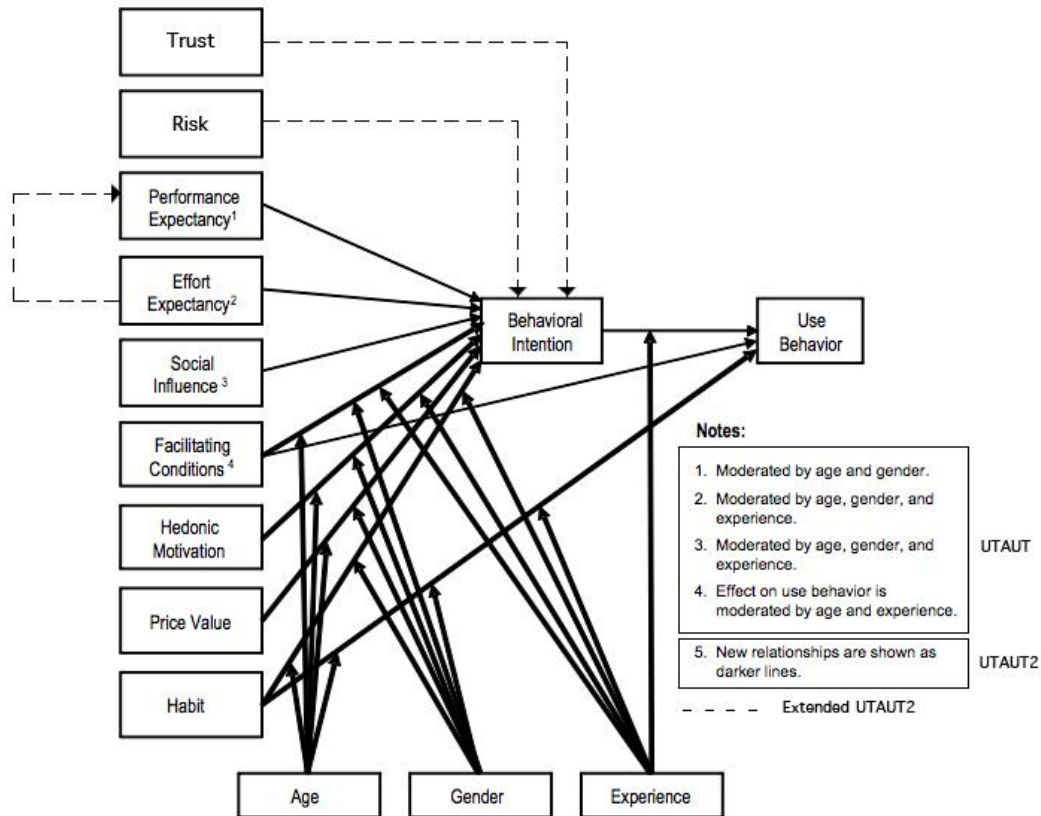
Perceived Risk (PR) - BI	Babae (2010); Dyna and Purwo Adi (2012); Joubert and Van Belle (2009); Tai and Ku (2013); Yang et al. (2012); Zhou (2012)	Wiratmadja et al. (2012); Xiang et al. (2008)
BI - Use	Alkhunaizan and Love (2012); Deng et al. (2008); McKenna et al. (2011); Verkasalo (2009); Pedersen (2001); Pedersen (2005)	Lehrer et al. (2011)
PEOU - PU	Conci et al. (2009); He et al. (2013); Kuo and Yen (2009); Li and Bai (2011); Li and Yen (2009); Parveen and Sulaiman (2008)	Leong et al. (2013)
Effort Expectancy (EE) - Performance Expectancy (PE)	Gao and Deng (2012); Knutsen (2005); Meeder (2011)	
Value - BI	Alborz (2010); Kim and Kwahk (2007); Kim et al. (2007); Ko et al. (2009); Wang and Wang (2010a)	Wang and Wang (2010b)
Social Influence (SI) - BI	Lai and Lai (2010); McKenna et al. (2011); Meeder (2011); Venkatesh et al. (2012); Wang and Wang (2010b); Wiratmadja et al. (2012)	Gao and Deng (2012)

**Table2. The most important and relevant relationships in the context of Mobile Technologies such as M-Internet and M-Government**

## Propositions

As can be seen in Table 2, the influence of trust and PR on consumer intention to use mobile services data such as M-Internet and M-Government have been tested by a number of authors. The importance of perceived trust is derived from ‘the spatial separation’ between the consumer and the producer (Babae, 2010; Zhou 2012). In detail, the consumer needs to send personal details such as name, telephone number, and/or credit card details to the seller (Grabner-Krauter and Kaluscha, 2003). The significance of PR is based on the fact that ‘mobile networks’ have ‘limitations in connection’ to the Internet (Siau and Shen, 2003). Furthermore, mobile technologies are suffering technological problems that are related to the mobile devices such as the ‘memory, short battery life and limited power’ (Mallat et al., 2008). Accordingly, this study will extend the UTAUT2 model through adopting these two constructs as new factors. Furthermore, the original model of UTAUT2 discards the importance of paths among the determining variables such as EE-PE, although there is extensive measuring of these relations in many empirical studies (Meeder, 2011). As a result, this paper will take further steps by examining the EE-PE path as a part of the

author's research model. To sum, this paper adds two new variables and will try to examine a new path among two existing variables.



**Figure1: Research Model (Source: Adapted from Venkatesh et al., 2012)**

### **Perceived Risk (PR) - Behavioural Intention (BI)**

Within the field of M-Internet and M-Government, Susanto and Goodwin (2010) define PR as ‘the degree to which a person believes that using an SMS-based e-government service may cause problems for him/her.’ This source of fear leads the consumer to act in order ‘to minimize any expected negative utility that is associated with the adoption behaviour’ (Yang et al., 2012). Susanto and Goodwin (2010) added that the risk includes SMS technology, privacy and security, and financial issues. Furthermore, Tai and Ku (2013) assert that perceived risk has different facets as people perceive it; in their UTAUT-based model for analysing the benefit-risk outcome regarding mobile stock trading among Taiwanese consumers, they found that security risk, economic risk, and functional risk are the most important facets of PR

that influences BI to use mobile stock trading. Furthermore, Dyna and Purwo Adi (2012) in their TAM-derived model for analysing mobile ticketing reaffirmed the Risk-IU path, i.e. impact value -0.293 with significance level 0.000. Similarly, in a research model derived from UTAUT with an aim to examine Location-Based Services (LBS), Zhou (2012) pointed out that PR has a substantial negative influence over IU, i.e. (B=-0.11, p<0.05). In a study, based on TRA, IDT, and relating to mobile payment services in China, Yang et al. (2012) adopted two research models; namely, one for potential users and the second for current user. They stated that the influence of PR over BI is considerably significant in the two models; however, the influence in the current user's model was higher than it was in the potential adopter's model. Thus, for p<0.01, the path coefficient was -0.256, -0.142, respectively. To sum, it can be concluded with a proposition that:

- Proposition 1: PR has a strong negative association with consumers' BI to adopt M-Internet and M-Government.

### **Perceived Trust - Behavioural Intention (BI)**

Trust plays a central role in shaping users' choice to embrace new mobile data services such as M-Internet and M-Government (Holsapple and Sasidharan, 2005). Trust reflects 'a willingness to be in vulnerability based on the positive expectation toward another party's future behaviour' (Mayer et al., 1995). In other words, trust is an individual decision that implies an agreement on the M-Internet and M-Government's producers, sellers and vendors' conditions or services; yet, this decision is coming after accepting the different characteristics of providers such as the security level of their service (Chong et al., 2012). According to Chong (2012) who extended the TAM model in his study about m-commerce adoption in China, trust is the most significant variable influencing the intention to use of m-commerce with a path coefficient of 0.315 and a p-value<0.001. Furthermore, in a model that extends Expectations-Confirmation Model (ECM) and aims to understand the intentions of the Chinese consumers towards mobile commerce, the same writer asserted in a recent study the same result, i.e. trust influenced BI the most among all other variables with a path coefficient of 0.354 and p-value<0.001 (Chong, 2013). Moreover, according to Zhou (2012) who built a model based on UTAUT to study the mobile Internet in China, trust significantly affected the usage intention (B=0.21, p-value<0.01).

Furthermore, in a study based on TAM for analysing the factors that affected mobile ticketing, Dyna and Purwo Adi (2012) asserted on the considerable importance of trust-BI. To sum, trust will be one of the variables that will influence BI in the author's research and the proposition is that:

- Proposition 2: Perceived Trust has a significant positive relationship on consumers' BI to adopt M-Internet and M-Government.

### **Effort Expectancy (EE) - Performance Expectancy (PE)**

EE can be defined as 'the extent to which an individual believes that using a given system would be free of effort' (Venkatesh et al., 2003) while PE is 'the degree to which an individual believes that using the system will help him or her to attain gains in job performance' (Davis, 1989; Venkatesh et al., 2003). Inserting this path will lead to increasing the positive effects of PE over BI (Gao and Deng, 2012; Knutsen, 2005; Meeder, 2011). Furthermore, this path equals PEOU and PU in the TAM model which has been proved as a significant path by a considerable number of writers such as (Parveen and Sulaiman, 2008). In his empirical research on the m-services in Denmark which was based on the TRA, TPB and UTAUT theories, Knutsen (2005) proved that EE significantly influenced PE ( $B=0.557$ ,  $p<0.01$ ) and the amount of this influence was the second among all different paths in his research. They affirm that 'the responses pertaining to PE appear to be moderated by the first impressions pertaining to EE.' Furthermore, in an empirical study about the application of mobile e-books among consumers in China, Gao and Deng (2012) asserted the importance of path EE-PE ( $B=0.49$ ,  $p<0.001$ ) in their model research which was developed on the basis of the UTAUT model. Furthermore, according to an empirical research that is based on the UTAUT theory about Branded Smartphone Applications in the Netherlands, Meeder, (2011) refers to the remarkable and significant effect of EE on utilitarian PE, i.e. ( $B=0.452$  when  $p<0.01$ ) which is the second highest value among all paths in his model. This result echoed Hövels (2010) who asserted that EE-PI coefficient  $B=0.429$ ,  $p<0.001$ . Although this path has been tested a few times, i.e. three studies, all studies asserted the significance of the EE-PE path. Moreover, the coefficient B in two of the previous studies has a relatively bigger value compared with other paths in each study. Thus, this relationship is worth considering in any



future research as it deeply affects the subsequent influence of PE on BI. The proposition is:

- Proposition 3: EE has a considerable positive relationship with PE.

## **Summary and conclusion**

An examination of the M-Internet and M-Government adoption literature revealed that about 287 researches had been done to study mobile data services implementation. The most relevant M-Internet and M-Government adoption studies were also included and were represented by 56 studies reviewed. Theories that have currently been implicated in M-Payment and M-Banking adoption research include TPB, DTPB, TAM, TRA, UTAUT, and UTAUT2, although TAM has been used significantly more than any other model. The variables of UTAUT2 have been proved to be more suitable in predicting consumer behaviour intentions regarding M-Internet and M-Government. Following the construct analysis of the current M-Internet and M-Government, it showed that adoption research PR and trust were chosen as appropriate extensions of UTAUT2 in the M-Internet and M-Government context and the relationships were proposed. Moreover, the EE-PE path should be considered as a significant one.

## **Contribution**

Through examining the current knowledge in a systematic review, this study has analysed the relative importance of each one of the IS theories affecting consumer behaviour to use M-Internet and M-Government. Furthermore, although there is an assertion on the predictable importance of UTAUT2, this research adds perceived risk and trust in order to fix a probable gap in UTAUT2 that dismissed the empirical results about the significance of these new determinants. Moreover, this paper asserts the significance of examining the interrelations among the main variables such as EE-PE in any future study.

## **Limitations and future research**

This paper examined the existing knowledge about M-Internet and M-Government; yet, it depends on researching some empirical evidences on various mobile data

services such as M-Commerce, M-Banking, M-Payment, SMS-technology mobile, etc. Moreover, the cultural parameters constitute an important point when measuring the probable influence of each determining factor over Saudi consumers' behavioural intention. Furthermore, this study opens the doors for future empirical researches in the KSA regarding the role of perceived risk and trust in an extended UTAUT2 instead of previous studies that applied UTAUT2. In other words, this proposed model would contribute to the existing knowledge in the KAS domain in order to improve Saudi consumers' adoption for M-Government and M-Internet.

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