

Factors that Influence End-Users' Adoption of Smart Government Services in the UAE: A Conceptual Framework

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Abstract: As mobile government (m-government) services are a new field, there is limited research that identifies the factors that affect the acceptance of smart government (mobile-application-based) services. This study intends to explore the factors that seem to improve end-users' acceptance of mobile government services. Mobile technologies are one of the pillars of a smart city. Mobile technologies have huge potential to become one of governments' most effective and efficient tools in offering their services to the public. However, the technologies that are available for use are not fully welcomed by end-users. The key problem associated with the high failure rate of e-government projects is the lack of awareness of the potential factors that may help citizens adopt m-government services. By reviewing the existing work, this paper proposes a framework, as an extension of Davis's technology acceptance model (1989), to address the factors that influence user acceptance of smart government services in the UAE and thereby guide the successful implementation of smart government. The literature reviewed led to ten propositions that present the main elements in ensuring end-users' adoption of smart government in the UAE. A framework is developed to highlight the key factors that influence the successful implementation of smart government services. The paper will help in understanding the key issues surrounding mobile applications that may support the successful operation of m-government.

Keywords: e-government, m-government, smart government, technology acceptance model, UAE.

1. Introduction

In the smart city era, governments intend to provide their citizens with easily accessible, accurate, real-time, high-quality services and information with the use of smart devices, including high-speed wireless Internet connections. For example, Dubai Smart Government is an initiative that has started to provide a wide range of online services for both business and personal requirements (Almuraqab and Jasimuddin, 2016). M-government (mobile-application-based government services) adds value to the smart government initiative, where citizens will be able to access government services using mobile technologies such as mobile phones, Wi-Fi-enabled devices and wireless networks (Ghyasi and Kushchu, 2004). For the purpose of this paper, the terms m-government, electronic government (e-government) and smart government are used interchangeably. Internet-enabled mobile devices' penetration rates are growing compared to those of traditional wired PCs (Abdelghaffar and Magdy, 2012).

M-government refers to any transaction between government and citizen that occurs through mobile technologies (Al-hadidi and Rezgui, 2009). M-government is essential for the socio-economic development of a country; without such support, a government cannot operate efficiently (Kushchu and Kuscu, 2003). The organisations invests heavily in information and communication technologies (Islam et al., 2015; Jasimuddin et al., 2012; Jasimuddin and Zhang, 2011; Jasimuddin, 2008; Zhang and Jasimuddin, 2012; Jasimuddin and Zhang, 2009). Mobile technologies are one of the pillars of smart government. In other words, mobile technology is essential to support smart government initiatives (Abdelghaffar and Magdy, 2012). In this regard, Ziemba et al. (2014) suggest that high-quality, sophisticated web portals are needed for the successful adoption of e-government.

However, for such smart government initiatives to be successful, citizens need to understand and accept m-government services (Kaliannan et al., 2007). The successful implementation of smart government services depends on how end-users perceive the m-government initiative. The technologies available may not be welcomed by end-users. If m-government services are not effectively utilized by end-users then claims of the existence of a smart city are meaningless.

The success of mGovernment projects depends on the citizens' acceptance and usage. (Almuraqab et al. 2017). However, there has been limited research on factors that influence end-users' adoption of m-government services from Western countries' perspectives. This article intends to fill the gap in the current literature by reviewing the existing literature to identify forces that may affect end-users' adoption of smart government services in the UAE context. The insights of Davis (1989) inspired the theoretical foundation of this study. The goal of the paper is to identify the factors that affect the successful adoption of m-government services and develop a conceptual framework relating to the implementation of smart government in the UAE.

The paper will help to understand the key issues surrounding the mobile applications that may support the successful operations of m-government. This paper will attempt to provide a conceptual framework relating to the successful implementation of smart government and Smart Cities in the UAE. The rest of this article is structured as follows. Section 2 presents the research method. The next section reviews the relevant literature, developing a research model with ten propositions. The analysis of results is then presented, followed by the discussion. Finally, the paper concludes with the study's implications and limitations and suggests future directions for research.

2. Research methods

In order to capture the significance of relevant studies, as well as to limit bias, three procedures were followed (Rosenbusch et al., 2011). A computerized keyword search of the databases (e.g., ISI, Web of Knowledge, ABI, Google Scholar) was conducted to identify relevant studies on e-government, m-government and technology adoption. The literature from the six months between January and June 2016 was searched. In addition, most relevant journals in information management (*Information and Management, Computers in Human Behavior, Information Systems Journal*) and conference proceedings (AIS, ACM) were searched manually. As a third step, the reference sections of the relevant articles were searched, and 29 articles were thoroughly analysed to identify the factors that encourage end-users' adoption of smart government services. These papers were published in journals from 2005 to 2015. Three keywords, "factors influencing e-government", "factors influencing m-government" and "factors influencing technology adoption", were used in the literature search.

3. Literature review

M-government involves a multidimensional construct (Rana et al., 2015; Nfuka and Rusu, 2011; Pina et al., 2009). Most governments around the globe utilize the latest information and communication technology (ICT) to improve service delivery to citizens by introducing m-government (Mofleh and Wanous, 2008; Choudrie and Dwivedi, 2005). Recently, there has been rapid progression in wireless technologies and extensive use of Internet-enabled mobile devices in many countries (Hassan et al., 2009). The recent development of mobile technologies allows knowledge workers to engage in various stages of their work without the constraints of time and location (Zhang and Jasimuddin, 2015; Zhang and Jasimuddin, 2008). This encourages governments to move naturally towards m-government as a next phase to improve the quality and delivery of their services (Al-khamayseh et al., 2006; Antovski and Gusev, 2005) due to mobile device penetration, and the emergence of mobile Internet and mobile applications and also services (Hassan et al., 2009).

Heeks (2008) argues that it is critical to understand the predictors of smart or m-government services. According to him, only 15% of e-government projects are successful, which indicates that the failure rate of e-government projects is very high. The key problem associated with the high failure rate of e-government projects is the lack of awareness of the potential factors that may help citizens to adopt m-government services (Sang and Lee, 2009). Similarly, Khaleej-Times (2015) reports that 65% of respondents have never used smart government applications in the UAE, while 96% have smartphones, and furthermore they also found out that 71% have installed fewer than 10 apps. This indicates that there is a problem with adoption of m-government or smart government services in the UAE. Hence, these problems need to be researched to reveal the critical factors influencing end-users' behaviour to use or accept m-government services in the UAE. In the Gulf Cooperation Council (GCC), mobile services such as m-payment and m-banking are available. To our knowledge, the adoption of m-government or smart government in the GCC is not taken seriously by academicians and practitioners. By reviewing the existing literature relating to e-government, m-government and m-services (e.g., m-banking, m-commerce, and m-marketing) adoption factors, this paper identifies determinants of the acceptance of m-government that may expedite the successful establishment of smart city in the UAE.

Scholars (e.g., Ziemba et al., 2016; Yong et al., 2014; Mahmud et al., 2012; Althunibat et al., 2011; Ovais et al., 2013; Alomari et al., 2012; Rehman et al., 2012; Hussein et al., 2011; Carter, 2008; AlAwadhi and Morris, 2008) have identified various e-government and m-government adoption factors. Ziemba et al. (2016), for example, focus on the critical success factors (CSFs) of e-government, clarifying the concept of e-government and the CSFs for e-government, and showing a holistic approach to the CSFs for e-government. We have reviewed the existing literature in order to identify success factors and develop a conceptual framework in the UAE context. Following this review of the literature, the possible success factors for adopting m-government, e-government and m-services are shown in Table 1.

Table 1: Adoption of m-government, e-government and m-services (m-payment, m-banking, m-commerce, etc.)

Author(s)	Domain	Region	Adoption factors
Abu-Shanab (2015)	m-government	Jordan	Social influence, perceived usefulness, perceived ease of use, perceived compatibility and perceived responsiveness
Shareef Mahmud Akhter; Archer Nomm; Dwivedi Yogesh. K. (2012)	m-government	India	Perceived ease of use, perceived security, perceived reliability and relative advantage
Abdelghaffar and Magdy (2012)	m-government	Egypt	Perceived usefulness, compatibility, awareness, social influence and face-to-face interactions
Althunibat et al. (2011)	m-government	Malaysia	Social influence, service quality, perceived usefulness, perceived risk, cost of service, perceived compatibility, trust in government, trust in technology and service quality
Babullah et al. (2015)	m-government	KSA	Performance expectancy, effort expectancy, social influence, facilitating condition, hedonic motivation and price value
Dahi, M., Ezziane, Z. (2015)	e-government	UAE	Perceived usefulness, perceived ease of use, subjective norms and trust
Nawaz and Thejjigoda (2015)	e-government	Sri Lanka	Performance expectancy, effort expectancy and social influence
Khalil and Al-Nasrallah (2014)	e-government	Kuwait	Effort expectancy, social influence, Internet experience, facilitating conditions, trust and awareness
Ovais et al. (2013)	e-government	Pakistan	Performance expectancy, effort expectancy, facilitating conditions, social influence, lack of awareness and user data privacy
Alshehri et al. (2012)	e-government	KSA	Performance expectancy, effort expectancy and facilitating conditions
Alomari et al. (2012)	e-government	Jordan	Trust in government, website design, beliefs, complexity and perceived usefulness
Rehman et al. (2012)	e-government	Pakistan	Information quality, awareness, perceived ease of use, service quality and transaction security
Hussein et al. (2011)	e-government	Malaysia	Perceived ease of use and perceived usefulness, trust in government, image, compatibility and service quality
Sang et al. (2010)	e-government	Cambodia	Perceived usefulness, relative advantage, trust and perceived ease of use
Carter, L. (2008)	e-government	USA	Perceived usefulness, trust in the Internet and perceived ease of use
AlAwadhi and Morris (2008)	e-government	Kuwait	Performance expectancy, effort expectancy, peer influence and facilitating conditions
Suki et al. (2010)	e-government	Malaysia	Perceived usefulness, perceived ease of use, attitude, facilitating conditions, self-efficacy, subjective norms, perceived behavioural control, interpersonal influence and external influence
Cyrl et al. (2008)	m-services	Malaysia	Perceived usefulness, trust and perceived ease of use
Hans et al. (2005)	m-services	Germany	Social norms, perceived information utility, perceived utility, and negative impacts like perceived risk
Luarn and Lin (2005)	m-services	Taiwan	Perceived ease of use, perceived usefulness, credibility, self-efficacy and financial cost
Wu and Wang (2005)	m-services	Taiwan	Perceived risk, perceived ease of use, perceived usefulness and financial cost
Gerhard Schierz, P., Schulke, O., W. Witz, B. (2009)	m-services	Germany	Perceived compatibility, individual mobility, subjective norms, perceived usefulness, perceived security and perceived ease of use
Riquelme and Rios (2010)	m-services	Singapore	Usefulness, social norms, social risk and ease of use
Lee and Han (2015)	m-services	Korea	Usefulness, convenience and monetary values
Bhatti, T. (2007)	m-services	UAE	Perceived ease of use, subjective norms and behavioural control
Jeong and Yoon (2013)	m-services	Singapore	Perceived usefulness perceived ease of use and perceived self-efficacy
Sanjeev and Krishna (2013)	m-services	India	Perceived ease of use, expressiveness, trust and perceived usefulness
Li and Ly (2007)	m-services	China	Perceived risk, cost, perceived usefulness, perceived playfulness, perceived ease of use and perceived playfulness
Kuo and Yen (2009)	m-services	Taiwan	Perceived ease of use, perceived cost and perceived usefulness

The technology acceptance model (TAM) is the most popular theory that explains technology acceptance factors. Over the last two decades, there has been wide empirical support for TAM (Dahi and Ezziane, 2015); as of August 2016, Google scholar listed over 30,000 citations of the paper that introduced TAM (Davis, 1989). The present study has used Davis's (1989) TAM for two reasons. First, the model can be applied in different information system devices (Wang, 2003; Pikkarainen, 2004; Kleijnen, 2004; Nysveen, 2005; Luarn and Lin, 2005). Secondly, TAM supports better recognition of the relationship between many important constructs of the study, such as perceived risk, perceived usefulness, perceived ease of use, awareness and behavioural intention, as shown in Figure 1. In this regard, Paul and John (2003) suggest that, to enhance TAM's predictive power, the model has to be integrated into a border set of variables that relate to both human and social factors. In line with Paul and John's (2003) suggestion, an extended conceptual framework is proposed, incorporating organizational, cultural, economic, social and political aspects surrounding the acceptance of m-government services.

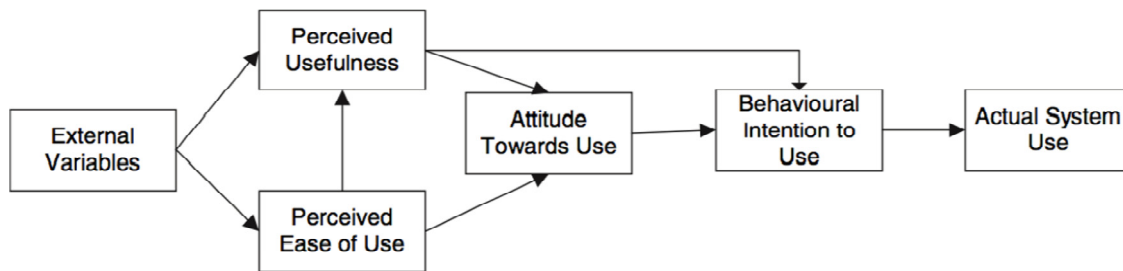


Figure 1: Davis's technology acceptance model (TAM) (1989).

4. Research findings

Several scholars (i.e., Amin, 2007; Althunibat et al., 2011) suggest the need for acceptance models that are customized to specific technologies. Abdelghaffar and Magdy (2012) argue that TAM may not be suitable to explain the adoption and use of different types of technologies and service channels, since it does not take into account other issues such as trust, risk and social influence. Therefore, it is important to include other explanatory variables in TAM. This study attempts to extend TAM by incorporating perceived risk (PR), perceived compatibility (PC), trust in technology (TOT), trust in m-government (TOG), social influence (SI), awareness (AW), facilitating conditions (FC), and perceived risk (PR) as the independent variables that influence behavioural intention to use smart government services (dependent variable). Figure 2 shows a proposed conceptual framework of m-government services in the UAE.

Perceived usefulness. According to Davis (1989), perceived usefulness is the degree to which a person believes that a system can improve his/her job performance. In other words, perceived usefulness is the degree to which a citizen (i.e. end-user) believes that using m-government services will help them to get what they want and make their life stress-free. Perceived usefulness is one of the strongest signs of technology adoption as it reflects a significant effect across many technologies and applications (Althunibat et al., 2011). Furthermore, the relevant literature has found out that perceived usefulness has a significant impact on the adoption of m-government services (Abu-Shanab, 2015; Yong et al., 2014; Abdelghaffar and Magdy, 2012; Althunibat et al., 2011) and also in e-government (Dahi and Ezziane, 2015; Mohammed, 2013; Ramlah et al., 2011; Sinawong, 2010; Carter, 2008; Suki et al., 2010).

Furthermore, the construct proved to be significant also in m-services (e.g., m-commerce, m-banking and m-marketing) (Cyril et al., 2008; Gerhard et al., 2009; Hernan et al., 2010; Kuo and Yen, 2009; Lee and Han, 2015; Bong-Keun and Tom, 2013; Sanjeev and Krishna, 2013; Luarn and Lin, 2005; Wu and Wang 2005). In the context of the UAE, especially in Abu Dhabi, the majority of users agreed that they would use the Abu Dhabi e-government website more if they perceived it to be useful to them. Similarly, Althunibat et al. (2011) explain that the more useful m-government services are, the greater the intention to adopt them shown by Jordanian citizens. Alomari et al. (2012) also report that a higher level of perceived usefulness is linked with increased intention to use e-government portals. This finding indicates that citizens will be keener to accept e-government if the services that are launched on the portals increase the efficiency and effectiveness of transactions. In the field of smart government services via the latest technology such as smart devices, it is important to test the significance level and direction of perceived use towards users' adoption of these services. In view of these arguments, we make the following proposition:

Proposition 1: The perceived usefulness of smart government applications will have a positive impact on end-users' intentions to use the smart government services.

Perceived ease of use. According to Davis (1989), perceived ease of use is the degree to which a person believes that a particular system is user-friendly. This is the second main construct of TAM, which has been used in prior technology adoption and e-government adoption studies. Scholars (e.g., Al-Thunibat, 2011; Abu-Shanab, 2015) have found that end-users might prefer to use a service because it is practical, simple, easy to access, less hassle and easy to use. Other studies have reported that perceived ease of use has a significant impact on the adoption of m-government services (Dahi and Ezziane, 2015; Alomari et al., 2012; Ramlah et al., 2011; Suki et al., 2010; Eze, 2008; Sinawong and Lee, 2010; Mahmud et al., 2012). In addition, the construct has also proved to be significant in m-services (e.g., m-commerce, m-banking and m-marketing) (Cyril et al.,

2008; Luarn and Lin, 2005; Wu and Wang, 2005; Gerhard et al., 2009; Riquelme and Rios, 2010; Bhatti, 2007; Jeong and Yoon, 2013; Sanjeev and Krishna, 2013; Li and Lv, 2007; Kuo and Yen, 2009).

Dahi and Ezziane (2015) state that their respondents agreed that a UAE m-government website will be more acceptable if it is easy to use. Yong et al.'s (2014) study also reflects the fact that end-users are more accepting of m-government services, especially if they are easy to use. Likewise, Althunibat et al. (2015) contend that the greater the perceived ease of use, the more likely it is that m-government services will be adopted by end-users. Indeed, it is important to make these services easy to use. Based on these arguments, we make the following proposition:

Proposition 2: Perceived ease of use of smart government applications will have a positive impact on end-users' intentions to use the smart government services.

Awareness. Awareness is people's knowledge of technology and the availability of electronic services (Venkatesh et al., 2003; Al-Adawi et al., 2005; Mofleh and Wanous, 2008). Abdelghaffar and Magdy (2012) suggest that awareness is the first step towards users knowing that the government provides its services over the Internet. In some studies, it has been reported that people's awareness of smart government services and the availability of electronic resources is a major concern. Indeed, the lack of awareness has a negative impact on citizens' intentions to adopt e-government and m-government services (Ovais et al., 2013; Rehman et al., 2012; Anas et al., 2014; Alateyah et al., 2014). Lack of awareness leads to a decline in interest in e-government services. This has been supported by previous studies (e.g., Dahi and Ezziane, 2015; Ovais et al., 2013; Khalil and Al-Nasrallah, 2014), which also argue that lack of awareness is one of the main obstacles to successful adoption of m-government services.

Without citizens' awareness, acceptance and use of the m-government services, the government cannot achieve its objectives of providing these services (Anas et al., 2014). Rehman et al. (2012) confirm the relationship between citizens' awareness and their intention to adopt m-government services. Napitupulu and Sensuse (2014) contend that awareness is one of the critical success factors in m-government service implementation. In the context of the UAE, Dahi and Ezziane (2015) report that many respondents are not aware of m-government services in the UAE and explore why they did not use m-government services. Hence, it is important to study the impact of awareness on end-users' adoption of smart services via their smart devices in the UAE. Hence, it is proposed that awareness will have an impact on intentions to use the government's smart services.

Proposition 3: Awareness will have a positive impact on users' intentions to use smart government services.

Facilitating conditions. According to Venkatesh et al. (2003), facilitating conditions relate to the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system. Facilitating conditions are also defined as one's belief regarding the extent to which a governmental and technical infrastructure is available to facilitate the system (Al-Gahtani et al., 2007). Furthermore, the conditions facilitating use of a technology or services are essential to support and encourage use. The availability of facilitating conditions can be understood by the ability to access the resources and obtain the knowledge required to use e-government services (AlAwadhi and Morris, 2008). Reflecting this view, Venkatesh et al. (2003) report that facilitating conditions are measured by perceptions of access to the resources, knowledge and technical support required to use m-government services. In other words, this factor refers to the degree to which people perceive that services (including communication media) within the current public service networks are reliable. This perception is linked to mobile networks' performance and to the performance of government SMS-based service systems (Abu-Shanab, 2015). In this regard, Susanto and Goodwin (2011) report that some of the respondents are doubtful about using services because they are not confident that mobile networks provide good coverage and connection performance. While the registration process for the Emirates ID (EID) requires a smart card reader, they are hard to find in the market.

Previous researchers (e.g., Ovais et al., 2013; AlAwadhi and Morris, 2008; Alshehri et al., 2012; Suki et al., 2010; Khalil and Al-Nasrallah, 2014; Babullah et al., 2015) suggest that facilitating conditions are very significant in the adoption of e-government and m-government. For example, Dahi and Ezziane (2015) report

that some users claim a lack of resources to support their use of e-government system. Therefore, the following proposition is presented:

Proposition 4: Facilitating conditions will have a positive impact on end-users' intentions to use smart government services.

Perceived cost. Access devices should be affordable and the cost of accessing the m-government services must be low (Ghyasi and Kushchu, 2004). The cost of mobile services is one of the main factors that affects end-users' intentions to use m-government services (El Kiki and Lawrence, 2007). Perceived cost has a negative effect on the users' intentions to adopt m-government services. In the context of citizens' behaviour, price is considered a very important factor. Comparing prices between different service providers and operators is not easy. It is very difficult to know which services are priced by time and by amount of data transferred. Since the cost of m-government services is important to citizens, government should therefore pay more attention to this issue (Althunibat et al., 2011).

According to Susanto and Goodwin (2011), the advantages of SMS-based services are low cost and the ability to reach citizens anywhere and at any time, including in areas with no Internet access. On the other hand, Bong-Keun and Tom (2013) argue that the cost of accessing mobile and wireless services (e.g., subscriptions, service charges and communication fees) is higher than that of accessing wired Internet services, e.g., personal computers (PCs or laptops). Financial considerations may influence consumers' behavioural intentions to use mobile-based services (Kuo and Yen, 2009; Luarn and Lin, 2005; Wu and Wang, 2005).

An individual with high financial resources may have higher behavioural intention to use m-banking services than an individual with low financial resources (Bong-Keun and Tom, 2013). Cost is a critical factor in consumer decision-making on purchase and use. Thus, perceived cost is an important factor affecting users' behaviour (Li, and Lv, 2007). Utilizing mobile networks saves governments resources and money (Mtingwi and Belle, 2012), which is reflected in lower costs of services to citizens. Citizens start to become sensitive about paying for m-government services (SMS-based). Abu-Shanab (2015) explains why some respondents rejected services that charged users more than the standard SMS cost. People who really need to use the service will weigh the benefits against the costs (Al-Thunibat et al., 2011c; Susanto and Goodwin, 2011; Al-Hujran, 2012). In the age of smart cities or smart government, the new mobile devices rely on wireless Internet. Governments provide their smart services using smart applications via smartphones. So it is critical to explore the cost factor since the Internet has an associated cost in the UAE. The cost factor is affecting end-users' intentions to use the smart services of the government. Hence, our proposition will be as follows:

Proposition 5: Perceived cost will have a negative impact on users' intentions to use smart government services.

Social influence. According to Venkatesh et al. (2003), the degree to which an individual perceives important that others (e.g., family and friends) believe he or she should use the new system. Social influence is emerging as a factor in the intention to use SMS government services (Althunibat et al., 2011). This variable also integrates social influence and subjective norms (Abu-Shanab, 2015). It is vital to realize the importance of the influence of friends and family on decisions to use a technology. Dahi and Ezziane (2015) report that 87.3% stated that they would use a UAE m-government service portal in future if their friends and colleagues used it and influenced them. Yong et al. (2014) argue that social influence gives rise to a strong feeling that mobile government is reliable. That is, a potential adopter is affected by word of mouth from family and friends.

Furthermore, social influence has been tested and proved to be a significant factor in many studies in the m-government domain (Sabraz and Thelijjagoda, 2015; Ovais et al., 2013; Alshehri et al., 2012; Abu-Shanab, 2015; Yong et al., 2014; Abdelghaffar and Magdy, 2012; Althunibat et al., 2011; Khalil and Al-Nasrallah, 2014; Babullah et al., 2015). Similarly, Abdelghaffar and Magdy (2012) also find that social influence has a significant influence on youth intentions to use m-government services since Egyptians' decisions are generally affected by their family and friends. If they notice that more people utilize online m-government services successfully then they will be encouraged to use them. We thus state the following proposition:

Proposition 6: Social influence will have a positive impact on end-users' intentions to use smart government services.

Perceived trust in government. Trust in government can be defined as the public’s assessment of government based on their perceptions of political authorities’, agencies’ and institutions’ integrity and ability to provide services according to the expectations of citizens (Carter and Bélanger, 2005; Becerra and Gupta, 2003; Ganesan and Hess, 1997; Jarvenpaa et al., 1998; Lee and Turban, 2001; Mayer et al., 1995; McKnight et al., 2002). According to Althunibat et al. (2011), many people view the government as Big Brother, arguing that government is watching citizens all the time and intruding upon their personal lives. Scholars (e.g., Carter and Bélanger, 2005) highlight how citizens must have confidence in the government. Rehman et al. (2012) states that lack of trust in government is one of the key m-government projects’ failure. Indeed, since technology empowers data collection and advanced analysis of information, users of m-government services will accept transactions more if they are confident that the government will protect and respect their private and confidential data. In fact, citizens need to believe that government agencies provide m-government services for the purpose of benefiting and not monitoring and policing them (Althunibat et al., 2011).

It is important to explore how citizens of the UAE, where people from over 74 countries work. There are almost 8 million expats and about one million locals (UAE National Bureau, 2015). Against this background, trust is important in government smart applications. It is important to know whether trust in government affects their decision on whether to adopt smart government services or not. Trust in m-government has been used in several studies to explain end-users’ intentions to use m-government services (e.g., Alomari et al., 2012; Dahi and Ezziane, 2015). Alomari et al. (2012), for example, highlight the lack of collaboration between the government of Jordan and its entities in terms of laws and regulations related to ICT usage. Such issues may create a problem for the government in Jordan in delivering its services, and thus Jordanian citizens may be suspicious of the government’s ability to operate and implement m-government systems. Moreover, Alomari et al.’s (2012) analysis shows that the higher the level of trust in government, the greater the use of the m-government web portal and its services in Jordan. Dahi and Ezziane (2015) argue that users’ intentions are largely explained by level of trust in e-government services in UAE, suggesting that trust is the most essential element for users having a confident attitude to using the m-government portals. Therefore, in our model, this construct is proposed to have a relationship to the users’ intentions to use m-government services:

Proposition 7: Perceived trust in government will have a positive impact on users’ intentions to use smart government services.

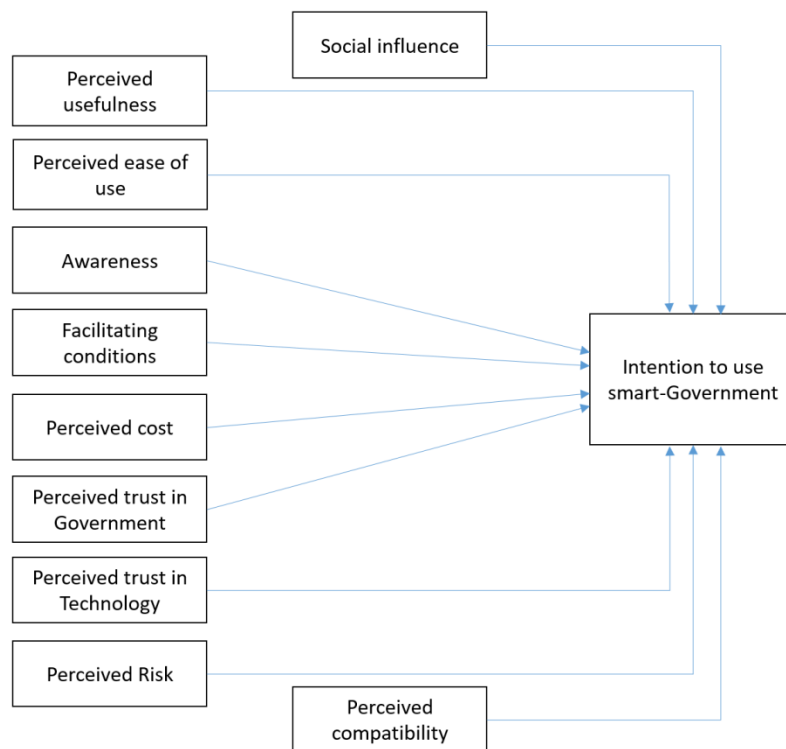


Figure 2: A proposed conceptual framework of m-government services in the UAE.

Perceived trust in technology. Trust in technology is constantly recognized as a key factor in adoption of m-services (McKnight, 2002; Pavlou, 2003; Warkentin et al., 2002; Welch et al., 2005). This kind of trust is often labelled institution-based trust. According to McKnight (2002), it refers to an individual's perceptions of the institutional environment, containing the structures and principles that make a safe environment. In this regard, Carter and Bélanger (2005) highlight how citizens must have confidence in the enabling technologies. In addition, Pavlou and Gefen (2004) suggest that institution-based trust is a highly critical form of trust in objective financial environments where a sense of a community with shared values is important. The recognized view of trust has been commonly adopted by e-commerce and e-government, m-government and m-services research (Carter and Bélanger, 2005; McKnight, 2002; Pavlou, 2003; Pavlou and Gefen, 2004; Warkentin et al., 2002; Welch et al., 2005; Carter, 2008; Alomari, 2012; Althunibat et al., 2011).

The UAE is facing the challenge of establishing an up-to-date legal framework to govern the utilization of information and communication technologies (ICT), regarding issues such as consumer protection, cybercrime and data privacy (Alkhouri, 2012). Accordingly, UAE citizens may be concerned about the privacy and security of their information, even when dealing with government agencies via smart devices on the Internet. Based on the analysis above, the following proposition is presented:

Proposition 8: Trust in technology will have a positive impact on users' intentions to use smart government services.

Perceived risk. Perceived risk is defined as a citizen's subjective expectation of suffering a loss in pursuit of a favoured outcome (Carter and Bélanger, 2005). Citizens' behaviour is intensely affected by perception of risk. End-users are frequently uncertain about the consequences of a decision or an action (Bauer, 1976). Moreover, it has been revealed that end-users try to minimize risk rather than maximize utility. An end-user's subjective risk perception can strongly explain her/his behaviour (Mitchell, 1999). If an end-user lacks experience of the new technology then he/she finds himself/herself in a condition of high risk. In fact, risk reduction should be given more priority, specifically during the early phases of introduction of m-government services

Hence, m-government service providers need to effectively address the issues surrounding the perceived risk variable. Concerns regarding issues such as identity theft and hacking are common phenomena that make end-users think twice before adopting an unfamiliar service option. Security issues need to be addressed (Chen, 2008). The risk associated with m-government services is mainly perceived as one of data security. Users of the new smart devices tend to have unauthorized data access, unwanted tracking of usage patterns and concerns about data manipulation. Previous studies (e.g., Althunibat et al., 2011; Hans et al., 2005; Wu and Wang, 2005) have also revealed this construct to be a significant variable in intentions to adopt m-government services. Based on the analysis above, the following proposition is presented:

Proposition 9: Perceived risk will have a negative impact on users' intentions to use smart government services.

Perceived compatibility. According to Rogers (1995), perceived compatibility is the degree to which an innovation is consistent with existing facilities and practice. Susanto and Goodwin (2011) argue that perceived compatibility integrates the perceived relevance, quality and reliability of the information and the perceived reliability of mobile networks and system performance. Compatibility refers to whether an end-user perceives an application/service to be compatible with his/her requirements or life routine. In other words, it refers to the extent to which m-government services are consistent with the prospective user's lifestyle and the way he or she prefers to access the services.

Compatibility is mirrored in m-government's ability to match end-users' behaviours and lifestyle and to enhance end-users' lifestyle image. Abbad et al. (2009) explain that when m-government is more compatible to users, potential adopters will be less uncertain of it. This means that the adoption of m-government services could be accelerated. Abbad et al. (2009) also indicate that the more compatible an innovation is, the less of a change in behaviour will be.

Design of m-government services is critical to ensuring its acceptance by citizens. As a result, m-government services should be flawlessly integrated into citizens' transactions without requiring unnecessary steps,

equipment or training. In fact, m-government service experiences should be fun and supportive to enhance citizens' lifestyle image (Althunibat et al., 2011). Abdelghaffar and Magdy (2012) report that Egyptian users prefer to transact and interact with m-government services that comply with their culture and level of experience. This has been examined and supported by other scholars (e.g., Abu-Shanab, 2015; Abdelghaffar and Magdy, 2012; Althunibat et al., 2011; Alomari et al., 201; Ramlah et al., 2011; Gerhard et al., 2009). Therefore, we propose that perceived compatibility will have a positive impact on users' intentions to use smart government services:

Proposition 10: Perceived compatibility will have a positive impact on end-users' intentions to use smart government services.

5. Discussion

This paper explores the major factors influencing end-users' adoption of smart government services (m-government) in the UAE. After reviewing the relevant literature, ten variables were explored as critical for the successful adoption of m-government services. A conceptual model was proposed that takes advantage of Davis's widely used technology acceptance model (TAM) (1989) to start understanding the factors affecting adoption of these services. Davis (1989) explained his model of technology acceptance, which is being successfully used in explaining the adoption of other, related technologies and services such as e-government, m-commerce and m-banking, as well as m-government.

It is to be noted that technology is advancing very fast, and governments around the globe, particularly in the UAE, are managing to utilize the latest devices and technologies to provide their services to the public. For example, since smartphone penetration is high, it is critical to know which factors will encourage the public to use m-government services via smartphones. In this regard, the UAE government is making efforts and spending resources in order to implement m-government services successfully. Against this background, it is very important to study the factors in the adoption of the latest technologies to avoid failure in smart government implementation. Drawing on the previous literature, the paper identified the following factors besides the main variables of TAM (i.e., perceived usefulness and perceived ease of use):

1. Awareness
2. Facilitating conditions
3. Social influence
4. Perceived cost
5. Perceived trust in government
6. Perceived trust in technology
7. Perceived risk
8. Perceived compatibility

In previous studies, awareness was found to be critical. It is observed that awareness of the availability of m-government services is very much lacking among citizens in the UAE. It has been proven to be significant in many studies, and some studies in the UAE have found the same. Some scholars argue that facilitating conditions such as organizational and technical infrastructure are vital to support the use of m-government services. Perceived cost is another important determinant of use of m-government services. The smart devices and Internet access required to gain access to m-government services are not free of cost. As a result, not everyone will be able to afford such smart services, which is important to explore in the context of the UAE.

In UAE culture, people are friendly and kind, which reflects social influence among the citizens that encourage them to use smart government services. In the proposed model, social influence has been considered as a factor. Social influence can be treated as a determinant of the adoption of m-government services to investigate to what extent families and friends are encouraging each other to use smart services.

Trust in technology and trust in government are very important elements in technology adoption. However, the latest technologies and devices are exposed to cybercrime, viruses and malware, which cause people to think twice before accessing smart applications for transactions. Moreover, people are concerned about their data privacy; this has been found and supported by previous works, and it needs to be tested in the context of the UAE's smart government services.

Similarly, perceived risk was found to have a negative impact on users' intentions. Scholars suggest that it is risky to conduct transactions via mobile devices due to security issues, and this makes citizens afraid of using services for transaction purposes. More specifically, some researchers have mentioned worry about losing money.

Finally, compatibility can be treated as an element to increase the intention to use m-government services to match end-users' behaviours and lifestyle, and to enhance end-users' lifestyle image. Following the review of the relevant literature, these eight variables have been incorporated into the proposed conceptual framework to ensure the successful adoption of m-government services in the context of UAE.

6. Conclusions

Drawing on the existing literature, this article explored the relevant issues surrounding smart government adoption by citizens and their relationship to people's intentions to accept smart government (mobile-application-based) services. This paper will help in understanding the key issues surrounding mobile applications that may assist in the successful operation of m-government. The article identifies the determinants of smart government adoption to avoid failure in the implementation of smart government. The researchers reviewed the existing literature to identify the underlying key variables. The literature reviewed led to ten propositions that present the main elements in ensuring end-users' adoption of smart government in the UAE. A framework was developed to highlight the key factors that influence the successful implementation of smart government services. The various variables that emerged were placed in a flow diagram (see Exhibit 2). This paper provides a conceptual framework relating to the successful implementation of smart government and smart cities in the UAE.

The successful adoption of these services needs the participation of all stakeholders (e.g., government employees, citizens and businesses) during the planning and implementation of smart government services. For this, coordination of the activities of various government agencies and close cooperation of employees, managers and IT specialists is required.

Although this study presents strong evidence regarding the factors that affect end-users' adoption of smart government services, it should also be evaluated in light of its limitations. First, our research did not comprehensively cover all the factors that influence end-users' adoption of smart government services. Other important variables should be taken into account in future works. Second, this paper is based on the existing literature. Further empirical research is needed to validate the conceptual model using the UAE environment and thereby help explore the determinants of successful smart government service adoption in the UAE and beyond.

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