

Smart Government Systems Adoption: The Case of Saudi Arabia

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Smart government systems are emerging technologies that are being used in many fields of endeavor, such as companies in the public and private sectors. Smart government systems consist of many parts, which play diverse roles in the success of smart government adoption of technologies. The most important factors are technological, organizational, environmental, and social in character, and good preparation has implications for government decision- and policymakers. The aim of this research is to investigate the adoption of smart government systems and their impact on the public sector in Saudi Arabia (SA). Not many studies have examined the factors that are critical to the acceptance of smart government systems. This research involves IT employees who work in the public sector, and their opinions on the adoption of smart government systems. This research integrates three models into one conceptual model, namely, the organization, and environment (TOE) framework, technology acceptance model (TAM), and unified theory of acceptance and use of technology (UTAUT) theories. This research will employ a quantitative approach (survey) for data collection. It provides a method of obtaining quantitative results suitable for later statistical analysis. The research model developed in this study integrates technology models adoption to comprehensively explain the major dimensions, which are technological, organizational, environmental, and social. Importantly, demographic factors play a role in this study and these will serve as moderators influencing IT employees' perceptions and the expected outcomes of adopting smart government systems.

Keywords: Smart government, Security concerns, ICT strategy, IT readiness, Effectiveness, Service quality, Culture.

1. Introduction

Over the past decade governments worldwide have realized the value of providing government information and services electronically. Information and communication technology (ICT) and resulting online capabilities provide the foundation for transforming government services. The use of e-government services is expected to enhance transparency, accountability in public administration and people's quality of a good and efficient service, by improving public service delivery, access to information and better public governance (Al-Hujran, Al-Debei, Chatfield, & Migdadi, 2015). With the recent rapid developments in many technologies, innovation strategies and greatly expanded ICTs, many governments are focused on being smarter. In their efforts to create a smart government system, public sector organizations have engaged in new strategies such as open data initiatives.

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Governments around the world have started to utilize the power of technological ubiquity which produces a huge quantity of data (Mellouli, Luna-Reyes, & Zhang, 2014). Big Data could help governments to better understand complex social and economic problems, to better satisfy citizens' needs and improve bureaucracies' relationships with citizens and private sector businesses. It also enhances decision-making by enabling governments to reach better decisions based on valid data (Harsh & Ichalkaranje, 2015). With the aim to be more agile and resilient, a smart government would use an aggregation of smart computing technologies and processes including: Big Data infrastructure and tools, the Internet of Things (IoT), wireless communication, sensor networks, smart devices, embedded systems, and cloud computing technologies (Recupero et al., 2016).

However, with this growing interest in smart government, the question of how to increase public sector organizations' usage of these services has been raised. Although smart government has the potential to offer many benefits to these organizations, for various reasons, smart government is still not widely adopted in Saudi Arabia. To make an informed decision, previous research has indicated that making decisions concerning ICT adoption commonly includes not only technological factors but also organizational and environmental ones (Aboelmaged, 2014; Hart O Awa, Ojiabo, & Emecheta, 2015; Recupero et al., 2016). Based on the technological perspective, issues such as insufficient technical infrastructure, risk and privacy are major concerns associated with the low level of smart government adoption (Almuraqab & Jasimuddin, 2017; Schedler, Guenduez, & Frischknecht, 2017). From the organizational dimension perspective, prior studies reported several factors that hinder the adoption of smart government. Examples of organizational factors are: scarcity of financial resources, lack of skills and knowledge, lack of a clear strategy for smart government, lack of clarity about the costs and benefits of smart government and the low readiness for innovation (Schedler et al., 2017). According to the environmental aspect perspective, legal issues and culture are the major issues associated with the limited acceptance of smart government (Kshetri, Alcantara, & Park, 2014; Schedler et al., 2017).

This study, therefore, will explore the existing ICT adoption theories and will then utilize the most appropriate theories. It considers the recent literature which has made calls for a holistic approach that proposes more than one theoretical framework to better understand the relevant phenomena from different perspectives (Oliveira & Martins, 2011; Y. Wu, Cegielski, Hazen, & Hall, 2013). This research will contribute to the literature on smart government adoption in the public sector by developing and validating a comprehensive conceptual framework that incorporates all the main factors influencing the adoption of smart government by public sector organizations in Saudi Arabia. The results will benefit government policy- and decision-makers regarding the main technological, organizational, environmental, and social factors that affect public agencies' decisions to adopt smart government in Saudi Arabia.

1.1 Research Aim and Objectives

The main aim of this study is to examine the adoption of smart government services by public sector organizations in Saudi Arabia. Furthermore, the specific objectives of this research are:

1. To increase knowledge and understanding of public organizations' efforts to adopt smart government services in Saudi Arabia.

2. To develop and examine a unique and a multi-perspective conceptual model depicting the main factors influencing the adoption of smart government services in Saudi Arabia.
3. To generate insights into the smart government phenomenon and provide some recommendations and future directions.

1.2 Significance of the Study

The implementation of smart government services can bring several organizational and social benefits to public sector organizations and a country's citizens. However, the benefits will not be realized without understanding what affects public sector IT department employees to adopt smart government. Therefore, the main aim of this research is to develop and examine a unique and a multi-perspective conceptual model depicting the main factors influencing the adoption of smart government services these employees. The new model combines a range of variables combined with the recent adoption and innovations theories to comprehensively cover technological, organizational, environmental and social dimensions associated with technological innovations in the workplace such as smart government. This study fills a critical knowledge deficiency in this subject and offers researchers, the ICT industry, managers and policy-makers valuable information on what could be hindering the adoption of smart government in Saudi Arabia. This study will explore the factors influencing the acceptance and use of smart government in public organizations, and the findings will assist managers and policymakers to better direct their strategies to boost more efficient, cost-effective and faster adoption of smart government services.

1.3 Motivation of the Study

The aim of this study is to investigate the main factors that impact on the adoption of smart government in Saudi Arabia. Most of the current literature on smart government concentrates on conceptualizing smart government and smart city concepts and defining their architectures and dimensions. However, although a careful review of the literature indicated there are some empirical studies on smart government services adoption conducted in already developed countries (Kshetri et al., 2014; Schedler et al., 2017), there is very little empirical research on this topic with reference to the Arab countries including Saudi Arabia. The findings for the adoption and usage of ICT-based solutions in developed nations are not necessarily applicable to other countries in the Arab region (Baker, Al-Gahtani, & Hubona, 2010). Cultural and social characteristics of Arab nations vary from not only from each other, but also those of the Western and Asian-Pacific regions. Due to these differences it is reasonable to expect that the factors which impact on ICT innovations' acceptance in Arab nations, such as Saudi Arabia, might differ fundamentally from industrialized Western societies (Alwahaishi & Snasel, 2012; White Baker, Al-Gahtani, & Hubona, 2007). This observation is supported in the literature with technology acceptance determinants in Saudi Arabia reported to be different from those in developed countries (Said S Al-Gahtani, 2004).

2. Literature Review

Saudi Arabia represents one of the largest twenty economics in the world with GDP per Capita of \$52,800 (Al-Somali, Gholami, & Clegg, 2015). In addition, Saudi Arabia

enjoys one of the largest and fastest growing ICT sectors in the Middle East with a strong expectation for significant progress in the near future. With the aim of transforming the country into a digital economy and a knowledge-based society, the country has developed several ICT national strategies, plans and initiatives (Said S Al-Gahtani, 2011) including those required for the public sector. In 2005, the government initiated an e-government project called YESSER. The goal of this program was to provide every citizen with access to government services electronically by the end of 2010 (Al-Nuaim, 2011). Nevertheless, because of various challenges and obstacles, the implementation of e-government projects in this country does experience failure or delay (Basamh, Qudaih, Suhaimi, & Science, 2014). As an initial effort to make smart government happen, wireless communication and mobile services have been adopted by the government for effective delivery of services. These services are currently applied to the fields of weather updates, traffic updates, emergency assistance, tracking of lost vehicles, notification of taxes and bills, airports security, etc. (Alotaibi, Houghton, & Sandhu, 2016).

Despite the rapid growth in the Saudi ICT market, indicators have the adoption of e-government services has been slow (Alshehri, Drew, & Alfarraj, 2012; Altameem, 2007; Basahel & Yamin, 2017; Basamh et al., 2014; Shehry, 2009). This problem needs to solve, in order bring to fruition the aim to be more agile and resilient with a smart government utilizing an aggregation of smart computing technologies and processes. These include: Big Data infrastructure and tools, the Internet of Things (IoT), wireless communication, sensor networks, CCTV cameras, smart devices, embedded systems, social media, and cloud computing technologies. These applications and technologies enable governments to collect and correlate large amounts of data about citizens from multiple sources (Recupero et al., 2016). Although this may improve service quality and availability, it also increases the risk for leaks of sensitive data and privacy violations through correlation. Smart government provides a higher level of interconnectivity which further adds to the body of privacy problems. However, even in world-leading smart governments and smart cities, privacy protection does not yet seem to be an integral part of current smart government development (Eckhoff, Wagner, & Tutorials, 2018). Although privacy protection risks have been explored at a micro level for each enabling technology for smart government (i.e. IoT, cloud computing, big data, etc.) separately, the current literature on privacy in smart governments is still scarce and lacks a comprehensive privacy protection framework that provides a holistic view of privacy protection in smart governments (Eckhoff et al., 2018). The literature on privacy in smart governments also indicated that privacy concerns can differ based on the type of data that are involved (i.e. personal or impersonal), the purpose for which data is used and the organization or persons collecting and using the information. For example, citizens of developed nations consider medical, financial and civic data as a highly sensitive issue while one's nationality, gender or age are considered to be less problematic (Van Zoonen, 2016). Therefore, it is critically important to identify which factors will impact on adoption in smart government in public sector institutions in Saudi Arabia and classify and prioritize these factors based on the type of data collected, the purpose for which data is used and the organization collecting and using the data.

Previous literature also showed that public organizations are different from private sector organizations and individuals in their responses to innovations (Kamal, 2006; Mreea, Munasinghe, & Sharma, 2016). The public administration literature indicated

that, compared to the private sector, decision-making in the former is more complex and surrounded by a variety of issues (Bretschneider, 1990). Decision-makers in the public sector need to cope with higher levels of red tape, procedural delays and bureaucracy than those in the private sector (Bretschneider, 1990; Kamal, 2006). While the decision-making process in the public sector contends with greater levels of coordination across organizational/departamental boundaries, making decisions in the private sector is more focused on internal coordination (Bretschneider, 1990). Technological innovations adoption at the level is also more complex than at the individual level (Oliveira & Martins, 2011). While there are comparatively many theoretical models used to study the adoption of IS/IT systems, few of such models are employed at the firm level. The most widely employed IS/IT adoption and use models at the individual level are: the theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1977), the theory of planned behaviour (TPB) (Icek Ajzen, 1985; Icek Ajzen, 1991), the technology acceptance model (TAM) (Davis, 1985, 1989), TAM 2 (Venkatesh & Davis, 2000), TAM 3 (Venkatesh & Bala, 2008) and unified theory of acceptance and use of technology (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003). At the organizational level, the major adoption models are: diffusion of innovation (DOI) (E. Rogers, 1995), and the technology, organization, and environment (TOE) framework (Tornatzky & Fleischer, 1990). According to these models, this research will integrate UTAUT, TOE and TAM theories, as they are most relevant and applicable for the objective of this study. These theories complement each other and provide a solid understanding of relevant contexts (Alkhalil, Sahandi, & John, 2017). Furthermore, these theories are expected to comprehensively cover the main technological, organizational, environmental and social dimensions associated with the adoption of technological innovations such as smart government.

A review of the previous literature indicated that many smart government initiatives have not reached their full potential for a number of reasons (Kshetri, Alcantara, & Park, 2014; Schedler et al., 2017). Hence, the main purpose of this research is to examine the process of smart government adoption in Saudi Arabia's public sector organizations, address the reasons why these organizations are slow to adopt smart government and, therefore offer theoretical and practical recommendations for policy- and decision-makers to resolve this problem. Smart government is an emerging and multidisciplinary research area. The concept of smart government is still being constructed and has received attention very much in the last few years from both practitioners and academics in different fields including public administration, political science and computing. There is no widely accepted definition of smart government and the term is frequently used interchangeably with the 'smart city' term in e-government literature. However, Anthopoulos and Reddick (2016) argued the two terms are not synonymous. Their findings showed that that smart city is a complementary dimension of a larger smart government development. Similarly, Gil-Garcia et al. (2014) clarify the relationship between smart government and smart city by stating that the "smart city is only a subset of smart government, where local governments understand the term "being smart" as their attempts to enhance their efficiency, effectiveness, transparency and collaboration with emerging technologies and innovation".

Smart government is defined as "the next step of e-government with the use of technology and innovation by governments for better performance" (Anthopoulos & Reddick, 2016). In another study (Gil-Garcia, Helbig, & Ojo, 2014) define smart government as "the deployment of a creative mix of emerging technologies and

innovation in the public sector, which is based on specific contexts and problems". According to them, emerging technologies are big data, cloud computing platforms, open government data, mobile government, smartphone applications, social networking, Really Simple Syndication (RSS) feeds, blogs, and sensors, among others. Another definition of smart government is given by Harsh and Ichalkaranje (2015) who stated: "smart governments utilize the power of "data" in their attempt to improve public services; to enable an integrated, seamless service experience; to engage with citizens; to co-develop policies; and to implement solutions for well-being of the community". As stated earlier, the literature has started to conceptualize the smart government and smart city (Gil-Garcia et al., 2014; Harsh & Ichalkaranje, 2015; Jiménez et al., 2016; Khatoun & Zeadally, 2016; Lv et al., 2018; Nam & Pardo, 2011). A few other studies focused on clarifying what smart government means and identifying its relationship with the smart city (Anthopoulos & Reddick, 2016). The literature also identified the main challenges that may hinder the development of smart cities and smart government. Based on 35 interviews with Swiss practitioners, Schedler (2017) analyzed the barriers to smart government adoption by public sector organizations in Switzerland. Findings showed that the main barriers are insufficient technical infrastructure, legal issues, scarce financial resources, lack of skills and knowledge, lack of a clear strategy for smart government, lack of clarity about the costs and benefits of smart government and the poor innovation readiness.

Kshetri et al. (2014) conducted a case study analysis of the new Songdo city in South Korea. They investigated the role of the core components of formal and informal institutions in shaping the development of the smart city of Songdo. Findings of their study showed that regulative institutions such as those in South Korea affect and could in fact hinder the adoption and acceptance of a smart city. One of these examples is the national Medical Law in South Korea which prohibits telemedicine. This, in turn, limits the adoption and diffusion of ubiquitous healthcare/medical initiatives in this country. Other factors that are found to negatively or positively impact on end-user's adoption of the smart city in South Korea were culture and privacy concerns. Indeed, these two factors have been frequently identified as the main challenges facing smart cities (Alghanim, Rahman, & Hossain, 2017; Braun, Fung, Iqbal, & Shah, 2018; Eckhoff et al., 2018; Van Zoonen, 2016). Smart government and smart city offer a high level of interconnectivity and data transfer which poses a major threat to the privacy of citizens. Although combining data from multiple parties, applications, and devices could improve service quality, but on the other hand it could increase the risk of privacy violations (Eckhoff et al., 2018).

The academic literature also indicated that smart government offers a variety of values and benefits to the public and examples of these are: enhancing governance (Gil-Garcia et al., 2014; Yaghi & Al-Jenaibi, 2018), improving government operations and services (Anthopoulos & Reddick, 2016; Gil-Garcia et al., 2014; Harsh & Ichalkaranje, 2015), emphasizing greater inter-organizational collaboration (Gil-Garcia et al., 2014; Harsh & Ichalkaranje, 2015), increasing transparency and openness (Gil-Garcia et al., 2014; Lv et al., 2018), enhancing decision-making (Gil-Garcia et al., 2014; Lv et al., 2018), enhancing emergency management practices, protecting the environment (Lv et al., 2018) and improving people's happiness (Yaghi & Al-Jenaibi, 2018).

2.1 Related Studies on the Important Factors of Smart Government Adoption

Table 1: Findings of Key Studies on Smart Government (M-Government) Adoption

Title of Paper	Authors	Date	Research model	Findings
Smart government services adoption in the UAE: a conceptual model	Nasser A. SaifAlmuraqab	2017	TAM, UTAUT	This study found that the following factors, namely perceived usefulness, perceived ease of use, social influence, awareness, trust in technology, trust in government, perceived cost, perceived risk, facilitating conditions are significant for the adoption of smart government by citizens and their determination to accept these services placed on mobile applications.
Major factors influencing the adoption of m-government in Jordan.	Emad Abu-Shanab&Shatha Haider	2015	TAM	This study used the TAM model to investigate factors, i.e. perceived usefulness, social influence, perceived ease of use, perceived responsiveness, perceived compatibility and perceived the cost of services. These five factors are important whereas the perceived cost of services was deemed to be insignificant.
Saudi citizens' perceptions on Mobile Government (mGov) adoption factors	Babullah et al. (2015)		UTAUT	This study employed a descriptive analysis of 600 participants and showed that performance expectancy, effort expectancy, social influence, facilitating condition, hedonic motivation, and price value influenced the adoption of m-government by Saudi citizens.
Developing and Validating an Instrument for Measuring Mobile Government Adoption in Saudi Arabia	Alotaibi & Roussinov	2016	TAM	This research was based on the TAM model with four constructs (Perceived usefulness, Perceived Ease of Use, Attitude towards to use, Perceived mobility, Perceived trustworthiness, Perceived service quality, and User's satisfaction. It found there is a significant relationship between the use of m-government services and all factors.
Examining Adoption Behavior of Mobile Government	Mahmud Akhter Shareef, Norm Archer & Yogesh K. Dwivedi	2012	TAM, DOI, TRA	This study developed a model for integrating TAM, DOI, and TRA theories and concluded that perceived ease of use, perceived security, perceived reliability, perceived empathy, and relative advantage are important factors that influence users' adoption of m-government in India.
The Adoption of Mobile Government Services in Developing Countries: The Case of Egypt	Abdelghaffar and Magdy	2012	UTAUT, TAM	This research found five factors are significant determinants of m-government adoption, namely compatibility, perceived usefulness, social influence awareness, and face-to-face interactions. They all significantly contribute to predicting the intention of m-government use. Internet experience, perceived ease of use, trust and personal connections insignificantly contribute to predicting the intention to use m-government.
Factors that Influence End-Users' Adoption of Smart Government Services in the UAE: A Conceptual Framework	Nasser A. SaifAlmuraqaba nd Sajjad M. Jasimuddin	2017	TAM	This study used the TAM model (Perceived Usefulness, Perceived Ease of Use) and extended integration with Social influence, facilitating conditions, Perceived cost, Awareness, Trust in government, and Trust in Technology. It found that factors may influence end-user's adoption of smart government in the UAE.
How to make them use it? Citizens acceptance of M-government	Ibrahim Almarashdeh&Mutasem K. Alsmadi	2017	TAM	This study reported the results of all factors, i.e. perceived usefulness, social influence, cost of service, perceived ease of use and perceived trust. They all wield an important and direct impact on intention to use m-government and indirect impact on actual use behavior.
Public Acceptance of M-Government Services in Developing Countries: The Case of Jordan	Omar Al-Hujran& Mahmoud Migdadi	2013	UTAUT	This study found five factors - Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions and Trust - are important and strongly determine the intention to use m-government, whereas information privacy impact is not a significant factor in Jordanians'intention to use. The results show that of all factors, user intention is essentially influenced by citizens' trust in the services being provided.

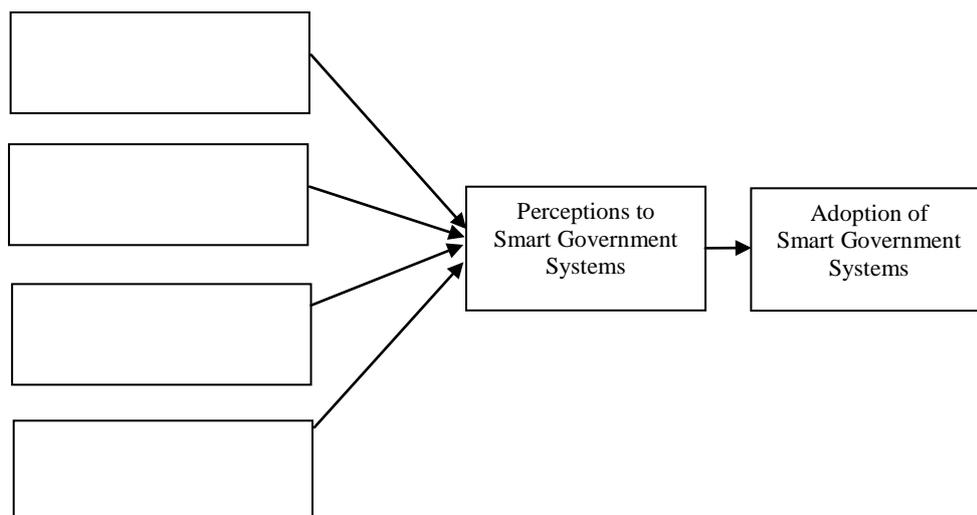
Table 1 provides an overview of studies on those factors that may affect the adoption of smart government (m-government) systems.

2.2 Theoretical Framework and Research Model

This thesis will use three theories that focus on technology adoption: Technology–Organization–Environment (TOE) framework devised by Tornatzky and Fleischer (1990); Unified Theory of Acceptance and Use of Technology (UTAUT) developed by Venkatesh, Morris, Davis and Davis (2003); and Technology Acceptance Model (TAM) which was proposed by Davis (1989). The extent to which any technology is employed dictates different levels (individual and organizational) of acceptance, which are then supported by theories that help us to develop the model for this research. Similarly, there are two theories that were developed to explain the adoption of technology: Technology-Organisation-Environment Framework (TOE) (Tornatzky & Fleischer, 1990) and Diffusion of Innovation (DOI) Theory (E. M. Rogers, 2003). Noted scholars recommend incorporating individual and task contexts (Alatawi, Dwivedi, Williams, & Rana, 2012; H. Awa, Baridam, & Nwibere, 2015; Hart Okorie Awa, 2015; Henderson, Sheetz, & Trinkle, 2012). Following this recommendation, we have incorporated the TOE, UTAUT and TAM frameworks to generate better scholarly outcomes.

We devised four categories or factors with the help of the relevant literature which suggests the determinants driving the adoption of smart governments by public sector IT employees: organizational factors, technological factors, environmental factors and social factors. They all affect the public sector organizations' implementation of smart government systems. Perception factors and adoption factors were further added in accordance with the TAM model. A further extension to this model gave rise to expected outcome variables. Figure 1 below presents a conceptual model which is able to meet the objectives of this study.

Figure 1: Conceptual Research Model



The conceptual model is composed of the following five categories and these will be illustrated here. The first category is the technological factors mainly originated from Technology Organization Environment Framework (TOE). This technological feature included four factors, namely security concerns, privacy concerns, ICT infrastructure,

and ICT strategy. As discussed elsewhere (Daniel, Chen, Liu, Wang, & Wei, 2014; Oliveira & Martins, 2011), security and privacy concerns have constituted a major determinant of technological adoption, and for this reason it is included in this dimension. The second category is organizational dimensions which is part of the TOE framework. This dimension includes five factors: managerial support, innovativeness, staff training, incentives, and IT readiness.

The third category is the environmental dimension used in the TOE framework. Several factors are suggested by scholars in this regard (H. Awa et al., 2015; Hart Okorie Awa, 2015; Depietro, Wiarda, & Fleischer, 1990; Intan Salwani, Marthandan, Daud Norzaidi, & Choy Chong, 2009; Tornatzky & Fleischer, 1990). It represents the economic, regulatory, cultural and political aspects (Ahn, 2011; Bakry, 2004; Bolgherini, 2007). This thesis adopts environmental factors that exert an influence on organizational adoption decisions, which are shaped by regulations, external support, competitive pressure, awareness, and trust.

The fourth category of social dimensions is similar to the social influence factor in the UTAUT model (Venkatesh et al., 2003). According to Christian (2008) a country's social norms, attitudes, behaviors, and beliefs determine its people's social interactions and the nature of government departments or agencies. As observed by Kulviwat, Bruner li, Kumar, Nasco, and Clark (2007), if innovation is publicly, as opposed to privately consumed, the social influence and intention to adopt tend to be more effective. Organizational creativity and innovation are observed with the help of a variety of contextual and social influences and otherwise are not easily measured (Agars, Kaufman, & Locke, 2008). Consequently, these social factors are expected to influence IT employees' perception of the adoption of smart government systems, and such factors refer to culture, religious values, social networks, and peers.

3. Method

This research uses a quantitative approach, and this means implementing survey questionnaires to collect the data for testing the list of factors that are important in Saudi public sector departments. This study utilizes previous literature to develop a series of measures suitable for finding the level and depth of acceptance of a smart government system. This method is based on validated items drawn from prior research and the paper develops conceptual models that integrate the unified theory of acceptance and use of technology (UTAUT), the technology, organization, and environment (TOE), and the technology acceptance model (TAM) theories. This is because they are the most relevant for the objective of this study. Furthermore, the quantitative method helps to analyze the collected data, discuss the findings and propose practical and theoretical conclusions.

4. Discussion of the Results

Investigating the factors that are critical to the adoption of a smart government system is vital for public sector institutions because it has important implications for leveraging departments' and agencies' performance. Such an analysis will help Saudi Arabia become a beacon of opportunity and progress throughout the Middle East (Table 2). This study comprises an integrative theoretical framework, where the TOE, UTAUT and TAM theories are combined and explore the key features of smart

government adoption in Saudi Arabia, i.e. technological factors, organizational factors, environmental factors, and social factors.

Table 2: ICT in Saudi Arabia and the other GCC Countries— United Nations Report 2018

Country	E-Government Development Index (EGDI)	Online Service Index (OSI)	Telecommunication Infrastructure Index (TII)	Human Capital Index (HCI)
Saudi Arabia	0.7119	0.7917	0.5339	0.8101
United Arab Emirates	0.8295	0.9444	0.8564	0.6877
Kuwait	0.7388	0.7971	0.7394	0.6852
Oman	0.6846	0.8125	0.5399	0.7013
Qatar	0.7132	0.7913	0.6797	0.6683
Bahrain	0.8116	0.7986	0.4866	0.7847

Technological factors play an important role in smart government systems where the end result has to be good efficiency. The four technological factors - security, concerns, privacy concerns ICT strategy, and ICT infrastructure - were significant contributors to smart government system adoption. This finding agrees with other studies on the technological context (Alfarraj, 2013; Alsaif, 2014; Gangwar, Date, & Ramaswamy, 2015; Johnson, 2015; Powelson, 2011). According to Kurnia, Karnali, and Rahim (2015) with reference to technological factors, the availability and features of IT innovation wield a significant impact on decisions about the smart government system.

This research also found organizational factors significant impact on the adoption of IT innovations in the public sector in Saudi Arabia. In this study, five factors were developed, these being managerial support, innovativeness, staff training, IT readiness, and incentives. Within developing countries and especially Saudi Arabia, similar factors have already appeared on this issue. Survey data were observed in the current study, as well as the relationship being confirmed between the factors mentioned above and smart government system (Al-Shehry, 2009; Al-Fakhri, Cropf, Kelly, & Higgs, 2008; Altameem, 2007). For instance, in Saudi Arabia, identifying managerial support as vital in the adoption of smart government. This involves individual support for all staff members in the workplace, where personnel need to be encouraged and maintain an adequate level of confidence. Analysis revealed here that in the public sector, managerial support is indeed necessary for smart government adoption in the country.

This confirms the work of other scholars such as Wang et al. (2016), Ngai et al. (2012) and I.-L. Wu, Li, and Fu (2011) that management support is fundamental for the successful implementation of technological innovation. It was found that the innovativeness factor strongly impacts on employees' technology acceptance and usage (Said S. Al-Gahtani & King, 1999; Davis, 1989; Igbaria, Parasuraman, & Baroudi, 1996; Lewis, Agarwal, & Sambamurthy, 2003; Venkatesh & Davis, 2000; Xu, Frey, Fleisch, & Ilic, 2016). Referring to the staff training factor, this study found it does influence smart government system, and arose as a significant issue arising during the survey where staff do need to be well trained in government systems.

Numerous scholars have studied the issue of lack of staff training in electronic government systems (Al-Fakhri et al., 2008; Alfarraj, 2013; Altameem, 2007). Also, these studies found that environmental factors played an important role in the adoption of the smart government system. Bakry (2004) defines the environment as including regulatory, political and economic themes that are relevant to the e-government system.

As well, social factors had significant effects on the adoption of innovative information technologies in Saudi Arabia. The social factors were defined as the scope to which an individual considers that the opinions of others are important in the decision to adopt smart government. Several studies have analyzed the social factors (Konana & Balasubramanian, 2005; Venkatesh & Brown, 2001). Other studies found social factors did impact on the adoption of technological innovations in the workplace (Oliveira, Thomas, Baptista, & Campos, 2016; Peansupap & Walker, 2005; Westphal, Gulati, & Shortell, 1997).

5. Conclusion and Implications

The main findings are that technological factors, organizational factors, environmental factors, and social factors influence the adoption of smart government system in Saudi Arabia. These results are confirmed by other studies on this topic. This research contributes to the development of knowledge by researching a specific phenomenon in the Saudi public sector. It develops anew and comprehensive conceptual model about smart government system adoption and understanding the key factors that impact on the acceptance of smart government. This research will make a theoretical contribution to the growing knowledge on the smart government system adoption literature by analyzing the determinants and how important each factor is. Also, this research provides public sector IT employees and their managers with valuable knowledge and benchmark strategies on the adoption of smart government systems in their workplace. It provides them with a roadmap and guidelines which can help them to identify the risks involved in the decisions to implement a smart government system.

5.1 Limitations and Further Research

There are some limitations to this study that must be noted hereabout smart government adoption by organizations. This research is limited to IT employees in four ministries in Saudi Arabia. This study does not include IT staff working in other ministries, departments or agencies, or the private sector. This research raises opportunities for future research to be conducted on planning and implementing a smart government system. Further research should be carried out in other government departments where the smart government system is being seriously considered. This would expand the investigation to other areas of government and administration involving online contact with the general public. The conceptual model could be employed in other countries. Future analyses can use this study's conceptual model to explore the determinants of successful smart government system adoption.

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