An Exploratory study of proposed factorsto Adopt e-government Services

Saudi Arabia as a case study

Sulaiman A. Alateyah
Electronics and Computer Science
University of Southampton
Southampton, UK

Richard M Crowder
Electronics and Computer Science
University of Southampton
Southampton, UK

Gary B Wills
Electronics and Computer Science
University of Southampton
Southampton, UK

***Abstract*—this paper discusses e-government, in particular the challenges that face adoption of e-government in Saudi Arabia. In this research we define e-government as a matrix of stakeholders: governments to governments, governments to business and governments to citizens, using information and communications technology to deliver and consume services. e-government services still face many challenges in their implementation and general adoption in many countries including Saudi Arabia. In addition, the background and the discussion identify the influential factors that affect the citizens' intention to adopt e-government services in Saudi Arabia. Consequently, these factors have been defined and categorized followed by an exploratory study to examine the importance of these factors. Therefore, this research has identified factors that determine if the citizen will adopt e-government services and thereby aiding governments in accessing what is required to increase adoption.**

Keywords—adoption; citizens' intention;e-government;e-government models; influential factors; Saudi Arabia

I. INTRODUCTION

As information and communication technologies (ICT) rapidly develop, coupled with considerable improvements in digital connectivity, government departments are reassessing the way they work and interact both with internal departments and external organisations [1]. This technology has encouraged the government's organisations and affiliations to reconsider their internal and external relations and transactions.

Therefore, in order to succeed and build for the future, the administrative processes of government are being transferred to electronic systems. Governments worldwide are considering establishing an electronic approach (e-government) to government organisations and agencies in order to provide and facilitate many services to people anywhere and at any time, and to replace traditional routine procedures. Within the paradigm of human and social development, the United Nations [2] has a conceptual framework for e-government programmes. In the United Nations context, e-government is achieved when a state uses ICT to improve the availability of information to its citizens. In order to achieve this, the capacity and readiness of the public sector have to increase in the areas of a country's technological and telecommunications infrastructure and the level of its human resources development [3].

A. The Saudi'Arabiane-government Program

The Saudi government launched the YESSER Program, the country's first national e- government strategy, in 2005 [4]. The aim of this initiative is to create user-centric electronic initiatives that focus on improving government services to the public sector. In addition, the vision of the Kingdom of Saudi Arabia is to adopt and activate communication and IT systems which led to realize an IT community and a digital economy [5]. The government of Saudi Arabia has taken steps to develop business process and disseminate the concept of e-services in various government agencies in order to realize their vision [5]. Furthermore, it has been announced by Lean, et al. [5] that to achieve the objectives, a set of promising ambitious plans and strategies have been adopted by the Saudi Arabian government. The plans for developing and implementing the e-government program has been set and have two actions, which is the first plan has took a place from 2006 to 2010, and the second is progressing from 2012 to 2016 [5].

B. Adopting new technology

The success of the implementation of the e-government is dependent not only on the government support, but also on willingness to accept and adopt e-government services by the citizens [6]. Although the government decision makers are keen on providing services using traditional approaches, they also need to understand the factors that would encourage their citizens to use the electronic service delivery channels [6]. In fact, the research on exploring factors that would encourage citizen to adopt e-government services in developing countries is not enough [6]. Therefore, one theaim, of this research, is to identify the factors that affect the citizens' intention to adopt e-government services.

C. The paper's structure

The structure of this paper is as follows: the followingsection discusses the background of e-government, the adoption of the e-government, and various models of citizens' adoption are reviewed. Section III discusses the challenges facing the implementing and developing e-government in Saudi Arabia specifically, followed by factors that would influence the Saudi Arabian citizens to adopt e-government. A new integrated model is proposed in Section IV. In section V, the approaches that have been used to validate the proposed model are presented, leading to Section VI that presents the results of the study. The paper concludes withSection VII.

II. BACKGROUND

As Saudi Arabia has been chosen as the case study in this research, the related e-government drivers and barriers within the country areidentified and discussed. The review primarily concentrates on the adoption of e-government services by citizen, and different approaches that have been used to influence citizen to adopt e-government services.

A. e-government

To define e-government from a single perspective is relatively easy, but defining e-government in a way that suits everyone's view or needs is a significant challenge. Based on the work by Meng Seng, et al. [7], it has been noted that although -e-government as a term has become known across the world, there is evidence of insufficient consensus on its meaning, particularly regarding the main features of e-government. e-government can be defined in different ways. For instance, it can mean everything from just looking up information to using an online service, such as renewing a passport [2]. In addition, the use of information technology to enable and increase efficiency is key to e-government, while providing services and information to citizens, employees, businesses and government agencies [8]. A different approach is to define e-government as using the Internet as a tool for information and communications technology (ICT) to accomplish better government [9, 10]. Lu, et al. [11] define e-government as an ICT application that interacts efficiently, effectively, transparently and accountably with stakeholders. Lu, et al. [11] also identify three different transactional exchanges: government to government (G2G), government to business (G2B) and government to citizens (G2C), while Ndou [12] stated that e-government is simply providing information and engaging in digital transitions, which can be achieved through a simple web portal.

A wide range of different definitions from researchers have been identified; while everyone has a different point of view and requirements, most of them share the view that e-government incorporates ICT as one of its major elements.

From the definitions abovewe can conclude thate-government can be defined in terms of isa matrix of stakeholders: government to government, government to business and government to citizens, using information and communications technology to deliver and consume services. e-government has the objective of saving money, time and effort with increased efficiency, with due consideration for information security and privacy.

B. Challenges facing e-government

Developing any framework, such as e-government, that is capable of benefiting private and public organisations, results in a number of challenges for the different stakeholders, both internal and external, of the organisations [1]. Furthermore, in order to build e-government, there are some barriers facing implementation that should be kept in mind. Therefore, it is important to find out what these challenges and barriers are and how we can solve or avoid them. Later inthis section, we will discuss the most common challenges in general that other researchers have found, and present their solutions.

C. Adoption

Adoption is an important aspect for the success of e-government initiatives in developing countries [13]. However, growing interest in e-government raises the question of how governments can increase citizen adoption and use of their online government services [14]. To date, there has been little research exploring factors that determine the adoption of e-government services by citizens in developing countries, especially in the Arab world [6, 15]. Moreover, Dong, et al. [16] point out that e-government researchers often do not consider the adoption of e-government. They also make the point that, although there is enormous potential for online government services, citizens are not adopting them [14]. Furthermore, Carter and Belanger [8] agreed with other researchers that, although numerous studies have analysed user adoption of electronic commerce [17-19], to date, no study has identified the core factors that influence citizen adoption of e-government initiatives.

According to Colesca [20], many studies focused on the citizen adoption of e-government services suggest that trust [21], security [22] and transparency [23] are major issues for e-government adoption. Based on Margetts [24], cited by Yonazi, et al. [13], high adoption of these initiatives increases the chance that e-government will facilitate social and economic benefits to citizens. In Kuwait the increasing use of ICT by government departments resulted in the creation of an IT infrastructure capable of supporting e-government services [15]. User acceptance of IT is deemed a necessary condition for the effective implementation of any IT project [6, 25]. Adoption comes after direct experience with the technology and after an individual has decided to accept the technology [6, 26]. A number of studies have investigated the adoption of e-government services in developed countries [6, 27], whereas relatively little has been undertaken in developing countries [6, 15]. Successful implementation of adoptable e-government initiatives in that context requires complex customization between the technology and implementation context in developing countries [13, 28]; the result in designing citizen-adoptable e-government initiatives is still a challenge to many developing countries' governments [13]. AlAwadhi and Morris [6] conducted a study in Kuwait to explore factors that affect the adoption of e-government services, and concluded the main factors that could influence citizens to adopt e-government which includes, usefulness of e-government services, ease of learning and use, cultural and social influences, remove face-to-face interaction, gender issues, technical issues, lack of awareness, trust in the Internet, and cultural differences

However these factors influence Kuwaiti citizens to adopt e-government services, these factors might influence Saudi citizens since the culture in Kuwait and Saudi Arabia is almost identical. In addition,Alshehri, et al. [29] has identified somefactors the might influence the intention of the Saudi Arabian citizen to adopt e-government services. Therefore, in order to determine which of these factors can influence Saudi citizens and whether there are other factors that have not been mentioned, an investigation is going to be carried out among citizens of Saudi Arabia and selected Saudi organisations.

D. Previous Models used to measure adoption of new technologies

Many researchers have introduced models of citizen adoption. These models are constructed based on three widely used models, which are used to measure the acceptance of a new technology. The three models are the Technology Adoption Model, the Diffusion of Innovations Model, and the Unified Theory of Acceptance and Use of Technology. Trustworthiness is a fourth model that has been addressed by [30] to measure citizens' intention to use a new system. Trustworthiness has been used by Carter and Belanger [8] in their proposed model (TAM, DOI and Trust). Trustworthiness is referred to as the citizens' perception of the reliability and integrity of the electronic marketer [8, 30].

1) Technology Adoption Model and Diffusion of Innovations Model

Davis [31] proposed a model that can measure how far people can accept or reject a new technology. Technology's adoption depends on two basic attributes: Perceived Usefulness (PU) and Perceived Ease of Use (PEU) [31, 32]. Davis [31] defines perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance". In contrast, perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" [31]. The intention to use the system is determined by perceived usefulness and perceived ease of use [31, 32]. On the other hand, Rogers [33] has addressed a theory called Diffusion of innovations (DOI). The diffusion of innovations model is used to explain user adoption of new technologies in Information System research [8]. DOI consist of relative advantage, complexity, compatibility, trialability and observability.

2) Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology (UTAUT) has been presented by [26]. It consists of five main constructs including performance expectancy, effort expectancy, social influence, facilitating conditions and behavioural intention, which play an important role as direct determinants of usage behaviour and user acceptance [26]. According to Venkatesh, et al. [26], these constructs are influenced by gender, age, voluntariness and experience.

E. Models proposed for influencing citizen to adopt e-government

To introduce the research model, in this section different researchers' models and contributions are going to be presented. First, Carter and Belanger [8] proposed a research model based on Technology Adoption Model (TAM), Diffusion of Innovations Model (DOI) and Trustworthiness. In addition, Carter and Belanger [8] proposed a research model that contains attributes from TAM, DOI and Trustworthiness model. Compatibility, Relative advantage and Complexity have been adopted from DOI, while Trialability and Observability have been excluded and replaced by image [8]. Image refers to "the degree to which the use of the innovation is seen as enhancing to an individual's image or social status" [8]. Carter and Belanger [8] have adopted Perceived Usefulness and Perceived Ease of Use from TAM. Trustworthiness has been adopted and included in the author's research model. Second, AlNuaimi, et al. [32] presented another research model for citizen adoption that is based on TAM, DOI and Unified Theory of Acceptance and Use of Technology (UTAUT). The model has been created to have attributes that have been adopted from TAM, DOI and UTAUT models with some modifications to suit use within the United Arab Emirates. The model has 11 independent variables and has been used to examine the impacts of these variables on the use of e-government services [32]. Rehman and Esichaikul [34] delivered a third model of citizen adoption based on integrated models adapted from TAM, DOI and UTAUT. Rehman and Esichaikul [34] defined factors that influence the citizens' intention to adopt e-government services in Pakistan and categorize them in their proposed model. As Pakistan is a developing country as Saudi Arabia, and also is using to implement and develop e-government, these proposed factors might affect the Saudi Arabia citizen.

There are some factors that have been mentioned by other researchers as influencing people to use e-government services. Cultural and social influences, including connection (Wasta[1]), face-to-face interaction, cultural differences and gender issues have an impact on the intention to use e-government services [35]. Privacy is another issue that influences citizen to adopt e-government services [1]. In addition, web usability and accessibility are also critical factors that affect the intention to use e-government services [36, 37].

III. Research Discussion

Based on the background research, the following discussion will consider two aspects of e-government in order to answer the following key questions:

a) What are the challenges or barriers to implement and develop e-government in Saudi Arabia?,

b) How can citizens adopt e-government? and

c) What are the influential factors to be integrated in a model for implementing and developing e-government in order to be adopted by citizen?

These aspects are the challenges facing e-government implementation and development in Saudi Arabia; and also considerthe factors that influence citizens' intention to adopt e-government services.

A. e-government challenges and barriers in Saudi Arabia

In section II we noted that many researchers have discussed challenges and barriers that face e-government implementation and development in many countries. Some of these challenges are common, such as security, privacy and trust, while there are other challenges that vary from country to country and from city to city, or even from department to department in one organisation. The Saudi Arabian e-government, for instance, has both general and specific challenges and barriers. The core question is: What are the challenges or barriers to implement and develop e-government in Saudi Arabia? To answer this question, some of the challenges which are mentioned by other researchers, are going to be investigated including accessibility,

[1] [1] It is Arabic word which means being served because you know someone in the organization otherwise you will not get these services if you don't know anyone, for instance, jumping the queue.

availability, citizen expectations, computer and information literacy, cost of Internet usage, culture, privacy and security, technical infrastructure, and trust. However, not all of these challenges face the Saudi Arabian government with its plan to introduce e-government.

B. *Factors influencing citizens' intention to adopt e-government services in Saudi Arabia*

The initial question for this research and investigation is: How can the Saudi government overcome challenges to help its citizens adopt e-government? To answer this question and to help people adopt e-government services, there are some factors that should be credited to government requirements. Therefore, in Table I the influential factors have been identified and grouped based on the Background.

IV. RESEARCH MODEL

In the previous sections we have developed an understanding of the requirements for the introduction of e-government in to Saudi Arabia. In this section we develop a suitable model. The model will be developed by adapting and integrating the critical factors that have been identified in the previous sections. Figure 1 shows the high level view of the proposed new model, which combines the intention to use e-government services and e-Readiness.

These two main blocks, "Intention to use e-government services" and "e-Readiness", have factors that affect the adoption of e-government services. The intention to use e-government services, which has been classified as citizens' concerns, includes Trust, Privacy, Security, Culture and Website design while e-Readiness has Quality Services, DOI, Skills and knowledge, Culture, Lack of Awareness, Technical Infrastructure and Security, and it is classified as government's responsibility. In this paper we will only present the breakdowns of the e-readiness block which is shown in Figure1.

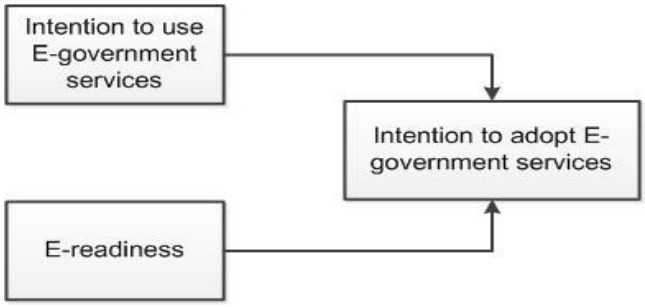

Fig. 1. A high level overview of an Integrated Model for Citizen Adoption of e-government Services in Saudi Arabia

TABLE I. CATEGORIES, TOGETHER WITH THE FACTORS THAT INFLUENCES CITIZENS TO ADOPT E-GOVERNMENT SERVICES.

Categories	Factors
Infrastructure Issues	Technical Infrastructure
Skills and Knowledge	• Computer and Information Literacy • Education • Age. • Gender.
Security Issues	• Information Security.
Quality of Service	• Service Quality. • Speed of Delivery. • Reliability. • Information Quality. • Availability.
DOI	• Compatibility. • Image. • Complexity. • Relative Advantage
Website Design	• Usability. • Multi-lingual Website. • Accessibility.
Awareness Issues	• Lack of Awareness
Culture Issues	• Culture

A. *Quality of service*

Quality of service has been suggested to play an important role in online services [34]. To encourage citizens to adopt e-government services, it is important for the government to provide high quality service and high quality information with the objective of speed of delivery, with due consideration of information reliability and availability [34].

- Service Quality: Service quality refers to the assessment done by the consumer for the overall excellence of the online provided service [38]. The government website should be designed carefully to address customers' needs because the face-to-face interaction is lacking in online service [39].
- Reliability: One critical issue regarding building an integral e-government to provide online services is making it reliable. Liu and Arnett [39] state that in customer online services, reliability is required. A system could be reliable when it has a quick error recovery [39], whereas service quality would be reliable when delivering services to the customers as promised [40]. Moreover, reliability is defined as the capability of a system to accomplish its intended function [41].

- Availability: It is important to the customers to use online services whenever they want. Therefore, system availability is an influential factor for the citizens' adoption of e-government services [34]. System availability refers to the probability of the system to be ready to provide responses at a specific time [42]. In addition, Lin and Chang [41] defined system availability as the expectation of a system to be available for operating tasks.
- Speed of Delivery Consumers of services or products are concerned about the speed of receiving their orders. Rehman and Esichaikul [34] identified speed of delivery as a critical factor of the quality service that influences citizens' intention to adopt e-government services. When a government increases the delivery speed of their online services, it would help the citizens to use and adopt the new services [40]. Furthermore, speed of delivery refers to the elapsed time between customers requesting services and receiving them [40].
- Information Quality The assessment of the government's website quality lists information quality as a key element [43]. Additionally, prior research employed various measures of IS success that result in the importance of the information quality for a website to success [39]. Bock, et al. [44] state that the degree to which the information on the website possesses the elements of content, usefulness, timeliness and accuracy is referred to as information quality.

B. Skills and Knowledge

Literacy as applied to ICT is defined as "whatever a person needs to be able to use (and know about) computers" [45], while "the ability to use information, or possibly the possession of knowledge of information is information literacy" [45]. The computer and information literacy are affected by the citizen's level of education, age and gender [1], which all bar the citizen to adopt e-government services [32]. Additionally, researchers have stated that the age of a person and the level of education can positively or negatively influence the intention to use e-government services [26, 32,34]. People, who have grown up among educated family and have got use to technology, have a highly chance to adopt a new technology e.g. e-government. Furthermore, Gender has played critical roles in influencing citizens' intention to use the e-government services [34]. It has been stated that people who are forty and below are more likely to welcome the usage of e-government services than older [20].

C. Culture

Culture impacts citizens' intentions to use e-government services, including cultural influences, culture awareness and national culture [35, 46]. Culture has been defined as "values, beliefs, norms and behavioural patterns of a group – people in a society for national culture, staff of an organisation for organisational culture, specific professions for professional" [47]. Akkaya, et al. [46] state that many researchers recognize the importance of considering cultural characteristics in the development and use of online services.

D. Lake of Awareness

Awareness refers to how a person understands the activities of others, which provides a context for his own activity [48]. To encourage citizens to adopt e-government services, the government should increase citizens' awareness. It has been found that awareness is one of the barriers that affect the adoption of e-government services [15, 35]. According to Baker and Bellordre [49], a major concern related to the deployment and use of new technologies is a lack of awareness that a given technology exists, or that the citizen could benefit from using the new technology.

E. Technical Infrastructure

Technical infrastructure can be defined as: "design and installation of LAN local area network, determination of cooperation scope in the corporate WAN network (Internet, Intranet), technical parameter specification of computers used as workstations and servers, selection of operational system environment and database platform" [50]. A study by AlAwadhi and Morris [35] found that most of the participants were worried about the technical issues. AlAwadhi and Morris [35] state that the findings give a clear view that technical infrastructure is important for encouraging citizens to adopt e-government services. In addition, Al-Sobhi, et al. [1] state that reliable and integrated technical infrastructure could be the difficult part facing the government, especially in developing countries, in obtaining a higher level of e-government services that can influence citizens to adopt e-government services. Also, Al-Sobhi, et al. [1] suggest that governments should provide a budget to build a strong technical infrastructure in order to encourage citizens to adopt e-government services.

F. Diffusion of innovation and Website design

This element of the DOI model is based on Rogers [33] model of Diffusion of Innovation, as discussed in the background Section E.1. Subsequently, Carter and Belanger [8] have made a modification by adopting compatibility, relative advantage and complexity, and excluding trialability and observability to replace them with image. Furthermore, as it is known that e-government and e-commerce are almost identical and both use online services, one of the key components of the online marketing strategy is the website; this means that good website design is required to serve the target market effectively and efficiently [51]. It is mentioned that a consideration of elements such as ease of navigation, accessibility, and features such as personalisation, customisation and multiple languages are required [51]. Combining these elements will directly influence users' experiences and encourage them to adopt the services [51]. In addition, researchers have suggested that the design of an e-government website may encourage citizens to use the services and make a good impression to increase citizens' repeated usage [34, 52]. Website design, includingusability, accessibility and multiple languages are the main factors that governments should focus on to influence citizens to adopt and use e-government services [34, 36].

- Usability: Website usability is a key aspect of website functionality [53]. Usability is defined as the ease with which users can access and navigate information in a portal with the objective of learning to manage the system and become familiar with basic functions [53].

Well-designed portals are easy to use and have pleasant, consistent interfaces [53]. Nielsen [54] states that improving the ease-of-use of a website during the design process by using methods known as usability. Also, usability refers to the quality attributes that measure how easy it is to use a user-interface, which includes five factors: learnability,efficiency, memorability, errors and satisfaction [54].

- Accessibility: Accessibility of a website is an essential factor that may affect citizens' intentions to use e-government services [37]. Website accessibility is defined as the degree to which citizens and automatic tools can access web information [36].
- Multi-Lingual Website and disabilities: Rehman and Esichaikul [34] suggest that building an e-government website with multi-lingual web support will positively influence the citizens' intention to adopt e-government services. Multi-lingual web support includes the official language with one or more additional well-known languages and output for disabled users, which allows citizens to access and navigate the information easily [53].

G. Security

It is mentioned that citizens concerned with information privacy have an impact on the consumers of electronic services [30]. According to Akkaya, et al. [46], citizens are sensitive towards storage of their personal data, which has a negative influence on the intention to adopt and continue e-government services. In Addition, security is defined as the protection of information or systems from unsanctioned intrusions or outflows [55]. Lack of security is one of the main factors that affect the intention to adopt e-government services that have been identified in most studies [55].

- Information Security: Information security is defined as "the subjective probability with which consumers believe that their personal information will not be viewed, stored or manipulated during transit or storage by inappropriate parties, in a manner consistent with their confident expectations" [56].

V. Approaches to Validate this Model

Since the factors have been integrated in the addressed model, it is essential to find out the importance of these factors on the citizens' intentions to adopt the e-government services. In this paper, these identified factors are going to be validated and confirmed using the Triangulation method. Triangulation is used to increase precision in empirical research [57].

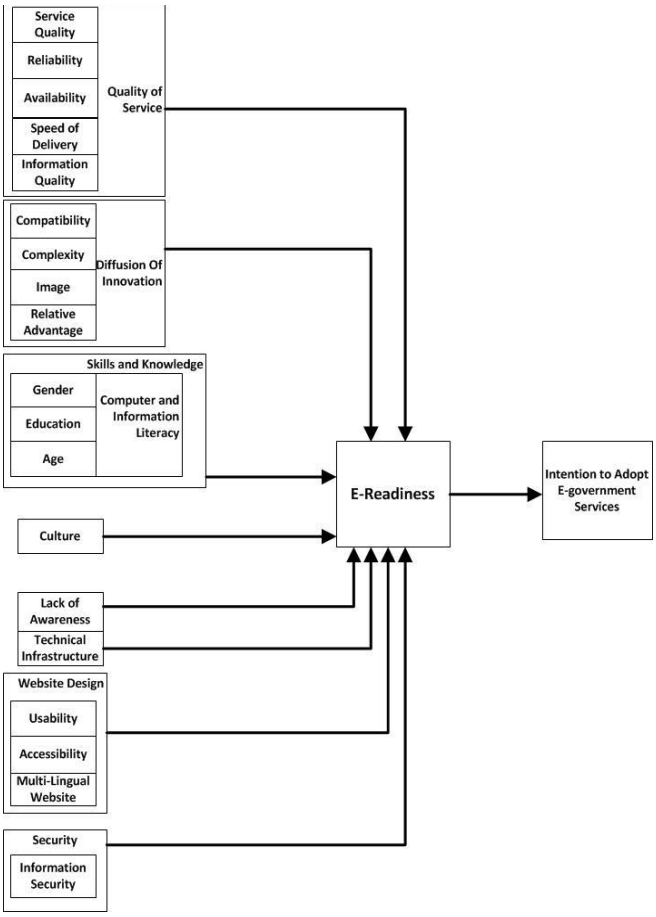

Fig. 2. A breakdown of the high level overview of the e-readiness of the Integrated Model for Citizen Adoption of e-government Services figure

According to Runeson and Höst [57], using the triangulation method by taking different angles towards the studied object will provide a broader picture. Runeson and Höst [57] also defined four different types of triangulation as follows:

- Data (source) triangulation—using more than one data source or collecting the same data at different occasions.
- Observer triangulation—using more than one observer in the study.
- Methodological triangulation—combining different types of data collection methods, e.g. qualitative and quantitative methods.
- Theory triangulation—using alternative theories or viewpoints.

In order to validate the proposed factors using triangulation methods, three main activities were undertaken. Firstly, a detailed background literature review has been conducted, which produced a summarized table of reviews from expert authors in this field. Secondly, questionnaires were distributed among Saudis' government employee. Finally, interviewsand questionnaires were conducted among government staff and leadership. However, the questionnaires are used as an exploratory study since there is no basis model for Saudi's e-government. The exploratory study gave a clear picture of the important factors affecting the adoption of e-government in Saudi Arabia.

VI. Exploratory Study And Results

Since the factors influencing Saudi's citizens are still argued, a study will be used to clarify the importance of the discussed factors and validating the proposed model. A study has been undertaken by developing a questionnaire for Saudi Arabiangovernment employee and an interview of experts in the information technology field. This study used mixed techniques, including questionnaires (structured questions) and interviews (semi-structured questions) to clarify the importance of the integrated factors and validate the proposed model. The surveys included a number of objectives which wereidentify challenges and factors valid from the employee's view, and identify challenges and factors valid from the expert's view.

A. Questionnaire applies to government employees

The questionnaires that wereansweredby employees who work at any government organisations have been designed to include open- and closed-ended questions. The closed-ended questions gather the opinions about the whether the proposed factors are important for adopting e-government services, whereas the open-ended questions asked for their opinions based on their experience and whether there were any missed factors. The government staff answered a questionnaire including twenty-three questions grouped under eight categories, which are: quality of service, culture, security, skills and knowledge, website design, lack of awareness, technical infrastructure and diffusion of innovation. The experts were asked for their opinion about all the proposed factors as closed-ended questions, while having open-ended questions to give their opinion about any missed factors.

B. Interviewingexperts in Saudi's e-government project

Similar to the government employees' questionnaires, the expert interviews were also designed to include open- and closed-ended questions. The closed-ended questions gather the opinions about the whether the proposed factors are important for adopting e-government services, whereas the open-ended questions ask for their opinions based on their experience and whether or not there were any missed factors. The experts were asked for their opinion about all the proposed factors as closed-ended questions, while having open-ended questions to give their opinion about any other missed factors.

C. Data analysis of the questionnaires

The government's employee survey wasdesigned to be conducted in person. Two government organisations werechosen to be part of this study. These organisations were selected because one has launched its website and started to provide basic online services, while the other is trying to implement an e-service to serve citizens. Thirty-five questionnaires were handed out and thirty-one responses were received, which was enough for this exploratorystudy. On the other hand, the interview survey wasdesigned to have all the proposed factors that have been discussed in the proposed model, and eightexperts were interviewed. This survey will get information from experts who work on the Saudi's e-government project. As the respondents for all surveys could respond between 1 (strongly disagreed) and 5 (strongly agreed), the results wasevaluatedusing aone-sample t-testwith the important value wasdefined as 3.5. The 'important value', is used to test if the collected data is statistically different. This is an exploratory study and the scale that has been chosen has 5 possible answers. Therefore3.5 has been identified as the lower value of importance.

1) Summarising the collected government employees' comments and suggestions

The government employees were asked to give feedback about the questioned factors and comments based on their experience. Respondents provided valuable comments and suggestions. Additionally, the majorities agreed with most of the questioned factors and believe these factors have an impact on the citizens' intentions to adopt the e-government services. However, some employees gave helpful comments that might be useful to be kept in mind for future investigation. The comments included:

- "Government should advertise in the media and launch a campaign to increase the citizens' awareness".
- "The media in Saudi Arabia has a negative impact on the citizens' intention to adopt e-government by announcing hacking crime and ignoring the developments and achievements in information security by the government".

2) Experts' comments

The interviewed experts' emphasised increasing the citizens' awareness of trust, privacy, security and gaining benefits from using e-government services. An expert suggests that introducing a demo about how to use the online services would make the use of the e-government website easier. Additionally, putting e-services machines and mobile kiosks would help citizens to become familiar with how to use the services and the benefits as well," the expert says.

D. Discussion

As it is mentioned previously, the collected data has been analysed using a one sample t-test. The accepted value to be statistically important has been identified as 3.5 and above. The test showed that the result of most of the identified factors have been seen adequate Table II. The result of data analysis of the factor Multi-Lingual has been accepted by the result of the data analysis for the questionnaires applied to citizen and government's employee as well as from the background, even though the experts' result is seen not adequate. The reliability of the results is givenin Table III, using Cronbach's alpha. Therefore, the identified factors have been accepted and being integrated in the proposed model in order to be used in future.

TABLE II. THE RESULT OF THE ONE SAMPLE T-TEST OF THE FULL STUDY

Factors	Government Employees	Experts	Result
Information Security	.016	<.001	Accepted
Culture	.006	.004	Accepted
Multi-Lingual	.008	.052	Accepted[2]
Usability	<.001	.007	Accepted
Accessibility	<.001	.004	Accepted
Relative Advantage	<.001	.013	Accepted
Compatibility	<.001	.031	Accepted
Image	.001	.020	Accepted
Complexity	.014	.013	Accepted
Computer and Information Literacy	<.001	.033	Accepted
Gender	.009	.013	Accepted
Education	<.001	.013	Accepted
Age	.005	.020	Accepted
Technical Infrastructure	.001	.013	Accepted
Lack of Awareness	<.001	.048	Accepted
Service Quality	<.001	.013	Accepted
Reliability	<.001	.007	Accepted
Availability	<.001	.007	Accepted
Speed of delivery	.036	.007	Accepted
Information quality	.016	.013	Accepted

TABLE III. RELIABILITY ANALYSIS FOR THE QUESTIONNAIRES, AS MEASURED BY CRONBACH ALPHA

Questionnaire	Government's employees	Saudi Arabian experts on e-government
Cronbach's α	0.846	0.664

From the survey's analysis, the proposed factors have been accepted to be integrated in the proposed model. Furthermore, since one of the author is a Saudi citizen and experienced how the services are delivered in Saudi Arabia, he found that there is a problem with delivering services due to the postal infrastructure. The Saudi citizens do not have a clear address, such as house number or a clear street name, or secure postal address which usually available in front of their house or a box beside their doors. Although there are post office Boxes available for the citizen rent, not many Saudis have one, which makes the communication between the citizens and the government difficult. Therefore, the mail service system in Saudi Arabia needs to be developed and improved to become a certified contact. The postal address should be introduced as the main contact between government and citizen.

[2]Based on the literature review and the employees' result.

VII. CONCLUSION

Since the rapid development of information and communication technologies (ICT) and the significant improvements in digital connectivity, adoption of e-government services by citizens is the concern of many governments. This paper considers how to encourage citizens to adopt e-government services and the challenges facing implementation and development of e-government.

Initially, it is important to know how Electronic Government (e-government) is defined. e-government can be defined based on an existing set of requirements, since there is no unique definition. e-government has been developed and implemented for a considerable period of time in developed countries, while it is still being implemented and developed in most developing countries. This results in many benefits that e-government services have addressed to governments, businesses and citizens. In addition, many researchers have found and discussed challenges that face the implementation and adoption of e-government. There are common challenges such as privacy, security, trust, culture, skills and knowledge, and IT infrastructure.

There are also many other more specific challenges, including authentication, digital divide and funding shortage, facing some countries. Adoption is a critical issue to governments that want to implement and develop e-government. However, governments can find aspects of the process can influence and encourage citizens to adopt e-government services. Nevertheless, challenges and barriers can be overcome by investigating various approaches to adopting e-government services and presenting an appropriate model that can suit most similar countries, including Gulf States. Additionally, the core questions of this research are (i) What are the challenges or barriers to implementing and developing e-government in Saudi Arabia?, (ii) How can the Saudi Arabian government overcome these challenges?, (iii) How can citizens adopt e-government? and (iv) What are the influential factors to be integrated in a model for implementing and developing e-government in order to be adopted by citizens? A discussion and investigation has been conducted to answer these questions. The result is presented in the previous sections which show the factors that would influence the Saudi citizens to adopt e-government services. However, it is proposed that a large survey will be conduct in the near future; this will lead to a far better model. Supported by SEM.

ACKNOWLEDGMENT

The authors acknowledge the award of a King Abdullah scholarship to SulaimanAlateyah to allow this research to be undertaken.

REFERENCES

[1] F. Al-Sobhi, V. Weerakkody, and M. M. Kamal, "An exploratory study on the role of intermediaries in delivering public services in madinah city: Case of saudiarabia," Transforming Government: People, Process and Policy, vol. 4, pp. 14-36, 2010.

[2] United Nations (2010, 05/07). The united nations e-government development database. Available: http://www2.unpan.org/egovkb/about/index.htm

[3] United Nations "United nations e-government survey : Leveraging e-government at a time of financial and economic crisis," New York2010 2010.

[4] S. Sahraoui, G. Gharaibeh, and A. Al-Jboori, "E-government in saudiarabia: Can it overcome its challenges?," eGovernment Workshop '06, 2006.

[5] O. K. Lean, S. Zailani, T. Ramayah, and Y. Fernando, "Factors influencing intention to use e-government services among citizens in malaysia," International Journal of Information Management, vol. 29, pp. 458-475, 2009.

[6] S. AlAwadhi and A. Morris, "The use of the utaut model in the adoption of e-government services in kuwait," presented at the Proceedings of the Proceedings of the 41st Annual Hawaii International Conference on System Sciences, 2008.

[7] W. Meng Seng, N. Hideki, and P. George, "The use of importance-performance analysis (ipa) in evaluating japan's e-government services," Journal of Theoretical and Applied Electronic Commerce Research, vol. 6, pp. 17-30, Aug. 2011.

[8] L. Carter and F. Belanger, "Citizen adoption of electronic government initiatives," in System Sciences 2004. , Proceedings of the 37th Annual Hawaii International Conference, 2004, p. 10

[9] OECD, E-government studies: The e-government imperative: OECD Publishing, 2003.

[10] I. Alghamdi, R. Goodwin, and G. Rampersad, "E-government readiness assessment for government organizations in developing countries," Computer and Information Science, vol. 4, pp. 3-17, May 2011 2011.

[11] L. Lu, G. Zhu, and J. Chen, "An infrastructure for e-government based on semantic web services," in International Conference on Services Computing, 2004.

[12] V. Ndou, "E – government for developing countries: Opportunities and challenges," EJISDC, vol. 18, pp. 1-24, 2004.

[13] J. Yonazi, H. Sol, and A. Boonstra, "Exploring issues underlying citizen adoption of egovernment initiatives in developing countries: The case of tanzania.," Electronic Journal of e-Government, vol. 8, pp. 176-188, Dec 2010.

[14] M. Warkentin, D. Gefen, P. A. Pavlou, and G. M. Rose, "Encouraging citizen adoption of e-government by building trust," Electronic Markets, vol. 12, pp. 157-162, 2002.

[15] H. AlShihi, "E-government development and adoption dilemma: Oman case study," in The 6th International We-B (Working for eBusiness) Conference, Victoria University, Melbourne, Australia 2005.

[16] X. Dong, L. Xiong, and W. Wang, "How adoption is g2c model e-government? — evidence from xi' an and nan jing," in E -Business and E -Government (ICEE), 2011 International Conference on, 2011, pp. 1-4.

[17] P. Pavlou, "Integrating trust in electronic commerce with the technology acceptance model: Model development and validation," in Americas Conference on Information Systems 2001, p. 159.

[18] D. H. McKnight, V. Choudhury, and C. Kacmar, "Developing and validating trust measures for e-commerce: An integrative typology," Information Systems Research, vol. 13, pp. 334-359, 2002.

[19] D. Gefen, E. Karahanna, and D. W. Straub, "Trust and tam in online shopping: An integrated model," MIS Quarterly, vol. 27, pp. 51-90, 2003.

[20] S. E. Colesca, "Increasing e-trust: A solution to minimize risk in e-government adoption," JOURNAL OF APPLIED QUANTITATIVE METHODS, vol. 4, pp. 31-44, 2009.

[21] S. C. Srivastava and T. S. H. Teo, "Citizen trust development for e-government adoption: Case of singapore," in "Proocedings of Pacific Asia Conference on Information Systems, 2005, pp. 721-724.

[22] S. Colesca, "The main factors of on-line trust," Economia. Seria Management, vol. 10, pp. 27-37, 2007.

[23] S. Marche and J. D. McNiven, "E-government and e-governance: The future isn't what it used to be," Canadian Journal of Administrative Sciences / Revue Canadienne des Sciences de l'Administration, vol. 20, pp. 74-86, 2003.

[24] H. Margetts, "E-government in britain—a decade on," Parliamentary Affairs, vol. 59, pp. 250-265, 2006.

[25] J. K. Pinto and S. J. Mantel, Jr., "The causes of project failure," IEEE Transactions on Engineering Management, vol. 37, pp. 269-276, 1990.

[26] V. Venkatesh, M. G. Morris, B. D. Gordon, and F. D. Davis, "User acceptance of information technology: Toward a unified view," MIS Quarterly, vol. 27, pp. 425-478, 2003.

[27] R. Titah and H. Barki, "E-government adoption and acceptance: A literature review," International Journal of Electronic Government Research (IJEGR), vol. 2, pp. 23-57, 2006.

[28] R. Heeks, Implementing and managing egovernment: An international text. London: SAGE Publications Ltd 2006.

[29] M. Alshehri, S. Drew, and O. Alfarraj, "A comprehensive analysis of e-government services adoption in saudiarabia: Obstacles and challenges," International Journal of Advanced Computer Science and Applications, vol. 3, pp. 1-6, 2012.

[30] F. Belanger, J. S. Hiller, and W. J. Smith, "Trustworthiness in electronic commerce: The role of privacy, security, and site attributes," The Journal of Strategic Information Systems, vol. 11, pp. 245-270, 2002.

[31] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," MIS Quarterly, vol. 13, pp. 319-340, 1989.

[32] M. AlNuaimi, K. Shaalan, M. Alnuaimi, and K. Alnuaimi, "Barriers to electronic government citizens' adoption: A case of municipal sector in the emirate of abudhabi," in Developments in E-systems Engineering (DeSE), 2011, 2011, pp. 398-403.

[33] E. M. Rogers, Diffusion of innovations, 4th ed. New York: Free Press, 1995.

[34] M. Rehman and V. Esichaikul, "Factors influencing the adoption of e-government in pakistan," in E -Business and E -Government (ICEE), 2011 International Conference on, 2011, pp. 1-4.

[35] S. AlAwadhi and A. Morris, "Factors influencing the adoption of e-government services," Journal of Software, vol. 4, pp. 584-590, 2009.

[36] A. Abanumy, A. Al-Badi, and P. Mayhew, "E-government website accessibility: In-depth evaluation of saudiarabia and oman," The Electronic Journal of e-Government, vol. 3, pp. 99-106, 2005.

[37] M. K. Alomari, P. Woods, and K. Sandhu, "Predictors for e-government adoption in jordan: Deployment of an empirical evaluation based on a citizen-centric approach," Information Technology & People, vol. 25, pp. 4-4, 2012.

[38] R. N. Bolton and J. H. Drew, "A multistage model of customers' assessments of service quality and value," Journal of Consumer Research, vol. 17, pp. 375-384, 1991.

[39] C. Liu and K. P. Arnett, "Exploring the factors associated with web site success in the context of electronic commerce," Information & Management, vol. 38, pp. 23-33, 2000.

[40] A. Trentin, E. Perin, and C. Forza, "Overcoming the customization-responsiveness squeeze by using product configurators: Beyond anecdotal evidence," Computers in Industry, vol. 62, pp. 260-268, 2011.

[41] Y.-K. Lin and P.-C. Chang, "Evaluation of system reliability for a cloud computing system with imperfect nodes," Systems Engineering, vol. 15, pp. 83-94, 2012.

[42] T. Walkowiak, "Web systems availability analysis by monte-carlo simulation," Computer Modelling and New Technologies, vol. 15, pp. 37-48, 2011.

[43] V. McKinney and K. Yoon, "The measurement of web-customer satisfaction: An expectation and disconfirmation approach," Information Systems Research, vol. 13, pp. 296-315, 2002.

[44] G.-W. Bock, J. Lee, H.-H. Kuan, and J.-H. Kim, "The progression of online trust in the multi-channel retailer context and the role of product uncertainty," Decision Support Systems, vol. 53, pp. 97-107, 2012.

[45] I. J. Cole and A. Kelsey, "Computer and information literacy in post-qualifying education," Nurse Education in Practice, vol. 4, pp. 190-199, 2004.

[46] C. Akkaya, P. Wolf, and H. Krcmar, "Factors influencing citizen adoption of e-government services: A cross-cultural comparison (research in progress)," in System Science (HICSS), 2012 45th Hawaii International Conference on, 2012, pp. 2531-2540.

[47] M. Ali, V. Weerakkody, and R. El-Haddadeh, "The impact of national culture on e-government implementation: A comparison case study.," in Proceedings of the Fifteenth Americas Conference on Information Systems., San Francisco, California, 2009, pp. 1-13.

[48] P. Dourish and V. Bellotti, "Awareness and coordination in shared workspaces," presented at the Proceedings of the 1992 ACM conference on Computer-supported cooperative work, Toronto, Ontario, Canada, 1992.

[49] P. M. A. Baker and C. Bellordre, "Adoption of information and communication technologies: Key policy issues, barriers and opportunities for people with disabilities," in System Sciences, 2004. Proceedings of the 37th Annual Hawaii International Conference on, 2004, p. 10 pp.

[50] A. Kaminski, "Computer integrated enterprise in the mrp/erp software implementation," foundations of management, vol. 4, p. 25, 2010.

[51] V. Kumar, B. Mukerji, I. Butt, and A. Persaud, "Factors for successful e-government adoption: A conceptual framework," Electronic Journal of e-Government, vol. 5, pp. 63-76, 2007.

[52] S. M. Pi, H. L. Liao, and H. M. Chen, "Factors that affect consumers' trust and continuous adoption of online financial services," International Journal of Business and Management, vol. 7, pp. 108-119, 2012.

[53] J. P. Gant and D. B. Gant, "Web portal functionality and state government e-service," in System Sciences, 2002. HICSS. Proceedings of the 35th Annual Hawaii International Conference on, 2002, pp. 1627-1636.

[54] J. Nielsen, "Usability 101: Introduction to usability," JakobNielse'sAlertbox, August 25 2003.

[55] D. Berdykhanova, A. Dehghantanha, and K. Hariraj, "Trust challenges and issues of e-government: E-tax prospective," in Information Technology (ITSim), 2010 International Symposium in, 2010, pp. 1015-1019.

[56] K. C. Ramnath and A. P. Paul, "Perceived information security, financial liability and consumer trust in electronic commerce transactions," Logistics Information Management, vol. 15, pp. 358-368, 2002.

[57] P. Runeson and M. Höst, "Guidelines for conducting and reporting case study research in software engineering," Empirical Software Engineering, vol. 14, pp. 131-164, 2009.