Identified Factors Affecting the Intention of Saudi Arabian Citizens to Adopt e-Government Services

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***Abstract*—This paper discusses e-government, in particular the challenges that face adoption in Saudi Arabia. e-government can be defined based on an existing set of requirements. 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 has been implemented for a considerable time in developed countries. However, e-government services still face many challenges in their implementation and general adoption in many countries including Saudi Arabia. It has been noted that the introduction of e-government is a major challenge facing the government of Saudi Arabia, due to possible concerns raised by its citizens. In addition, the literature review 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.**

***Index Terms*—Adoption, citizens' intention, e-government, G2C, influential factors.**

I. Introduction

The World Wide Web (WWW) has become a necessity and an indispensable tool in the daily life of people worldwide [1]. It is widely recognized that many people prefer the online version of a service as a quick and easy approach to achieving their daily activities, including reading newspapers, paying bills, etc. [2].

As information and communication technologies (ICT) rapidly develop, coupled with considerable improvements in digital connectivity, governments are reassessing the way they work and interact both internally and with external organizations [1]. This technology has encouraged the government's organizations 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 organizations 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 [3] 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 [4].

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A. E-Government in Saudi Arabia

The Saudi government launched the YESSER Program, the country's first national e-government strategy, in 2005 [5]. The aim of this initiative was to create a user-centric electronic initiatives that focuses on improving government services to the general public. 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 [6]. 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 [6]. Furthermore, it has been announced by Saudi e-government Program [6] 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 sat and have to actions, which is the first plan has took a place from 2006 to 2010, and the second is progressing from 2012 to 2016. Additionally, the e-governance strategy will provide citizens with access to all government-related services and information. This will enhance the accountability of the public sector in Saudi and it is being implemented in all ministries in the country. This Saudi initiative to implement e-government has been criticized for not being feasible and for having transaction systems limited to business [7].

B. Adopting New Technology

Adopting new technology is required to ensure success in implementing e-government in developing countries, including Saudi Arabia [8]. The success of the implementation of the e-government is dependent not only on the government support, but also on willingness of the citizen to accept and adopt e-government services [9]. Although the government decision makers are keen on providing services using the traditional ways, they also need to understand the factors that would encourage their citizens to use the electronic service delivery channels [9]. Although there is enormous number of research in e-government field, the research on exploring factors which would encourage citizen to adopt e-government services in developing countries is not enough [9]. Therefore, one of this research's aims is

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identifying 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 next section discusses the literature review and previous models used to measure new technology adoption; in Section III, a set of factors that influence the citizens' intentions to adopt e-government services is identified followed by a number of approaches the could be used to validate a research; Section IV, illustrate the proposed research model. The results of the study are reported in Section V; and finally, Section VI presents the conclusion.

II. Literature Review

A. Citizen Adoption

Adoption is an important aspect for the success of e-government initiatives in developing countries [5]. However, growing interest in e-government raises the question of how governments can increase citizen adoption and use of their online government services [6]. 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 [7], [8]. Moreover, Dong *et al.* [9] stated that although researchers are concerned on discussing the challenges and barriers facing the e-government implementation and development, 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 [6]. Furthermore, Carter and Belanger [10] agreed with other researchers that, although numerous studies have analyzed user adoption of electronic commerce [11], to date, no study has identified the core factors that influence citizen adoption of e-government initiatives. According to Colesca [12], many studies focused on the citizen adoption of e-government services suggest that trust [13], security [14] and transparency [15] are major issues for e-government adoption. Based on Margetts [16], cited by Yonazi, et al. [5], high adoption of these initiatives increases the chance that e-government will facilitate social and economic benefits to citizens.

In the case of Kuwait, the increasing use of ICT by government departments resulted in the creation of an IT infrastructure capable of supporting e-government services [7]. User acceptance of IT is deemed a necessary condition for the effective implementation of any IT project [8]. Adoption comes after direct experience with the technology and after an individual has decided to accept the technology [8], [17]. A number of studies have investigated the adoption of e-government services in developed countries [8], whereas relatively little has been undertaken in developing countries [7], [8]. Successful implementation of adoptable e-government initiatives in that context requires complex customization between the technology and implementation context in developing countries [5]; the result in designing citizen-adoptable e-government initiatives is still a challenge to many developing countries' governments [5]. AlAwadhi and Morris [8] conducted a study in Kuwait to explore factors that affect the adoption of e-government services. The result identified the main factors that could influence citizens to adopt e-government including usefulness, ease of use, cultural and social influences, face-to-face interaction, gender issues, technical issues, lack of awareness, trust in the Internet and cultural differences.

Although these factors influence Kuwaiti citizens to adopt e-government services, there is no evidence that these factors can influence Saudi citizens. However, the culture is almost identical between Kuwait and Saudi Arabia. Additionally, Alshehri *et al*. [18] has identified some general factors for e-government in Saudi Arabia Therefore, in order to determine which of all 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 organizations.

B. Models Used to Measure Adoption of New Technologies

To identify the influential factors, different researchers' models and contributions have been reviewed includes Technology Adoption Model (TAM) by Davis [19], Diffusion of Innovations Model (DOI) by Rogers [20] and Unified Theory of Acceptance and Use of Technology (UTAUT) by [17]. Additionally, other models have been built based on the previous models which have been reviewed in order to identify factors that's influence citizen to adopt e-government. These models are, Trustworthiness by [21], model for citizen adoption by [22] and Rehman and Esichaikul [23] delivered a third model of citizen adoption based on an integrated model adapted from TAM, DOI and UTAUT.

III. Discussion

Based on the literature review, this discussion will consider the factors that influence citizens' intention to adopt e-government services; in order to answer the following key question: What are the influential factors to be integrated in a model for implementing and developing e-government in order to be adopted by citizen?

A. Factors Influencing Citizens' Intention to Adopt e-Government Services in Saudi Arabia

The initial question for this research 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 require government intention to be added to their requirements in implementing and developing e-government. Table I presents the influential factors from the literature review in ten categories.

B. Methods to Validate This Research

In this paper, only the identified factors that applied to citizen were validated using the Triangulation method. Triangulation is used to increase precision in empirical research [24]. According to Runeson and Höst [24], using the triangulation method by taking different viewpoints towards the studied object will provide a broader picture.

In order to validate the proposed factors using triangulation methods, two main components were used. First, a detailed literature review had to be undertaken. Secondly, questionnaires need to be distributed among Saudis' government employees and experts.

TABLE I: FACTORS INFLUENCING CITIZENS TO ADOPT E-GOVERNMENT SERVICES

Factors	Applied to
Technical Infrastructure	Government employees and experts
Skills and Knowledge • Computer and Information Literacy • Age. • Gender. • Education.	
Lack of Awareness	
Security Issues • Transaction Security. • Information Security. • Perceived Risk.	Citizen
Privacy Issues	
Trust Issues • Trust in Government. • Trust In Internet.	
Quality of Service • Service Quality. • Reliability. • Availability. • Speed of Delivery. • Information Quality.	Government employees and experts
Culture	All parties
Diffusion Of Innovation • Compatibility. • Complexity. • Image. • Relative Advantage.	Government employees and experts
Website Design • Perceived Usefulness. • Perceived Ease of Use.	Citizen
• Multi-lingual Website • Usability. • Accessibility.	Government employees and experts

IV. THE RESEARCH MODEL

Based on what has been discussed previously, a new model will be developed by adapting and integrating the critical factors that have been mentioned by other authors. Fig. 1 shows the new model – higher level. The addressed higher level model contains the intention to use e-government services and E-Readiness.

These two main blocks, are the 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 has Quality Services, Diffusion Of Innovation, Computer and information Literacy, Culture, Lack of Awareness, Technical Infrastructure and Security, and it is classified as government's responsibility. In this paper only the breakdowns of the e-readiness block as shown in Fig. 1 are presented in the next sections and are shown in Fig. 2. In the breakdown, the factors have been categorized in order to make the validation easy and accurate.

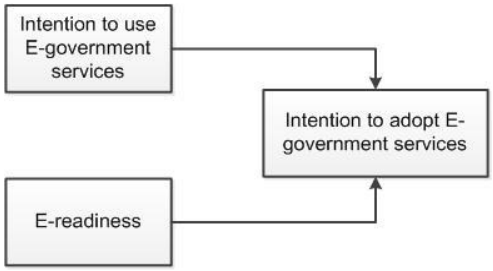

Fig. 1. A high level overview of an integrated model for citizen adoption of e-government services.

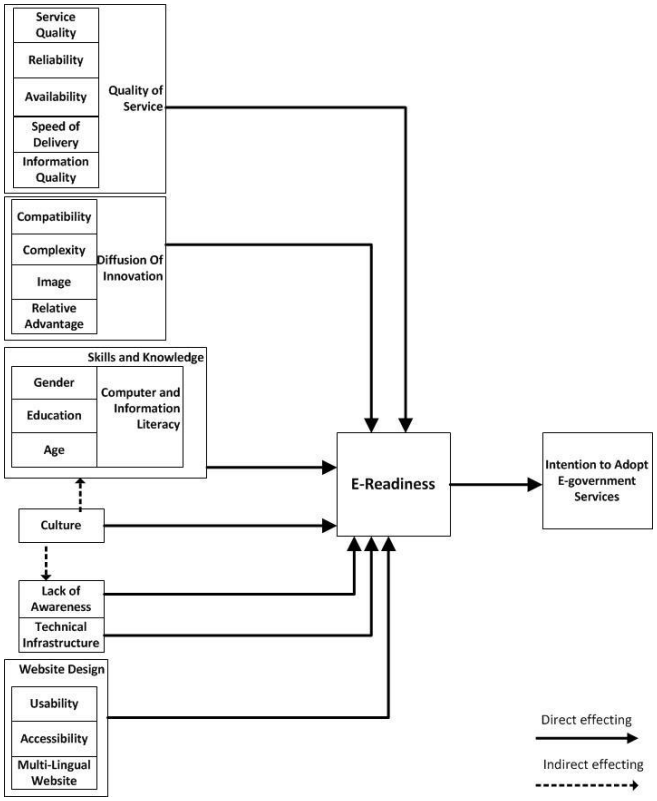

Fig. 2. A breakdown of the high level overview of the integrated model for citizen adoption of e-government services figure.

A. 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" [25]. A study by AlAwadhi and Morris [26] found that most of the participants were worried about the technical issues. AlAwadhi and Morris [26] 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.

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" [27], while "the ability to use information, or possibly the possession of knowledge of information is information literacy" [27]. 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 [22]. 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 [17, 22, 23]. 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 [23]. It has been stated that people who are forty and below are more likely to welcome the usage of e-government services than older [12].

C. Lake of Awareness

Awareness refers to how a person understands the activities of others, which provides a context for his own activity [28]. 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 [7], [26]. According to Baker and Bellordre [29], 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.

D. Quality of Service

Quality of service has been suggested to play an important role in online services [23]. 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 [23].

1) Service Quality: Service quality refers to the assessment done by the consumer for the overall excellence of the online provided service [30]. The government website should be designed carefully to address customers' needs because the face-to-face interaction is lacking in online service [31].
2) Reliability: One critical issue regarding building an integral *e-government* to provide online services is making it reliable. Liu and Arnett [31] state that in customer online services, reliability is required. A system could be reliable when it has a quick error recovery [31], whereas service quality would be reliable when delivering services to the customers as promised [32]. Moreover, reliability is defined as the capability of a system to accomplish its intended function [33].
3) 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 [23]. System availability refers to the probability of the system to be ready to provide responses at a specific time [34]. In addition, Lin and Chang [33] defined system availability as the expectation of a system to be available for operating tasks.
4) Speed of Delivery: Consumers of services or products are concerned about the speed of receiving their orders. Rehman and Esichaikul [23] 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 [32]. Furthermore, speed of delivery refers to the elapsed time between customers requesting services and receiving them [32].
5) Information Quality: The assessment of the government's website quality lists information quality as a key element [35]. Additionally, prior research employed various measures of IS success that result in the importance of the information quality for a website to success [31]. Bock, et al. [36] 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.

E. Culture

Culture impacts citizens' intentions to use e-government services, including cultural influences, culture awareness and national culture [26], [37]. 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" [38]. Akkaya *et al*. [37] state that many researchers recognize the importance of considering cultural characteristics in the development and use of online services.

F. Diffusion of Innovation

This element of the DOI model is based on Rogers [20] model of Diffusion of Innovation, as discussed in the background Section D.2. Subsequently, Carter and Belanger [10] have made a modification by adopting compatibility, relative advantage and complexity, and excluding trialability and observability to replace them with image.

G. Website Design

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 [39]. 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 [39]. Combining these elements will directly influence users'

experiences and encourage them to adopt the services [39]. 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 [23], [40]. Website design, including perceived usefulness, perceived ease of use, usability, accessibility and multiple languages are the main factors that governments should focus on to influence citizens to adopt and use e-government services [23], [41].

1) Usability: Website usability is a key aspect of website functionality [42]. 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 [42]. Well-designed portals are easy to use and have pleasant, consistent interfaces [42]. Nielsen [43] 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 [43].
2) Accessibility: Accessibility of a website is an essential factor that may affect citizens' intentions to use e-government services [44]. Website accessibility is defined as the degree to which citizens and automatic tools can access web information [41].
3) Multi-Lingual Website and disabilities: Rehman and Esichaikul [23] 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 [42].

V. The Exploratory Study and the Result

A. Questionnaire for Saudi Government Employees and Interviewing Experts

The questionnaire that was taken by employees who worked in government organizations and expert interviews was designed using closed-ended questions. The closed-ended questions gather the opinions about the whether the proposed factors are important for adopting e-government services. The government staff questionnaire including twenty-three questions grouped under eight categories, which are quality of service, culture, security, computer and information literacy, website design, lack of awareness, technical infrastructure and diffusion of innovation. The expert will be asked for their opinion about all the proposed factors as closed-ended questions.

B. The Results

The surveys were designed as follows; the government employees' questionnaire had twenty three closed-ended questions which were handed in person, and the experts' interview had twenty nine closed-ended questions which interviewed in person, where the respondents could respond between 1 (strongly disagreed) and 5 (strongly agreed), and two open-ended question that sought suggestions from the respondents' experience. The results were tested using SPSS as one-sample t-test against a set value of 3.5 and the results are presented in Table II.

TABLE II: The Result of the One Sample T-Test of the Questionnaires Applies to Government Employees and Experts

Factors	Government Employees	Experts	Statistically significant result
Culture	.006	.004	Accepted
Multi-Lingual	.008	.052	Accepted based on the literature review and the employees' result
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

C. The Reliability of the Results

A common way to confirm that measurement error is at a minimum level is to determine the properties of the measurement in order to increase the confidence level that its job is being done accurately [45]. Reliability, which is what it is concerned with here, refers to the extent to which data analysis procedures will produce consistent results [46]. Furthermore, the reliability value has been widely discussed by researchers, which [45] stated that the reliability value of 0.7 to 0.8 is an acceptable value for Cronbach's alpha. However, Liu and Arnett [31] suggested that as a "rule of thumb" 0.6 could be accepted.

After presenting the result of the questionnaires in Table II, an assessment of the reliability was carried out using Cronbach's alpha. The values of Cronbach's alpha were acceptable; government employees' questionnaire (α=0.846),

and experts' interview (α=0.664) which indicates that the reliability coefficient for the questionnaires' result could be seen as adequate.

VI. Conclusion

This research 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. 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 question of this research is: 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 this question. The study represent that the identified factors, including quality of service, diffusion of innovation, computer and information literacy, culture, lack of awareness, technical infrastructure, website design, security, privacy, and trust, are statistically significantly important in order to address a new model to suit the Saudi Arabian requirement which could led to influence Saudi Arabian citizens to adopt e-government services.

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