Factors influencining Citizen intention to adopt E-government in Saudi Arabia

Sulaiman A. Alateyah
saa1y10@ecs.soton.ac.uk
Electronics and Computer Science
University of Southampton
Southampton, UK

Richard M Crowder
rmc@ecs.soton.ac.uk
Electronics and Computer Science
University of Southampton
Southampton, UK

Gary B Wills
gbw@ecs.soton.ac.uk
Electronics and Computer Science
University of Southampton
Southampton, UK

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.**

Keywords-component; E-government, adoption, factors, G2C, intention.

I. INTRODUCTION

The World Wide Web (WWW) has become a necessity and an indispensable tool in the daily life of people worldwide [1, 2]. 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. [3].

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 [2, 4]. 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 [5] 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 [6].

The Saudi government launched the YESSER Program, the country's first national E- government strategy, in 2005 [7]. 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 current government of the Kingdom of Saudi Arabia is to adopt and activate communication and IT systems which lead to the creation of an IT community and a digital economy [8]. 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 [8]. Furthermore, it has been announced by Saudi E-Government Program [8] that to achieve the objectives, a set of promising ambitious plans and strategies have been adopted by the Saudi Arabian government. The first phase of the plans for developing and implementing the E-government program has been completed, between 2006 to 2010, and the second is progressing from 2012 to 2016 [9][9][9][9][8]. 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 [10].

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 3, 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 4 presents the results of the study; and finally, Section 5 presents the conclusion.

II. LITERATURE REVIEW

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 significant challenge. Meng Seng, et al. [11], 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 [11, 12]. 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 [5]. 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 [13]. 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 [14, 15].

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

In this paper, E-government is defined as a 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. Citizen Adoption

Adoption is an important aspect for the success of E-government initiatives in developing countries [16]. However, growing interest in E-government raises the question of how governments can increase citizen adoption and use of their online government services [17]. 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 [18, 19]. Moreover, Dong, et al. [20] 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 [17]. Furthermore, Carter and Belanger [13] agreed with other researchers that, although numerous studies have analyzed user adoption of electronic commerce [21-23], to date, no study has identified the core factors that influence citizen adoption of E-government initiatives. According to Colesca [24], many studies focused on the citizen adoption of E-government services suggest that trust [25], security [26] and transparency [27] are major issues for E-government adoption. Based on Margetts [28], cited by Yonazi, et al. [16], 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 [18]. User acceptance of IT is deemed a necessary condition for the effective implementation of any IT project [19, 29]. Adoption comes after direct experience with the technology and after an individual has decided to accept the technology [19, 30]. A number of studies have investigated the adoption of E-government services in developed countries [19, 31], whereas relatively little has been undertaken in developing countries [18, 19]. Successful implementation of adoptable E-government initiatives in that context requires complex customization between the technology and implementation context in developing countries [16, 32]; the result in designing citizen-adoptable E-government initiatives is still a challenge to many developing countries' governments [16]. AlAwadhi and Morris [19] 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. [33] 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.

C. 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 [34], Diffusion of Innovations Model (DOI) by Rogers [35] and Unified Theory of Acceptance and Use of Technology (UTAUT) by [30]. 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 [36], model for citizen adoption by [37] and. Rehman and Esichaikul [38] delivered a third model of citizen adoption based on integrated models adapted from TAM, DOI and UTAUT.

III. DISCUSSION

Based on the literature review, this discussion will consider, first, the challenges facing E-government implementation and development in Saudi Arabia, and secondly, the factors that influence citizens' intention to adopt E-government services; in order to answer the following key questions: (i) What are the challenges or barriers to implement and develop E-government in Saudi Arabia?, (ii) 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 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. Table 1 presents the influential factors from the literature review in 10 categories.

Table 1: Factors influencing citizens to adopt E-government services

No	Factors
1	Technical Infrastructure
2	Computer and Information Literacy • Age. • Gender. • Education.
3	Lack of Awareness
4	Security Issues • Transaction Security. • Information Security. • Perceived Risk.
5	Privacy Issues
6	Trust Issues • Trust in Government. • Trust In Internet.
7	Quality of Service • Service Quality. • Reliability. • Availability. • Speed of Delivery. • Information Quality.
8	Culture
9	DOI • Compatibility. • Complexity. • Image. • Relative Advantage.
10	Website Design • Perceived Usefulness. • Perceived Ease of Use. • Usability. • Accessibility. • Multi-lingual Website.

Although the identified factors are not yet proven to meet the needs of Saudi citizens, it will be used as bases to examine some well-known models and theories.

B. Methods to Validate this Research

In this paper, these identified factors are validated using the Triangulation method. Triangulation is used to increase precision in empirical research [39]. According to Runeson and Höst [39], using the triangulation method by taking different angles towards the studied object will provide a broader picture.

In order to validate the proposed factors using triangulation methods, three main components will be used. First, a detailed literature review has to be undertaken. Secondly, questionnaires need to be distributed among Saudis' citizens. Finally, interviews, questionnaires and expert reviews should be conducted among government staff and leadership.

IV. THE EXPLORATORY STUDY AND THE RESULT

A. Questionnaire for Saudi citizens

The citizens' questionnaire was designed to have closed-ended questions. The closed-ended questions found out how important the defined factors are that influence their intention to use the E-government services. The questionnaire was designed to have fifteen closed-ended questions about the identified factors under five categories including culture, security, privacy, trust and website design.

B. Questionnaire for Saudi government employees and interviewing experts

The questionnaires that undertaken by employees who work at any government organizations and expert interviews have been 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.

C. The results

The surveys were designed as follows; the citizens' questionnaire had fifteen closed-ended questions which were designed and distributed online, 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 2.

Table 2: The result of the one sample t-test

Factors	Citizen	Government Employees	Experts	Result
Security	.005	<.000	.013	Accepted
Transaction Security	<.000 .010	Not applied	<.000	Accepted
Information Security	<.000	.016	<.000	Accepted
Risk	<.000	Not applied	.013	Accepted
Privacy	.034	Not applied	<.000	Accepted
Trust	<.000	Not applied	.007	Accepted
Trust in Internet	<.000	Not applied	<.000	Accepted
Trust in Government	<.000	Not applied	.080	Accepted[1]
Culture	<.000	.006	.004	Accepted
Usefulness	<.000	Not applied	.031	Accepted
Ease of Use	<.000	Not applied	.020	Accepted
Multi-Lingual	Not applied	.008	.052	Accepted[2]
Usability	Not applied	<.000	.007	Accepted
Accessibility	Not applied	<.000	.004	Accepted
Relative Advantage	Not applied	<.000	.013	Accepted
Compatibility	Not applied	<.000	.031	Accepted
Image	Not applied	.001	.020	Accepted
Complexity	Not applied	.014	.013	Accepted
Computer and Information Literacy	Not applied	<.000	.033	Accepted
Gender	Not applied	.009	.013	Accepted
Education	Not applied	<.000	.013	Accepted
Age	Not applied	.005	.020	Accepted
Technical Infrastructure	Not applied	.001	.013	Accepted
Lack of Awareness	Not applied	<.000	.048	Accepted
Service Quality	Not applied	<.000	.013	Accepted
Reliability	Not applied	<.000	.007	Accepted
Availability	Not applied	<.000	.007	Accepted
Speed of delivery	Not applied	.036	.007	Accepted
Information quality	Not applied	.016	.013	Accepted

[1] Based on the literature review and the citizens' result.

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

D. The reliability of the results

A common way to ensure 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 [40]. Reliability, which is what it is concerned with here, refers to the extent to which data analysis procedures will produce consistent results [41]. Furthermore, the reliability value was argued by researchers, which [40] stated that the reliability value of 0.7 to 0.8 is an acceptable value for Cronbach's alpha (α). However, Nunnally [42], Liu and Arnett [43] suggested that as a "rule of thumb" 0.6 could be accepted.

After presenting the result of the questionnaires, an assessment of the reliability was carried out using Cronbach's alpha. The values of Cronbach's alpha were acceptable; citizens' questionnaire (α=0.618), 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.

V. 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. There are common challenges such as privacy, security, trust, culture, computer and information literacy, 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 question of this research is (i) 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.

ACKNOWLEDGMENT

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

REFERENCES

[1] J. Pérez-Villaplana, "Technology for e-Government: A Study Case," *The European Journal for the Information Professional*, vol. 4, pp. 33-38, April 2003.

[2] 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 Saudi Arabia," *Transforming Government: People, Process and Policy*, vol. 4, pp. 14-36, 2010.

[3] F. Salem, "Exploring E-Government Barriers in the Arab States," *Policy Briefs Series, Policy Brief 2, Dubai, Dubai School of Government*, 2006.

[4] P. Beynon-Davies and M. D. Williams, "Evaluating electronic local government in the UK," *Journal of Information Technology*, vol. 18, pp. 137-149, 2003.

[5] United Nations (2010, 05/07). *The United Nations E-Government Development Database.* Available: http://www2.unpan.org/egovkb/about/index.htm

[6] United Nations "United Nations E-Government Survey : Leveraging e-government at a time of financial and economic crisis," New York2010 2010.

[7] S. Sahraoui, G. Gharaibeh, and A. Al-Jboori, "E-GOVERNMENT IN SAUDI ARABIA: CAN IT OVERCOME ITS CHALLENGES?," *eGovernment Workshop '06,* 2006.

[8] Saudi E-Government Program. (2012, 27/02). *Strategy and Action Plan*. Available: http://www.yesser.gov.sa/en/MechanismsandRegulations/strategy/Pages/default.aspx

[9] (23/06). *Saudi's National ID*. Available: http://www.moi.gov.sa/wps/portal/civilaffairs/home

[10] B. A. Al-Sheha, "E-Government program of Saudi Arabia Advantages and Challenges," *King Fahd University of Petroleum and minerals, Finance and Economics Department. Retrieved from: http://unpan1. un. org/intradoc/groups/public/documents/unpan/unpan*, vol. 33485, 2007.

[11] 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.

[12] P. T. Jaeger and K. M. Thompson, "E-government around the world: lessons, challenges, and future directions," *Government Information Quarterly*, vol. 20, pp. 389-394, 2003.

[13] 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

[14] OECD, *e-Government Studies: The e-Government Imperative*: OECD Publishing, 2003.

[15] 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.

[16] 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.

[17] 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.

[18] 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.

[19] 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.

[20] 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.

[21] 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.

[22] 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.

[23] 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.

[24] 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.

[25] 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.

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

[27] 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.

[28] H. Margetts, "E-Government in Britain—A Decade On," *Parliamentary Affairs*, vol. 59, pp. 250-265, 2006.

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

[30] 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.

[31] 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.

[32] R. Heeks, *Implementing and managing eGovernment: An international Text*. London: SAGE Publications Ltd 2006.

[33] M. Alshehri, S. Drew, and O. Alfarraj, "A Comprehensive Analysis of E-government services adoption in Saudi Arabia: Obstacles and Challenges," *International Journal of Advanced Computer Science and Applications*, vol. 3, pp. 1-6, 2012.

[34] F. D. Davis, "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," *MIS Quarterly*, vol. 13, pp. 319-340, 1989.

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

[36] 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.

[37] M. AlNuaimi, K. Shaalan, M. Alnuaimi, and K. Alnuaimi, "Barriers to Electronic Government Citizens' Adoption: A Case of Municipal Sector in the Emirate of Abu Dhabi," in *Developments in E-systems Engineering (DeSE), 2011*, 2011, pp. 398-403.

[38] 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.

[39] 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.

[40] A. Field, *Discovering statistics using SPSS*: Sage Publications Limited, 2009.

[41] M. N. K. Saunders, P. Lewis, and A. Thornhill, *Research methods for business students*, 5TH ed.: Pearson, 2009.

[42] J. C. Nunnally, *Psychometric theory*, 2ed ed. New York: McGraw-Hill, 1978.

[43] 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.