UNIVERSITY OF SOUTHAMPTON

FACULTY OF PHYSICAL AND APPLIED SCIENCE

Electronics and Computer Science

AN INTEGRATED MODEL FOR CITIZENS TO ADOPT e-GOVERNMENT SERVICES IN THE KINGDOM OF SAUDI ARABIA

by

Sulaiman Abdullah Alateyah

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ABSTRACT

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This research discusses Electronic Government (e-Government), in particular the challenges that face its development and widespread adoption in Saudi Arabia. In this research 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/or consume services. Electronic Government has been implemented in developed countries for some time, while in Saudi Arabia it is still at the implementation and developing stages. Electronic Government services face challenges, including trust, privacy, security, computer and information literacy, and culture. In addition, this research has identified the influential factors, including quality of service, diffusion of innovation, knowledge and skills, culture, lack of awareness, technical infrastructure, website design, security, privacy, and trust, that affect the citizens' intentions to adopt e-Government services in Saudi Arabia. Therefore, these factors have been evaluated using an exploratory study, which uses mixed-methods, to confirm that these proposed factors are important and that the citizens are concerned about them. Resulting from the exploratory study, this research has developed an integrated model for aiding the Saudi government by identifying the factors that would influence citizens to adopt their services. The model has been validated by the main study for this research, including questionnaires for citizens, government employees and experts. The gathered data were analysed and assessed using the Structural Equation Modelling approach. From the main study, the results showed that the proposed model fits the data and applies to the Saudi context. Therefore, the validated model would be considered

essential in order to help the Saudi government to overcome the concerns of their citizens to use and adopt the online services. Consequently, applying the proposed model can reduce the government's time, effort, and money in influencing their citizens' intentions to adopt the proposed online services.

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DECLARATION OF AUTHORSHIP

I, Sulaiman Alateyah

declare that this thesis entitled “An integrated model for influencing citizens’ intentions to adopt e-Government services in Kingdom of Saudi Arabia” and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at this University;
- Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
- Where I have consulted the published work of others, this is always clearly attributed;
- Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
- I have acknowledged all main sources of help;
- Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
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  3. Alateyah, S., Crowder, R. M. & Wills, G. B. 2013. An exploratory study of proposed factors to adopt e-government services. *International Journal of Advanced Computer Science and Applications*, Vol 4, No 11.

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Signed: Sulaiman Alateyah.....

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Abbreviations

AMOS	Analysis of Moment Structures
CFI	Comparative Fit Index
e-Government	Electronic Government
EGDI	Electronic Government Development Index
GFI	Goodness-of-Fit Index
G2G	Government to Government
G2B	Government to Business
G2C	Government to Citizen
G2E	Government to Employee
ICT	Information and Communication Technology
KSA	Kingdom of Saudi Arabia
RMR	Root Mean Square Residual
RMSEA	Root Mean Square Error of Approximation
SEM	Structural Equation Modelling
SPSS	Statistical Package for the Social Sciences
SSO	Single-Sign-On
WWW	World Wide Web

Chapter 1: **Introduction**

The World Wide Web (WWW) has become a necessity and an indispensable tool in the daily life of people worldwide (Liu and Arnett, 2000). 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, such as reading newspapers and paying bills (Salem, 2006).

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 other departments and external organisations (Beynon-Davies and Williams, 2003; Al-Sobhi *et al.*, 2010). Therefore, in order to succeed and build for the future, the administrative processes of governments 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. Within the paradigm of human and social development, the United Nations (2005) 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 knowledge and 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 (United Nations, 2005). Additionally, according to the United Nations report that the majority of e-Government projects in developing countries have failed (United Nations, 2005), because of insufficient in-depth exploration of requirements (Salem, 2006). Therefore, the main object for this research is how to develop a model which can be constructed with factors that would influence the Saudi Arabian citizens' intention to adopt e-Government services. In order to achieve the main objective of this research, there is a research question which should be answered. The key 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?".

After identifying the main object of this research, and what is the key question of this research, an introduction is given about the current achievements of the

Saudi Arabian e-Government, with a brief comparison with other selected countries. If the e-Government survey carried out by the United Nations is considered, which incorporates 192 countries, the position of Saudi Arabia has improved from 105th to 36th between 2003 and 2014. This means that Saudi Arabia is in the top third of countries that have implemented e-Government. Table 1-1 presents the improvement of Saudi Arabia's e-Government ranking. The United Nations e-Government development index (EGDI) is a comprehensive scoring of the willingness and capacity of national administrations to use online and mobile technology in the execution of government functions (United Nations, 2010). Table 1-2 shows the improvement of the Saudi Arabian index value between 2003 and 2014. The results from the Tables show that the Saudi Arabian government is making good progress in implementing and developing the Saudi Arabian e-Government.

Table 1-1: The improvement of Saudi's e-Government rank based on data from the United Nations (2014) .

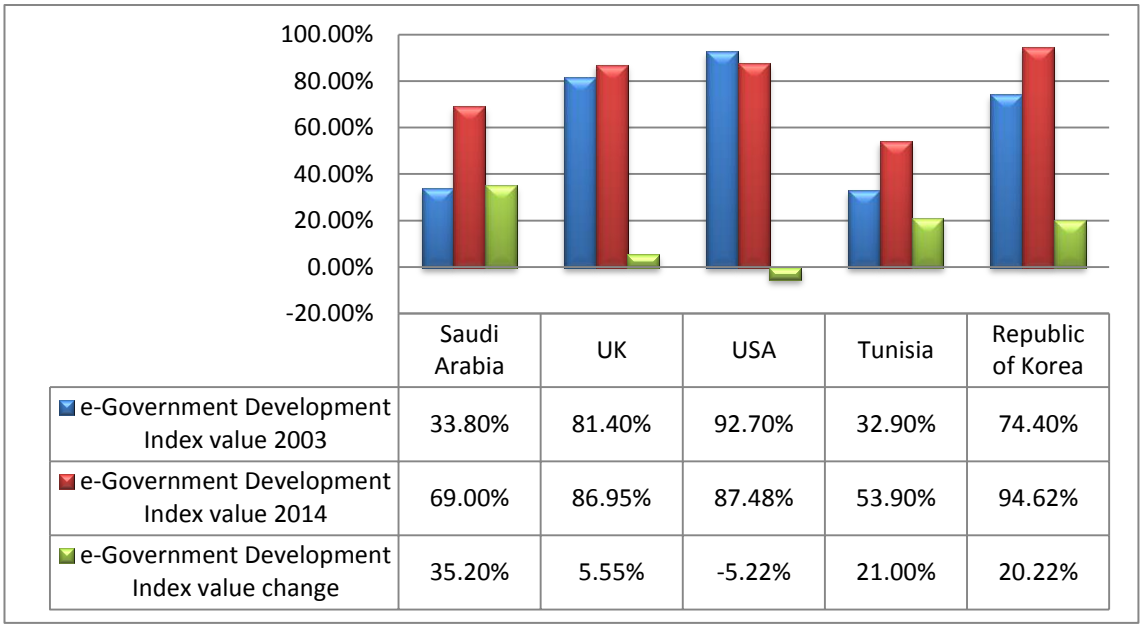
Year	2003	2005	2008	2010	2012	2014
Rank	105	80	70	58	41	36

Table 1-2: The Saudi's e-Government development index United Nations (2014).

Year	2003	2005	2008	2010	2012	2014
Index Value	33.80%	41.05%	49.35%	51.42%	66.58%	69.00%

By comparing Saudi Arabia with the highest scoring countries of different regions including the United Kingdom, the United States, Tunisia and Republic of Korea, it can be seen from Figure 1-1 that Saudi Arabia has improved the most. This means the Saudi government has worked to improve its services to the benefit of e-Government to its citizens. In addition, the United Nations (2010) reported that Saudi Arabia's national portal featured links to 215 separate e-services. While not a single sign-on system, the electronic portal easily connects Saudi citizens to the online services of various government agencies for such purposes as obtaining personal documents, filing complaints, utilizing business services and paying utilities. A single sign-on

(SSO) is an authentication of a session that permits a user, by logging in once, to gain access to multiple applications (Wang *et al.*, 2012). Although the Saudi government continues to develop the current e-Government project, the main challenge, in fact, facing the government of Saudi Arabia is how to influence the citizens to adopt the new online services. If a product has been produced, and is not being used, therefore, what is the point of inventing that product? Hence, the Saudi government should identify the major factors that would encourage its citizens to use and then adopt e-Government services. In the following section, information about Saudi Arabia is provided to give a clear picture of the Saudi culture, religion, main resources, and other general information. In addition, information about the current Saudi e-Government program is presented in the following sections.



	Saudi Arabia	UK	USA	Tunisia	Republic of Korea
e-Government Development Index value 2003	33.80%	81.40%	92.70%	32.90%	74.40%
e-Government Development Index value 2014	69.00%	86.95%	87.48%	53.90%	94.62%
e-Government Development Index value change	35.20%	5.55%	-5.22%	21.00%	20.22%

Figure 1-1: e-Government development index value change between 2003 and 2014 - data from the United Nations (2014).

1.1 Saudi Arabia - General overview

The Kingdom of Saudi Arabia (KSA), with a population of 27 million, is located in the southwest of Asia, with Arabic as the official language (CIA, 2012). Saudi Arabia's wealth is based on natural resources including petroleum, natural gas, iron ore, gold and copper (CIA, 2012). Although a decade ago computers were not widespread and people were not really interested in them, now most Saudis have at least a laptop while some others have multiple computers and a

smart phone (Communications and Information Technology Commission, 2013). At the end of 2013, government figures showed that Internet subscriptions have reached about 16.5 million, which means over 55% of people in Saudi Arabia have access to the Internet (Communications and Information Technology Commission, 2013). However, Saudis demand both technology and the Internet. In addition, based on the number of Internet subscriptions, most of the Saudis who access the Internet may flick through an electronic newspaper, watch news and get forecasts, music, movies and many other things. Some individuals may pay their bills, buy goods and apply for jobs online, while the rest prefer to use paper and deal with others face-to-face.

1.2 e-Government in Saudi Arabia

The Saudi government launched the *Yesser* Program, the country's first national e-Government strategy, in 2005 (Sahraoui *et al.*, 2006). Yesser is an Arabic word and it means 'make it easy'. 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 was to adopt and activate communication and IT systems which led to realize an IT community and a digital economy (Saudi e-Government Program, 2012). The government of Saudi Arabia has taken steps to develop business processes and disseminate the concept of e-services in various government agencies in order to realize their vision (Saudi e-Government Program, 2012). Furthermore, it has been announced by Saudi e-Government Program (2012) 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 have been set and have actions, which is the first plan which took place from 2006 to 2010, and the second is progressing from 2012 to 2016 (Table 1-3). Additionally, the e-Governance strategy would provide citizens with access to all government-related services and information. This will enhance the accountability of the public sector in Saudi Arabia 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 (Al-Sheha, 2007). Although the e-Government project is now in the middle of the second

phase, the services being built are still focussed on business with limited services for citizens.

Table 1-3: Action plans for implementing and developing e-Government in Saudi Arabia – data from the Saudi e-Government program (2012).

Objectives and initiatives 2006 – 2010	Components of the second plan 2012 – 2016
Provide better services by the end of 2010.	It comprises a national vision, a set of values and four strategic themes: • Build sustainable e-Government workforce. • Improve the experience of the public in their interaction with government. • Develop a culture of collaboration and innovation. • Improve government efficiency.
Increase internal efficiency and effectiveness.	
Contribute to the country's prosperity.	

1.3 Adopting new technology

Adopting new technology is required to succeed in implementing e-Government in developing countries, Saudi Arabia for instance (Yonazi *et al.*, 2010). The success of the implementation of the e-Government is dependent not only on the government support, but also on the willingness to accept and adopt e-Government services by the citizens (AlAwadhi and Morris, 2008). 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 (AlAwadhi and Morris, 2008). In fact, the research on exploring factors that would encourage citizens to adopt e-Government services in developing countries is not enough (AlAwadhi and Morris, 2008). Therefore, one of the aims of this research is identifying the factors that affect the citizens' intentions to adopt e-Government services.

1.4 Thesis structure

The flow of this research and the chapters' contents are shown in Figure 1-2. Many definitions of electronic government (e-Government) have been explored in Chapter 2 along with the challenges facing e-Government. e-Government is identified based on different views and requirements. ICT is stated as a key

component of e-Government. e-Government is a triangle relation between three main drivers which offer the benefits of saving money, effort, with increasing the services' efficiency. In addition, information security and privacy are considered in e-Government's relations. Governments are facing common challenges when implementing and developing e-Government, whereas some challenges are faced only by specific governments. Moreover, adoption is a critical challenge that many governments have faced. Therefore, common adoption models which were used to influence citizens' intentions are presented in Chapter 2.

A comparison between electronic and paper-based systems and the challenges facing the Saudi Arabian government in implementing e-Government are illustrated in Chapter 3. The transaction between the main stakeholders - government, business, and citizen - is presented in two different scenarios to show how the transaction is done in the traditional way compared to the electronic approach. Additionally, the challenges that are facing the Saudi Arabian government are presented, including the adoption which is identified as the main gap in this research. Therefore, some factors that could influence citizens' intentions are identified and grouped in Table 3-1.

An initial new integrated model is proposed in Chapter 4. The model is constructed with two main blocks: Intention to use e-Government services and Government's Readiness. The blocks have been broken down into details, identifying their attributes.

The research methodology for this research is addressed in Chapter 5. The method that is used to confirm the proposed factors and the research model is the triangulation method. The perspectives that are used in this approach are a detailed literature review, citizen's questionnaires, and questionnaires for government employees and experts. The final model was validated by using Structural Equation Modelling (SEM).

Chapter 6 presents the results of the exploratory study. The exploratory study was undertaken to confirm the proposed factors in Table 3-1. The data was gathered from three different groups including citizen's questionnaires, government employees' questionnaires, and experts' interviews. The surveys were built using the mixed-methods technique. The data was analysed by

SPSS. The results found that the proposed factors are significantly important in influencing citizens' intentions.

The evaluation study of the developed model is presented in Chapter 7. The study was undertaken to confirm the developed model. The data was gathered from two sets of questionnaires which were built using the mixed-methods approach. The two sets of questionnaires were distributed among first, the Saudi Arabian citizens, and the second group was the government's employees and experts in the field. The data was analysed by Structural Equation Modelling (SEM).

Chapter 8 presents the data analysis and the results for the citizen's questionnaires. The results show that the Citizens model is fitting the data well (CFI= 0.903, GFI= 0.855, RMR= 0.077, and RMSEA= 0.055) whereas a value close to 1 for CFI and GFI indicates a good fit. In addition, RMR and RMSEA represent a good fit with a value lower than 0.08 and a perfect match with a value of 0.05 or less.

The data from the government employees' and experts' questionnaires and their results are analysed in Chapter 9. It has been shown that the Government model is applicable to the Saudi Arabian context (CFI= 0.903, GFI= 0.829, RMR= 0.057, and RMSEA= 0.050).

Chapter 10 presents the research discussion where the key points of this research and the findings are identified.

Finally, Chapter 11 presents the conclusions of this research along with the research contributions. In addition, a plan of possible future work is suggested.

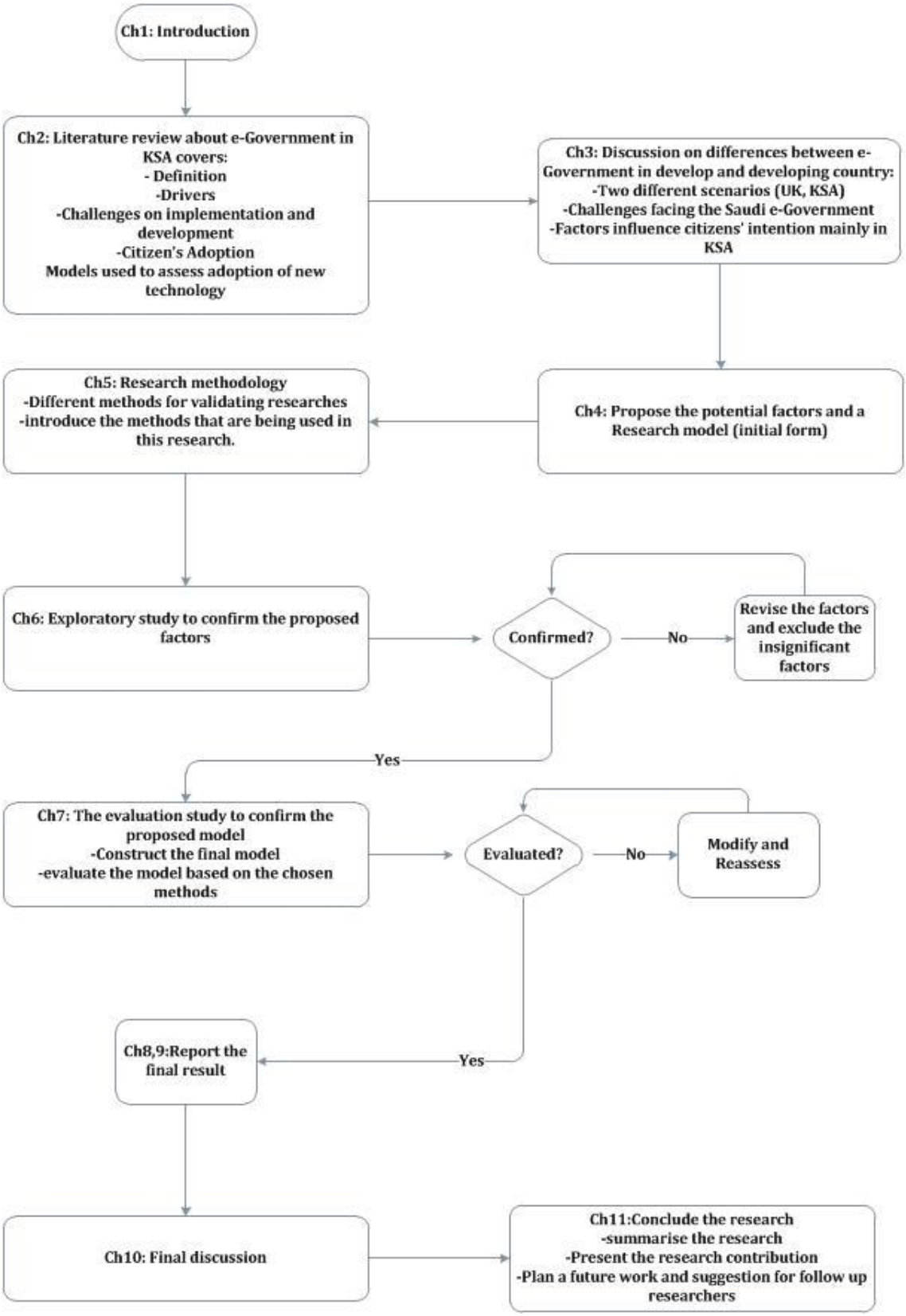


Figure 1-2: The summary of the research flow and the chapters' contents

Chapter 2: **Literature review**

In this chapter, a literature review is presented. In order to answer the research question and then achieve the research objective, there are some points to be introduced in order to make the picture clearer. Firstly, a wide range of different definitions of e-Government from researchers is discussed. As Saudi Arabia has been chosen as the case study in this research, the related e-Government drivers and barriers within the country can also be identified and discussed. The review primarily concentrates on the adoption of e-Government services by citizens, and different approaches that have been used to influence citizens to adopt e-Government services.

2.1 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.* (2011), 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 (Jaeger and Thompson, 2003; Meng Seng *et al.*, 2011). 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 (United Nations, 2010). 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 (Carter and Bélanger, 2004a). 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 (OECD, 2003; Alghamdi *et al.*, 2011). Lu *et al.* (2004) define e-Government as an ICT application that interacts efficiently, effectively, transparently and accountably with stakeholders. Lu *et al.* (2004) also identify three different transactional exchanges: Government to Government (G2G), Government to Business (G2B) and Government to Citizen (G2C), while Ndou (2004) stated that e-Government is simply providing information and engaging in digital transactions, which can be achieved through a simple web portal.

A wide range of different definitions from researchers has 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.

After presenting different researchers' definitions, a summary of what this writer understood leads to define e-Government 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.

2.2 Drivers for e-Government

The drivers for e-Government are still being widely discussed in the literature. Some researchers state that there are only three common drivers, which are Government to Government (G2G), Government to Business (G2B) and Government to Citizen (G2C) (Seifert, 2003; Al-Shehry *et al.*, 2006; Sang and Lee, 2009), while Fang (2002), Carter and Bélanger (2004a), Ndou (2004) and Alghamdi *et al.* (2011) identify a new driver, Government to Employee (G2E), as reported by Fang in 2002. In G2E the emphasis is on facilitating the management and internal communication of the civil service with the aim of moving toward a paperless e-Office. In addition, according to Ndou (2004), for most researchers G2E is subsumed into the G2G interaction type. However, Ndou (2004) does acknowledge that as employees are seen as internal customers, in a customer-centric organisation, G2E may need to be considered separately.

The three most widely recognized drivers are G2G, G2B and G2C, and they are considered in the following sections. G2E is currently omitted, as it is considered internal to government and does not directly impact citizens who are not government employees.

2.2.1 Government to Government

Government to Government (G2G) represents the infrastructure of e-Government in which governments (federal, state and local) incorporate their

internal systems and procedures into a central system (Seifert, 2003; Alsaghier *et al.*, 2009; Sang and Lee, 2009). Furthermore, Fang (2002) states that one of the effects of G2G is that it allows government departments or their executive agencies to collaborate using a large database, which has an impact on efficiency and effectiveness in their exchanges and commodities. The main aim of the G2G sector is to facilitate processes between inter-government organisations by restructuring collaboration and coordination (Seifert, 2003; Alsaghier *et al.*, 2009). According to Alsaghier *et al.* (2009), based on the work of Seifert (2003), the motivation behind G2G e-Government improves the consistency of sharing data, resulting in increased efficiency, a reduction in transaction costs, an increase in transition speed and a reduction in the number of people needed to complete a task. Examples of the G2G sector include e-Identity, e-Security Services, Electronic Document Management and Process Management Services (Alsaghier *et al.*, 2009).

2.2.2 Government to Business

Government to Business (G2B) initiatives receive a significant amount of attention, in part because of the high enthusiasm of the business sector and the potential for reducing costs through improved procurement practices and increased competition (Gilbert, 2001; Seifert, 2003). According to Fang (2002), G2B actively drives e-Transaction initiatives such as e-Procurement and the development of an electronic marketplace for government purchases, and carries out government procurement tenders through electronic means for exchange of information and commodities, and sale of goods and services. The G2B sector deals primarily with the sale of surplus government goods to the public and the procurement of products and services (Seifert, 2003; Alsaghier *et al.*, 2009). The main application of G2B e-Government is e-Procurement, which allows government agencies to gain the benefits realized in the private sector through electronic means (Fang, 2002; Alsaghier *et al.*, 2009). According to Alsaghier *et al.* (2009), FedBizOpps.gov website is an example of G2B, which is administered by the General Services Administration (GSA) and has been established by the United States government as an independent agency to accomplish and support basic functions of federal agencies. In addition, FedBizOpps.gov is designed to serve as a central location for agencies to post procurement notices (Alsaghier *et al.*, 2009).

2.2.3 Government to Citizen

Government to Citizen (G2C) provides the momentum to put public services online, in particular through electronic transaction delivery for the offer and exchange of information and communications (Fang, 2002). G2C refers to all relationships between citizens and the government over an electronic medium (DeBenedictis *et al.*, 2002; Alsaghier *et al.*, 2009). According to Alsaghier *et al.* (2009), based on the work of Seifert (2003), G2C e-Government is designed to facilitate citizen collaboration with government and is perceived to be the primary goal of e-Government. Citizens can benefit from e-Government services. Furthermore, using G2C e-Government services, citizens' transactions with government, such as booking a driving theory test, can be less time-consuming and easier to complete (Alsaghier *et al.*, 2009). Over the next decade, the demand for e-Government services is expected to grow considerably as young people – who are now living in an information environment with personal computers, including an Internet connection as a routine presence in their life – become adults (Seifert, 2003; Alsaghier *et al.*, 2009). Although many examples of the G2C sector can be found in the United States of America at the local and state level, there are also examples at the federal level (Seifert, 2003). One example of the G2C initiative is Benefits.gov, which is an American governmental website that offers a single point of access for citizens to find out about and determine potential eligibility for government benefits and services (Alsaghier *et al.*, 2009). In the United Kingdom, for instance, Gov.uk is the main website for citizens to access all the services they need. Meng Seng *et al.* (2011) identified two categories: citizen direct benefits (tangible) and citizen indirect benefits (intangible). Examples of direct benefits that can be obtained from the main services offered are:

- Saves money in transportation, parking and postage, and customer travelling time
- Reduces the number of general visitors to government offices
- Decreases face-to-face interaction with general enquiries, leaving more time to deal with specific enquiries
- Prevents long visitor queues
- Provides downloadable forms and documents round the clock

- Enables quicker responses to enquiries

Indirect benefits, which can be found in most electronic services media, include:

- User-friendly and easy to use
- Features with disability functions
- Easy to navigate
- Available most of the time (apart from maintenance and security issues)
- Security and privacy
- Keep information updated
- Appreciate customer feedback
- Use easy to understand language
- Reduce bureaucracy
- Increase customer retention

2.3 Challenges facing e-Government

Developing any framework, such as one for 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 concerned (Al-Sobhi *et al.*, 2010). 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 they can be solved or avoided. The following sections discuss the most common challenges in general that other researchers have found, and present their solutions, followed by the challenges facing the Arab states.

2.3.1 Common Challenges

In the following sections, well-known challenges are presented. These challenges have been identified by researchers as challenges facing governments in developed and developing countries.

2.3.1.1 Trust challenges

Research has identified many barriers to adopting e-Government services, including trust (Carter and Bélanger, 2005; Al-Sobhi *et al.*, 2010; Heidemann *et al.*, 2013). The word 'trust' can mean different things to different people. However, it is clear that trust is arguably the most difficult aspect of any digital security system (Jones, 2011). Bannister and Connolly (2011) state that terms like 'trust', 'transformational government', 'transformative e-Government', 'reinventing government', 'innovative government' and 'citizen centric government' are commonly used to describe similar concepts. Trust can be the relationship between people, which means it is the belief that the other party behaves in a socially responsible manner as expected, and in doing so, it fulfils the trusting party's expectations (Warkentin *et al.*, 2002). Moreover, the general concept of trust is defined as trust in a subject that has long been of interest in a variety of fields of human endeavour. While this has resulted in a rich vein of scholarship on trust, it has also led to a diversity of conceptualizations (Bannister and Connolly, 2011). However, these are general definitions of trust. What this research is concerned with is trust between governments and their citizens, and trust in the e-Government system, which uses a network of connections. Bannister and Connolly (2011) noted that trust in government is a different kind of trust than interpersonal trust and the measurement of trust. Additionally, there are some citizens' concerns about implementing e-Government that have been noticed, such as trust in government (Musau *et al.*, 2011). These concerns, according to Musau *et al.* (2011), might be raised by the lack of trust by citizens in their government, which may be caused by some attributes such as the services are not accessed as they should be, a lack of ICT services, or the data on the e-Government website is outdated.

2.3.1.2 Privacy and security challenges

Al-Sobhi *et al.* (2010) mentioned in their research that many researchers have highlighted privacy and security issues as a significant factor impacting e-Government implementation. It has been stated that sharing information through the Internet might increase many risks, such as privacy violation and security issues, including losing personal information or financial information which possibly caused fraud (Carter and Bélanger, 2005; Al-Sobhi *et al.*, 2010). Although most individuals have little knowledge about the real risks to their privacy in an online environment, as individuals spend more time online, they are becoming increasingly concerned about Internet privacy (Cranor *et al.*, 2006). People find that learning about privacy and reading website privacy policies difficult and time consuming (Cranor *et al.*, 2006; Tuunainen *et al.*, 2009). With regard to security, this is a basic requirement of information (Mingsheng *et al.*, 2011). It is asserted that non-profit organisations, such as governments and executive agencies, should improve the security of their services through the Internet (Pan *et al.*, 2006; Al-Sobhi *et al.*, 2010).

2.3.1.3 Computer and information literacy challenges

It has been mentioned by many researchers that e-Government has faced challenges such as computer and information literacy (Pan *et al.*, 2006; Pilling and Boeltzig, 2007; Al-Sobhi *et al.*, 2010; Alomari *et al.*, 2014). Winter *et al.* (1997) state that 'computer literacy' is a widely used term, but it is not precisely defined. Cole and Kelsey (2004) present and organize researchers' definitions of computer and information literacy. First, computer literacy can be considered to mean the minimum knowledge, know-how, familiarity, capabilities and abilities of computers (Bork, 1985; Cole and Kelsey, 2004). In addition, Hunter (1983) states that computer literacy skills vary from person to person and from time to time, but that computer literacy is whatever a person needs to be able to use (and know about) computers (Cole and Kelsey, 2004). Cole and Kelsey (2004) describe computer literacy as accessing and using information through the use of hardware and software. In contrast, information literacy is defined as the ability to use information, or possibly the possession of knowledge of information (Behrens, 1994; Cole and Kelsey, 2004). Breivik (1991) states that information literacy is, in fact, the first component on the continuum of critical thinking skills (Cole and Kelsey, 2004). However, there is

a basic level of computer skills needed to use e-Government services (Tsai, 2002; Poynton, 2005).

2.3.1.4 Cultural challenges

Any organisational changes are strongly influenced by cultural factors and e-Government initiatives are no different (Walsham *et al.*, 1988; Avgerou, 1993; Ali *et al.*, 2009). It has been stated that culture is one of the most common barriers facing e-Government (Hwang *et al.*, 2004; Schneider, 2010). The culture of an organisation is not static and governs the way we interact with one another (Schein, 2004; Johannessen, 2010). 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 culture, etc. (Leung *et al.*, 2005; Ali *et al.*, 2009). In addition, it has been asserted that beliefs and values dictate the way people think, behave, solve problems, make decisions, plan and lay out their homes and cities, and even organize their economic, political and transport systems (Hall, 1976; Ali *et al.*, 2009). National culture can be described as a collective mindset that sets apart one group of people from another (Hofstede, 1991; Ali *et al.*, 2009). It is also suggested that people share a collective national character that represents their cultural mental programming (Hofstede, 1991; Ali *et al.*, 2009). This mental programming shapes values, beliefs, assumptions, expectations, perceptions and behaviour (Myers and Avison, 2002; Ali *et al.*, 2009). According to the work of Hofstede (1980), which has been cited by Ali *et al.* (2009), culture is equivalent to the collective mental programming of a group, tribe, minority or nation. It is the aggregate of individual personality traits.

2.3.1.5 Accessibility challenges

Web accessibility is simply defined as making the information on a website accessible to all human beings, especially those who are disabled (e.g. by blindness, low vision, deafness, hard of hearing, physical disabilities or cognitive disabilities) and automatic tools (Abanumy *et al.*, 2005). The aim of web accessibility is to allow all people to access information on the web, without restriction (Abanumy *et al.*, 2005). It has been noted that lower quality of e-Government services is a result of providing low levels of Internet access to all kind of users (Jaeger and Thompson, 2003; Heidemann *et al.*, 2013).

Additionally, one of the crucial requirements for building a successful e-Government is accessibility (Abanumy *et al.*, 2005). Therefore, failing to provide an accessible website to the intended target users would lead to failure in implementing e-Government (Abanumy *et al.*, 2005).

2.3.1.6 Open Government Data challenges

It has been argued that the government data should be opened for citizens to access (Sheridan and Tennison, 2010). There are three criteria which should be found in a database to be defined as Open data which are: made accessible online, published in a readable format, and licensed to allow others to re-use it (Hall *et al.*, 2012). In addition, the e-Government projects are implemented to provide online services, such as government investments, budgets and other government data. These data, which do not put the government at risk or affect the government's security, is what the citizens are concerned about. Therefore, the citizens' demand for making the government data open is a rising issue that is facing the implementation of the e-Government (Harrison *et al.*, 2012).

2.3.2 Challenges facing e-Government in the Arab States

Most Arab countries share similar cultures, resources, religion, climate and geography, and hence have common barriers and challenges for e-Government. In addition, there are some barriers and challenges faced by these states based on research conducted by the Dubai School of Government (Salem, 2006). These challenges are categorized as follows:

- Capacity Deficit: lack of required knowledge for successful e-Government.
- Digital Divide: low Internet and personal computer penetration rates.
- Technical Infrastructure: most Arab countries suffer from inadequate ICT infrastructure within their public sector agencies.
- Institutional Framework: lack of appropriate e-Government institutional structure.

- Government Instability: although some governments implement e-Government as complementary, giving it high priority in this era is essential.
- Take-up of Services: provide limited information about online services to citizens and businesses; this leads to reluctance in using e-Government services.

2.4 Adoption

Adoption is an important aspect for the success of e-Government initiatives in developing countries (Yonazi *et al.*, 2010). However, growing interest in e-Government raises the question of how governments can increase citizen adoption and use of their online government services (Warkentin *et al.*, 2002). 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 (AlShihi, 2005; AlAwadhi and Morris, 2008; Ja'afer and ALnbhan, 2014). Moreover, Dong *et al.* (2011) 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 (Warkentin *et al.*, 2002). Furthermore, Carter and Bélanger (2004a) agreed with other researchers that, although numerous studies have analysed user adoption of electronic commerce (Pavlou, 2001; McKnight *et al.*, 2002; Gefen *et al.*, 2003), to date, no study has identified the core factors that influence citizen adoption of e-Government initiatives. According to Colesca (2009), many studies focused on the citizen adoption of e-Government services suggest that trust (Srivastava and Teo, 2005), security (Colesca, 2007) and transparency (Marche and McNiven, 2003) are major issues for e-Government adoption. Based on Margetts (2006), which was agreed by Yonazi *et al.* (2010), high adoption of these initiatives increases the chance that e-Government facilitates 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 (AlShihi, 2005). User acceptance of IT is deemed a necessary condition for the effective implementation of any IT project (Pinto and Mantel, 1990; AlAwadhi and Morris, 2008). Adoption comes after direct experience with the technology and after an individual has

decided to accept the technology (Venkatesh *et al.*, 2003; AlAwadhi and Morris, 2008). Based on the study by Venkatesh *et al.* (2003), when a person continues using a services, which would increase the intention to adopt, the user then would adopt the new services. Therefore, the user's intention to adopt new services comes after the person intends to use the services. A number of studies have investigated the adoption of e-Government services in developed countries (Titah and Barki, 2006; AlAwadhi and Morris, 2008), whereas relatively little has been undertaken in developing countries (AlShihi, 2005; AlAwadhi and Morris, 2008). Successful implementation of adoptable e-Government initiatives in that context requires complex customization between the technology and implementation context in developing countries (Heeks, 2006; Yonazi *et al.*, 2010); the result in designing citizen-adoptable e-Government initiatives is still a challenge to many developing countries' governments (Yonazi *et al.*, 2010). AlAwadhi and Morris (2008) conducted a study in Kuwait to explore factors that affect the adoption of e-Government services, and concluded that the main factors that could influence citizens to adopt e-Government were as follows:

- Usefulness of e-Government services
- Ease of learning and use: at the fingertips
- Cultural and social influences: people encouraged by their relatives (family, friends or colleagues)
- Remove face-to-face interaction
- Gender issues: women in Saudi Arabia and other countries would benefit more from e-Government services
- Technical issues: network connection, interruption
- Lack of awareness: government should launch a campaign to introduce new e-Government
- Trust in the Internet
- Cultural differences

However these factors influence Kuwaiti citizens to adopt e-Government services, these factors might also influence Saudi citizens since the culture in

Kuwait and Saudi Arabia is almost identical. In addition, Alshehri *et al.* (2012) has identified some factors that 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.

2.5 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 (TAM), the Diffusion of Innovations Model (DOI), and the Unified Theory of Acceptance and Use of Technology (UTAUT). Trustworthiness is a fourth model that has been addressed by (Bélanger *et al.*, 2002) to measure citizens' intention to use a new system. Trustworthiness has been used by Carter and Bélanger (2004a) 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 (Bélanger *et al.*, 2002; Carter and Bélanger, 2004a).

2.5.1 Technology Adoption Model

Davis (1989) 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) (Davis, 1989; AlNuaimi *et al.*, 2011). Davis (1989) 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" (Davis, 1989). The intention to use the system is determined by perceived usefulness and perceived ease of use (Davis, 1989; AlNuaimi *et al.*, 2011). Figure 2-1 was created by Carter and Bélanger (2004a) based on Davis (1989) research.

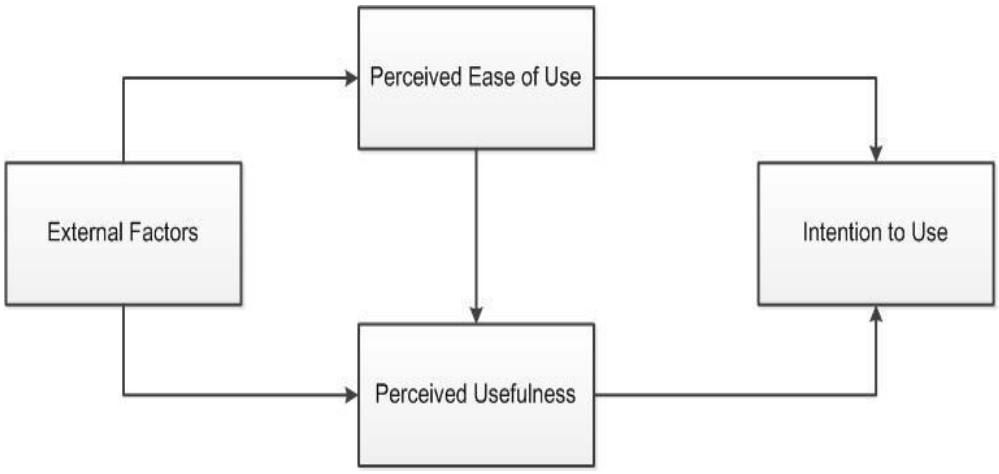


Figure 2-1: Technology Adoption Model adapted from Carter and Bélanger (2004a)

2.5.2 Diffusion of Innovations Model

Rogers (1995) 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 (Carter and Bélanger, 2004a). DOI consists of relative advantage, complexity, compatibility, trialability and observability. Rogers (1995) defines these attributes as follows (Carter and Bélanger, 2004a):

- **Relative advantage** is "the degree to which an innovation is seen as being superior to its predecessor".
- **Complexity** is "the degree to which an innovation is seen by the potential adopter as being relatively difficult to use and understand".
- **Compatibility** refers to "the degree to which an innovation is seen to be compatible with existing values, beliefs, experiences and needs of adopters".
- **Trialability** is "the degree to which an idea can be experimented with on a limited basis".
- **Observability** refers to "the degree to which the results of an innovation are visible".

2.5.3 Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology (UTAUT) has been presented by Venkatesh *et al.* (2003). Figure 2-2 shows the UTAUT model as discussed by Venkatesh *et al.* (2003). 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 (Venkatesh *et al.*, 2003). According to Venkatesh *et al.* (2003), these constructs are influenced by gender, age, voluntariness and experience. Venkatesh *et al.* (2003) have identified the four constructs as follows:

- **Performance expectancy** is "the degree to which an individual believes that using the system will help him or her to attain gains in job performance".
- **Effort expectancy** refers to "the degree of ease associated with the use of the system".
- **Social influence** is "the degree to which an individual perceives that important others believe he or she should use the new system".
- **Facilitating conditions** are "the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system".

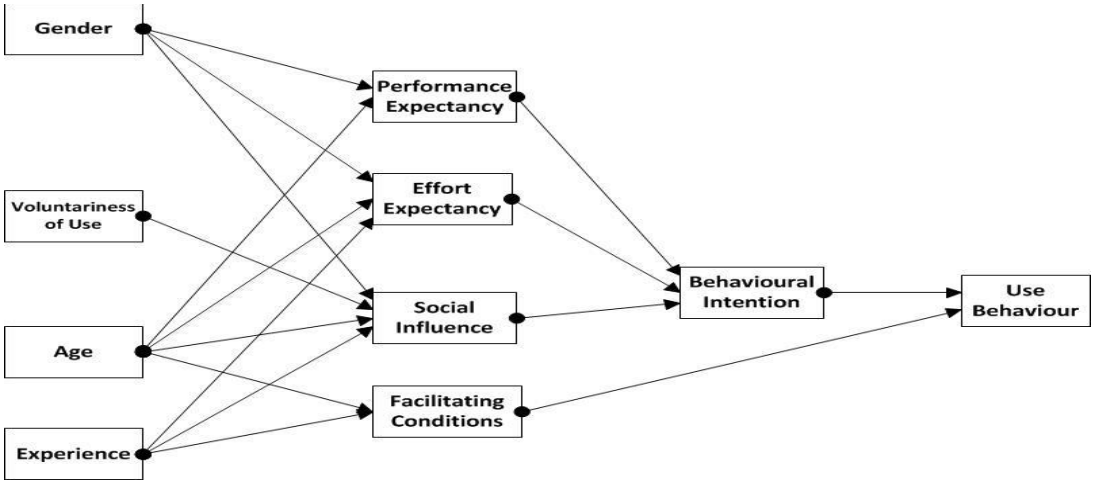


Figure 2-2: Unified Theory of Acceptance and Use of Technology adapted from Venkatesh *et al.* (2003)

2.6 Models proposed for influencing citizens 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 Bélanger (2004a) proposed a research model based on the Technology Adoption Model (TAM), the Diffusion of Innovations Model (DOI) and Trustworthiness. Second, AlNuaimi *et al.* (2011) presented another research model for citizen adoption that is based on TAM, DOI and the Unified Theory of Acceptance and Use of Technology (UTAUT). Rehman and Esichaikul (2011) delivered a third model of citizen adoption based on integrated models adapted from TAM, DOI and UTAUT.

2.6.1 Model of TAM, DOI and Trust in e-Government Adoption

Carter and Bélanger (2004a) proposed a research model that contains attributes from the TAM, DOI and Trustworthiness models (Figure 2-3). Compatibility, Relative Advantage and Complexity have been adopted from DOI, while Trialability and Observability have been excluded and replaced by Image (Carter and Bélanger, 2004a). Image refers to "the degree to which the use of the innovation is seen as enhancing an individual's image or social status" (Carter and Bélanger, 2004a; Slyke *et al.*, 2004). Carter and Bélanger (2004a) have adopted Perceived Usefulness and Perceived Ease of Use from TAM. Trustworthiness has been adopted and included in this author's research model.

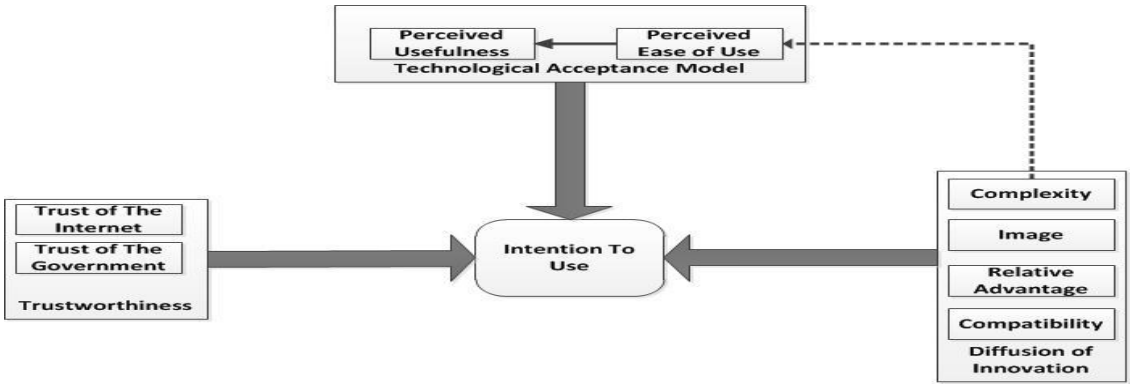


Figure 2-3: Model of TAM, DOI and Trustworthiness adapted from Carter and Belanger (2004a)

2.6.2 The proposed model of barriers to citizen adoption

AlNuaimi *et al.* (2011) have created a model of the attributes that have been adopted from the TAM, DOI and UTAUT models with some modifications to suit use within the United Arab Emirates (Figure 2-4). The model has 11 independent variables and has been used to examine the impacts of these variables on the use of e-Government services (AlNuaimi *et al.*, 2011).

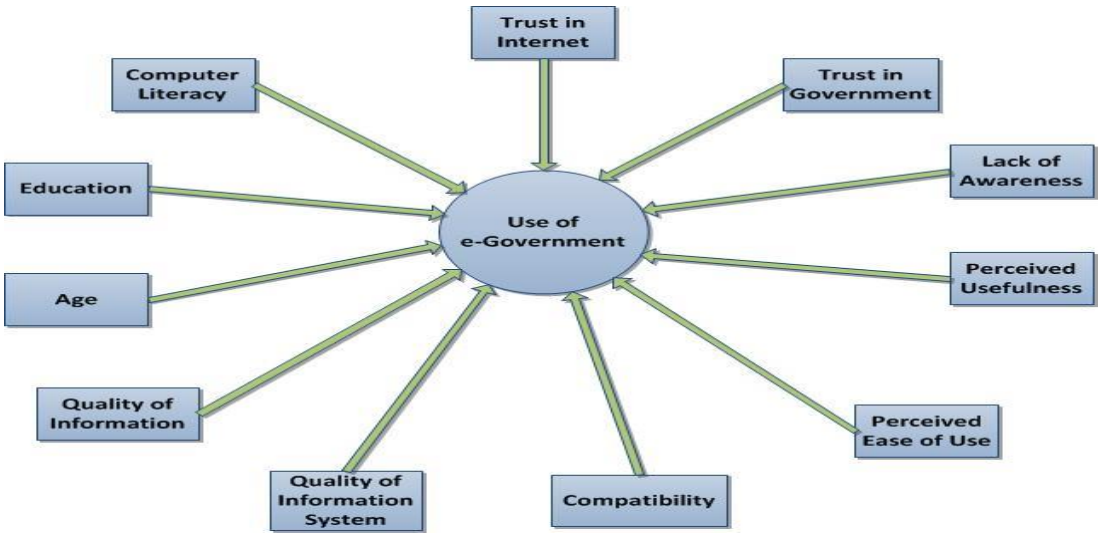


Figure 2-4: Model of barriers to citizen adoption adapted from AlNuaimi *et al.* (2011)

2.6.3 Conceptual Model for the adoption of e-Government

Rehman and Esichaikul (2011) defined factors that influence the citizens' intention to adopt e-Government services in Pakistan. Rehman and Esichaikul (2011) have collaborated on these factors in order to categorize them in the proposed model at Figure 2-5. As Pakistan is a developing country, as is Saudi Arabia, and also is trying to implement and develop e-Government, these proposed factors might affect the Saudi Arabian citizen.

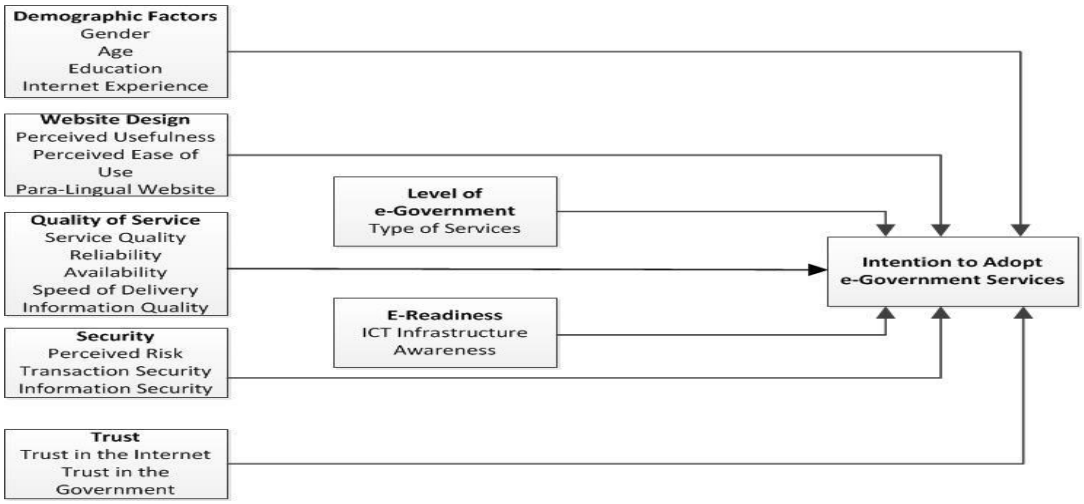


Figure 2-5: Conceptual Model for the adoption of e-Government in Pakistan adapted from Rehman and Esichaikul (2011)

2.6.4 Other factors that affect the adoption of e-Government services

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), face-to-face interaction, cultural differences and gender issues, have an impact on the intention to use e-Government services (AlAwadhi and Morris, 2009; Alomari *et al.*, 2014). Privacy is another issue that influences citizens to adopt e-Government services (Cranor *et al.*, 2006; Tuunainen *et al.*, 2009; Al-Sobhi *et al.*, 2010). In addition, web usability and accessibility are also critical factors that affect the intention to use e-Government services (Abanumy *et al.*, 2005; Alomari *et al.*, 2012).

2.7 Discussion

Earlier in this chapter, a wide range of information about e-Government is presented. In this section, a discussion on the factors that would affect the citizens' intention to adopt e-Government is undertaken. To develop a successful e-Government, a set of requirements are needed to be identified such as the beneficiary of using the services, barriers and enablers, and factors that influence the users' intention to adopt the e-Government services. In this research, the main beneficiary is the citizen. However, the barriers and enablers were addressed here to give a clear idea about the process of building an e-Government and which factors would drive the citizens' intention to

adopt the e-Government services. Additionally, adoption is an enabler which would drive the main purpose of building e-Government. Therefore, the barriers and enablers to build a reliable e-Government are addressed, followed by the most common factors which have been used by other researchers to influence the users' intention to adopt new services. Table 2-1 presents the barriers which would face the government in order to establish a successful e-Government, and the factors that have been used to influence the citizens' intention to adopt e-Government services in developed and developing countries.

Table 2-1: Summary of the barriers facing e-Government Development, leading to the factors used to influence users' intention to adopt e-Government.

Category	Item	Reference
Common Factors being raised world wide	Trust	(Carter and Bélanger, 2005; Al-Sobhi *et al.*, 2010; Musau *et al.*, 2011; Heidemann *et al.*, 2013)
	Privacy	(Carter and Bélanger, 2005; Cranor *et al.*, 2006; Tuunainen *et al.*, 2009; Al-Sobhi *et al.*, 2010)
	Security	(Pan *et al.*, 2006; Al-Sobhi *et al.*, 2010; Mingsheng *et al.*, 2011)
	Computer and Information Literacy	(Tsai, 2002; Poynton, 2005; Pan *et al.*, 2006; Pilling and Boeltzig, 2007; Al-Sobhi *et al.*, 2010)
	Culture	(Walsham *et al.*, 1988; Avgerou, 1993; Hwang *et al.*, 2004; Ali *et al.*, 2009; Schneider, 2010)
	Accessibility	(Jaeger and Thompson, 2003; Abanumy *et al.*, 2005; Heidemann *et al.*, 2013)
	Open Government Data	(Sheridan and Tennison, 2010; Hall *et al.*, 2012; Harrison *et al.*, 2012)
	Adoption	(Warkentin *et al.*, 2002; AlShihi, 2005; AlAwadhi and Morris, 2008; Yonazi *et al.*, 2010; Ja'afer and ALnbhan, 2014)
Factors being raised in Arabic	Capacity Deficit	(Salem, 2006)
	Digital Divide	(Salem, 2006)

	Technical Infrastructure	(Salem, 2006)
	Institutional Framework	(Salem, 2006)
	Government Instability	(Salem, 2006)
	Take-up of Services	(Salem, 2006)
Factors being mentioned as affecting the consumer's intention to adopt new service	Intention to adopt	(Rehman *et al.*, 2012)
	Intention to Use	(Davis, 1989; Venkatesh *et al.*, 2003; Carter and Bélanger, 2004b)
	Relative advantage	(Rogers, 1995; Carter and Bélanger, 2004a)
	Complexity	(Rogers, 1995; Carter and Bélanger, 2004a)
	Compatibility	(Rogers, 1995; Carter and Bélanger, 2004a; AlNuaimi *et al.*, 2011)
	Trialability	(Rogers, 1995; Carter and Bélanger, 2004a)
	Observability	(Rogers, 1995; Carter and Bélanger, 2004a)
	Image	(Carter and Bélanger, 2004a; Slyke *et al.*, 2004)
	Performance expectancy	(Venkatesh *et al.*, 2003; AlAwadhi and Morris, 2008)
	Effort expectancy	(Venkatesh *et al.*, 2003; AlAwadhi and Morris, 2008)
	Social influence	(Venkatesh *et al.*, 2003; AlAwadhi and Morris, 2008)
	Facilitating conditions	(Venkatesh *et al.*, 2003; AlAwadhi and Morris, 2008)
	Trust in The Internet	(McKnight *et al.*, 2002; Carter and Bélanger, 2005; Bélanger and Carter, 2008; Colesca, 2009)
	Trust in The Government	(Carter and Bélanger, 2005; Gefen *et al.*, 2005; Bélanger and Carter, 2008; Colesca, 2009)
	Lack of Awareness	(Baker and Bellordre, 2004; AlShihi, 2005; AlAwadhi and Morris, 2009; Rehman *et al.*, 2012)
	Gender	(Venkatesh *et al.*, 2003; Colesca, 2009; Al-Sobhi *et al.*, 2010;

		Rehman *et al*., 2012)
	Age	(Venkatesh *et al*., 2003; Colesca, 2009; Al-Sobhi *et al*., 2010; AlNuaimi *et al*., 2011; Rehman *et al*., 2012)
	Education	(Venkatesh *et al*., 2003; Colesca, 2009; Al-Sobhi *et al*., 2010; AlNuaimi *et al*., 2011; Rehman *et al*., 2012)
	Internet Experience	(Venkatesh *et al*., 2003; Colesca, 2009; Al-Sobhi *et al*., 2010; AlNuaimi *et al*., 2011; Rehman *et al*., 2012)
	Computer Literacy	(Venkatesh *et al*., 2003; Al-Sobhi *et al*., 2010; AlNuaimi *et al*., 2011; Rehman *et al*., 2012)
	Perceived Ease of Use	(Davis, 1989; Carter and Bélanger, 2004a; Bélanger and Carter, 2008; AlNuaimi *et al*., 2011)
	Perceived Usefulness	(Davis, 1989; Carter and Bélanger, 2004a; Kumar *et al*., 2007; Bélanger and Carter, 2008; AlNuaimi *et al*., 2011)
	Multi-Lingual Website	(Gant and Gant, 2002; Segovia *et al*., 2009; Rehman *et al*., 2012)
	Usability	(Abanumy *et al*., 2005; Alomari *et al*., 2012)
	Accessibility	(Abanumy *et al*., 2005; Alomari *et al*., 2012)
	Perceived Risk	(Bélanger *et al*., 2002; Bélanger and Carter, 2008; Rehman *et al*., 2012)
	Transaction Security	(Ramnath and Paul, 2002; Pi *et al*., 2012; Rehman *et al*., 2012)
	Information Security	(Ramnath and Paul, 2002; Berdykhanova *et al*., 2010; Pi *et al*., 2012; Rehman *et al*., 2012)
	Service Quality	(Liu and Arnett, 2000; Kumar *et al*., 2007; Rehman *et al*., 2012)
	Reliability	(Liu and Arnett, 2000; Kumar *et al*., 2007; Trentin *et al*., 2011; Rehman *et al*., 2012)
	Availability	(Kumar *et al*., 2007; Rehman *et al*., 2012)
	Speed of Delivery	(Kumar *et al*., 2007; Trentin *et al*., 2011; Rehman *et al*., 2012)
	Information Quality	(Liu and Arnett, 2000; McKinney and Yoon, 2002; Rehman *et al*., 2012)
	Technical	(AlAwadhi and Morris, 2009; Al-Sobhi *et al*., 2010; Rehman *et al*.,

	Infrastructure	2012)
	Privacy	(Bélanger *et al.*, 2002; Carter and Bélanger, 2005; Al-Sobhi *et al.*, 2010; Akkaya *et al.*, 2012)
	Culture	(AlAwadhi and Morris, 2008; AlAwadhi and Morris, 2009; Ali *et al.*, 2009; Akkaya *et al.*, 2012)

2.8 Concluding comments

In conclusion, government is defined as how the country or state is governed. Therefore, e-Government is simply an approach using ICT to deliver government services. Since there is no unique definition for e-Government, e-Government can be defined based on an organisation's needs. However, there are many e-Government drivers that have been identified by researchers; the most common mentioned here are Government to Government (G2G), Government to Business (G2B) and Government to Citizen (G2C). These three drivers are the main components of e-Government in this research, concentrating on the relationship between government and its citizens. Implementing e-Government is not easy due to challenges faced during the implementation and development stage. In addition, challenges that face e-Government implementation can be discovered and overcome in some countries, but they remain or even become a barrier to development of e-Government in other countries. Therefore, in order to figure out and overcome these challenges, an investigation should be carried out by government to reach the goal of e-Government implementation and gain the benefits. Finally, implementing e-Government is not the only purpose, but one of the main challenges is how to encourage citizens to adopt e-Government services. Therefore, in order to build successful e-Government, e-Government services should be adopted, especially by citizens. Three well-known models and theories, including TAM, DOI and UTAUT, are addressed to make the picture clearer. Moreover, some models, which have been built based on TAM, DOI and UTAUT, are presented. Finally, a summary of the barriers facing governments in building reliable e-Government, and the factors that would influence the citizens' intention to adopt e-Government is presented in Table 2-1.

Chapter 3: **Model development**

Based on the literature review, the following discussion considers three aspects of e-Government in order to answer the key "What are the influential factors to be integrated in a model for implementing and developing e-Government in order to be adopted by citizens?" Since the research question is broad; therefore it has been subdivided to the following questions in order to address the answer clearly and efficiently: (a) Which of the identified factors in Table 3-1 have an impact on the citizens' intention?, (b) How well does the proposed theoretical model of intention to adopt e-Government services fit the Saudi context?, (c) According to the proposed theoretical model, which relations are significant in explaining the users' intention to adopt e-Government services in Saudi Arabia?, and (d) Are there any other relationships between the proposed factors that might affect the intentions of citizens?

These aspects are the difference between electronic and non-electronic systems, which are presented by two simple scenarios to give a clearer picture; secondly, the challenges facing e-Government implementation and development in Saudi Arabia; and finally the factors that influence citizens' intention to adopt e-Government services.

3.1 **Electronic compared with paper-based systems**

In daily life, there are an enormous amount of services offered and consumed by government. These services can be consumed or produced in non-electronic systems such as conventional government or in electronic systems like e-Government. However, there are benefits and drawbacks to using non-electronic and electronic procedures. Figure 3-1(A) shows how services and transactions are delivered and consumed in non-electronic environments; Figure 3-1(B) shows how this can evolve through the use of ICT.

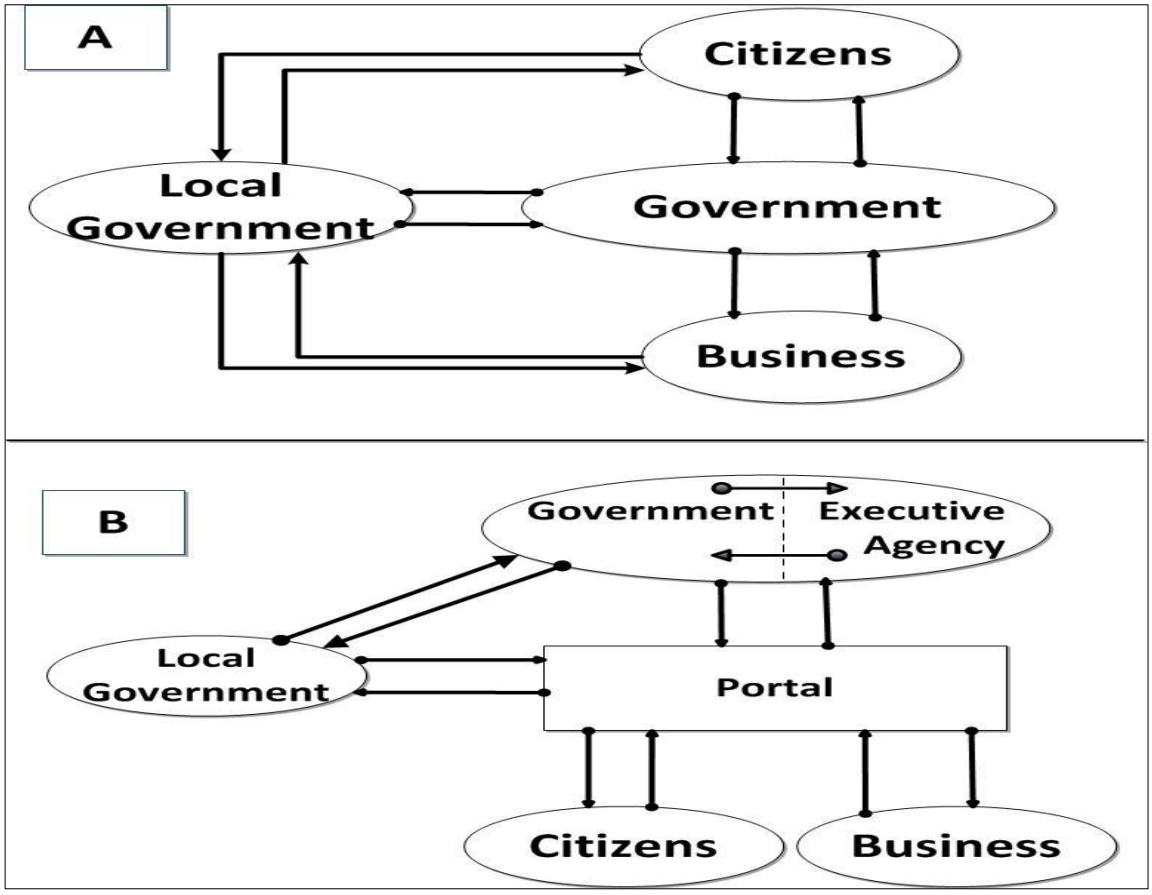


Figure 3-1: (A)Typical transaction routes in a Government that has not implemented e-Government, (B) Typical transaction routes within e-Government, the users access all services via a single portal, and the distribution takes place internally.

To illustrate these points, two scenarios have been developed: making a passport application and a school communications policy to parents and pupils.

3.1.1 Scenario 1: UK passport application

In a paper-based approach to obtaining a passport, the applicant obtains an application form from the Passport Office or Post Office, completes the form, has their picture taken and witnessed, and finally signs the form prior to submitting it to the Passport Office with the fee and supporting documentation. This process takes time and effort and there is room for error in the completion of a somewhat complex form. In addition, the staff that receive the application might not be able to deal with the application if the applicant has not completed a section correctly. Although the Post Office could

check the application form and all the requirements by charging a fee of about 9 British Pounds, the benefit of reducing the consumers' spending, which is one of the advantages by implementing e-Government, would not be gained.

Using the e-Government approach, the process can largely be undertaken from the applicant's home computer, where the applicant completes the application form provided by the Identity and Passport Service (IPS) online; this ensures that all the sections are completed, and additionally undertakes a number of initial checks (e.g. ensuring that the post code supplied refers to the applicant's address). The form is then printed and returned to the applicant for signature. Once signed, the form, documents and photographs can then be submitted via a Post Office.

One further advantage of this process in the UK is that the photograph and signature held by the IPS, which has been fully checked and verified, can be used for other services, for example for the renewal of a driver's licence, which can be completed totally online, with no separate submission of a paper signature or photograph.

In the UK, access to these services is via www.direct.gov.uk, which brings together a wide range of services provided by the central government, ranging from taxes to pensions. However, in both approaches, paper-based and electronic, the main communication channel is the Post Office in the UK. The UK Post Office is highly trusted and has a reliable infrastructure, which makes the delivery of the documents easy and trusted. On the other hand, in the Kingdom of Saudi Arabia, the documents are submitted and collected in person from the department. This is a cultural norm, as there is no delivery to individual houses (normally people rent a post box).

3.1.2 Scenario 2: School communications

A majority of the Schools in the UK are funded and inspected by the government, who also set the schools' policies, and provide reports about schools online. Therefore school communications has been chosen as a scenario to differentiate electronic and paper-based systems. School communications, for example calendars, letters, permission slips and end-of-term reports, were normally sent to the home with the children during the school year as paper documents. This approach risks loss (either accidental or

deliberate) by the pupil. When the information is lost, it causes problems for both the parents and the pupil. This means, for example, if there is a requirement to visit the school and the parents do not know, it might cause considerable inconvenience when they have to work full-time or experience childcare issues. Additionally, a paper-based system is expensive, time consuming and not environmentally friendly. In contrast, using an electronic system, parents can find all the school's calendars and letters by accessing the school's electronic portal. This helps parents track their children's progress and update their information at any time. In many schools in the UK this has been taken further, with the pupils using the system to receive homework, teaching material and other support.

Again taking the UK provision as an example, most schools are assessed individually or through the local authority. Again, a common portal approach is taken where the user can access services at a local level, which are wide-ranging and include such services as renewal of library books, reporting street light failures and accessing social care for the elderly.

3.2 e-Government challenges and barriers in Saudi Arabia

In Chapter 2 it was concluded 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 overarching question is: What factors would allow the government departments to overcome these challenges? To answer this question, the challenges which are mentioned by other researchers, should be investigated to present solutions, including accessibility, adoption, availability, citizen expectations, computer and information literacy, cost of Internet usage, culture, political challenges, privacy, security, technical infrastructure and trust. However, not all of these challenges face the Saudi Arabian government with its plan to introduce e-Government. Thus citizens' adoption has been identified as the gap in this research to be investigated deeply.

3.3 Factors influencing citizens' intention to adopt e-Government services in Saudi Arabia

The initial question for this research and investigation is: How can 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. In Table 2-1 a set of influential factors has been summarised and presented. The factors have been used by different researchers in developed and developing countries. The researchers have identified and used different models and theories to address their set of required factors. Therefore, in Table 3-1 the influential factors from the previous chapter have been synthesised, refactored, and categorized by the relevant factors based on their meaning, as well as refining duplication of factors. This process is summarized in Table 3-1.

Table 3-1: Factors influencing citizens to adopt e-Government services.

<table>
<tr><th colspan="2">Stage 1 factors from Table 2-1</th><th colspan="2">Stage 2 (when changing applicable)</th><th>Final Stage</th></tr>
<tr><td colspan="2">Demographic Factors
Computer Literacy</td><td colspan="2">Knowledge and skills</td><td>• Computer and Information Literacy.
• Age.
• Gender.
• Education.</td></tr>
<tr><td colspan="2">Security</td><td colspan="2">Security issues</td><td>• Transaction Security.
• Information Security.
• Perceived Risk.</td></tr>
<tr><td colspan="2">Trust</td><td colspan="2">Trust issues</td><td>• Trust in Government.
• Trust In Internet.</td></tr>
<tr><td colspan="2">Quality of Service</td><td colspan="2"></td><td>• Service Quality.
• Reliability.
• Availability.
• Speed of Delivery.
• Information Quality.</td></tr>
<tr><td rowspan="2">Diffusion Of Innovation</td><td rowspan="2">• Relative Advantage.
• Compatibility.
• Complexity.
• Trialability.
• Observability.</td><td>• Relative Advantage.
• Compatibility.
• Complexity.</td><td></td><td rowspan="2">• Relative Advantage.
• Compatibility.
• Complexity.
• Image.</td></tr>
<tr><td>• Trialability.
• Observability.</td><td>Image</td></tr>
<tr><td rowspan="4">Website Design</td><td>Usability.</td><td colspan="2" rowspan="4"></td><td rowspan="4">• Usability.
• Accessibility.
• Multi-lingual Website.</td></tr>
<tr><td>Accessibility.</td></tr>
<tr><td>Multi-lingual Website.</td></tr>
<tr><td>Perceived Usefulness.</td></tr>
</table>

Stage 1 factors from Table 2-1	Stage 2 (when changing applicable)	Final Stage
Perceived Ease of Use.		
Performance expectancy	Perceived Usefulness.	Perceived Usefulness.
Effort expectancy	Perceived Ease of Use.	Perceived Ease of Use.
Social influence		Cultural Influences
Facilitating conditions	Culture	
Culture		
Lack of Awareness		Lack of Awareness
Technical Infrastructure		Technical Infrastructure
Privacy		Privacy Issues
E-Readiness		E-Readiness
Intention to Use		Intention to Use
Intention to Adopt		Intention to Adopt

General literature of the identified factors may not reflect the needs of Saudi citizens; therefore they are used to examine some well-known models and theories to find whether they can suit the Saudi Arabian requirements. Further refinement is required (see Chapter 6). The examination can be done by investigating and discussing other models that are followed by questionnaires and interviews to investigate citizens, government employees and experts to find out how important these factors are in order to build a new model. Furthermore, in the literature review, AlAwadhi and Morris (2009) identified factors influencing the adoption of e-Government services by conducting a study in Kuwait as the Kuwaiti culture is very similar to the Saudi's.

3.4 Concluding comments

Earlier in this chapter, the research question "What are the influential factors to be integrated in a model for implementing and developing e-Government in order to be adopted by citizens?" has been stated in order to be discussed then addressing the answer. As it is clear this research is all about the e-Government system and how to encourage citizens to adopt it, a comparison between electronic and paper-based systems is presented. The comparison has been made by delivering two scenarios, including UK passport applications

and school communications. Next, challenges and barriers to the e-Government in Saudi Arabia have been concluded and addressed in order to answer one of the research questions. Finally, identifying the influential factors on the citizens' intention to adopt e-Government services is presented. These factors are explored in detail in the next chapter.

Chapter 4: **Research Model**

In this chapter the predefined factors are integrated and drawn as an initial model. These factors are going to be discussed in order to develop the final model. Additionally, the final model is going to be validated after confirming the influential factors.

4.1 The proposed model

Based on what has been discussed previously, an initial new model is addressed by adapting and integrating the critical factors that have been mentioned by other authors. Figure 4-1 shows the high level overview of the new model. The addressed higher-level model contains the intention to use e-Government services and the government's readiness.

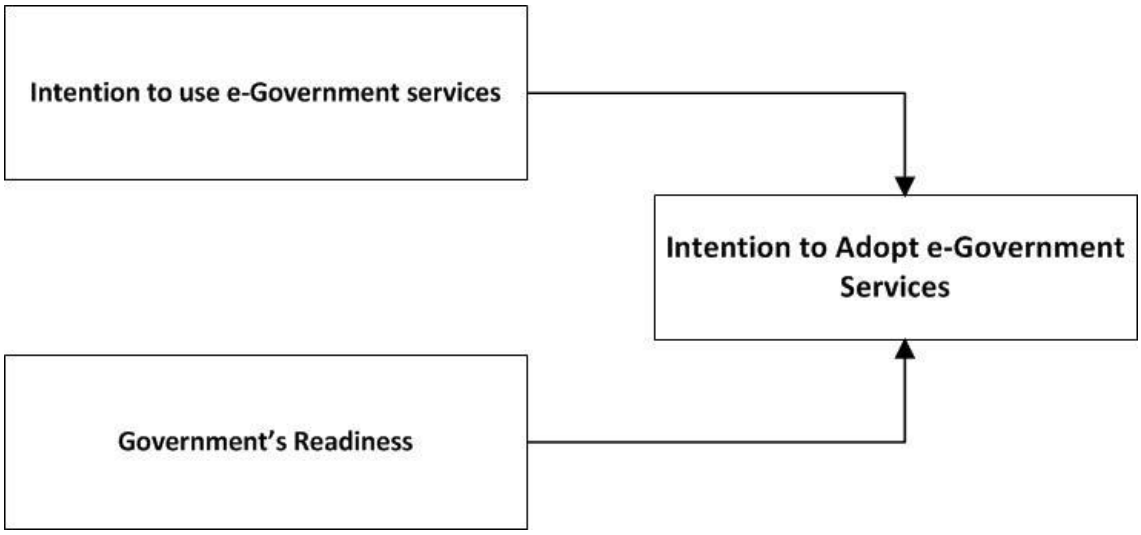


Figure 4-1: A high level overview of an Integrated Model for Citizen's Adoption of e-Government Services.

These two main blocks, which are the intention to use e-Government services and the government's readiness, have factors that affect the adoption of e-Government services. The intention to use e-Government services, which has been classified under citizens' concerns, includes Trust, Privacy, Security, Cultural influences and Website design while the government's readiness has E-Readiness, Quality of Services, DOI, Knowledge and skills, Lack of Awareness, and Technical Infrastructure, and they are classified as the

government's responsibility. The breakdowns of these blocks, as shown in Figure 4-1, are presented in the next sections and are shown in Figure 4-2.

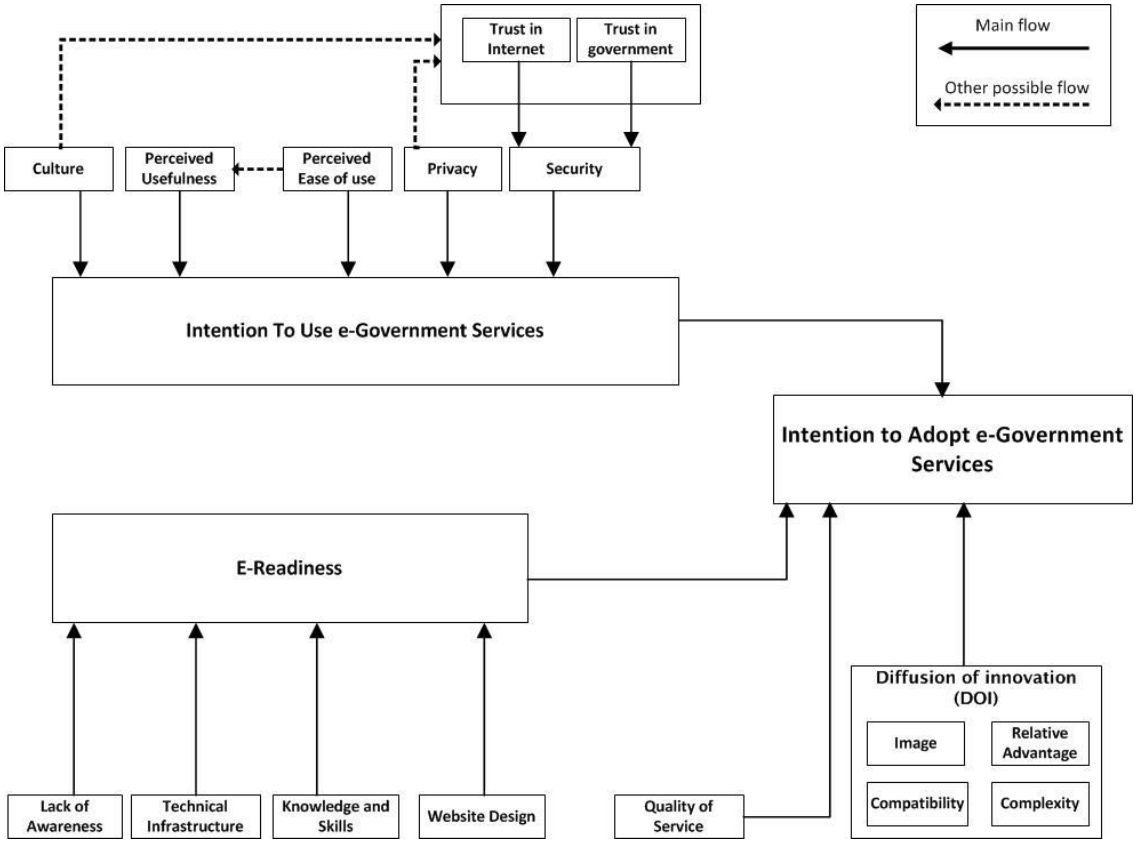


Figure 4-2: A breakdown of the high level overview of the Integrated Model for Citizen's Adoption of e-Government Services at Figure 4-1, where the top section of the model (A) represents the intention to use e-Government services and the Government's readiness is represented by the bottom section of the model (B).

4.1.1 Intention to use e-Government services

In this section is a breakdown of the attributes that are under the 'intention to use e-Government services' block. The attributes are Cultural influences, Website design, Security, Privacy, and Trust, and are presented as follows:

4.1.1.1 Cultural influences

Culture impacts citizens' intentions to use e-Government services, including cultural influences, cultural awareness and national culture (AlAwadhi and Morris, 2009; Akkaya *et al.*, 2012). 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" (Ali *et al.*, 2009). Akkaya *et al.* (2012) state that many researchers recognize the importance of considering cultural characteristics in the development and use of online services.

4.1.1.2 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 (Kumar *et al.*, 2007). 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 (Kumar *et al.*, 2007). Combining these elements directly influences users' experiences and encourage them to adopt the services (Kumar *et al.*, 2007). 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 (Rehman and Esichaikul, 2011; Pi *et al.*, 2012). 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 (Abanumy *et al.*, 2005; Rehman and Esichaikul, 2011).

Kumar *et al.* (2007) state that perceived usefulness and perceived ease of use can measure the effectiveness of website design from a citizen's perspective, which influenced citizens to use the e-services. In the business literature, perceived usefulness of a website is measured by *"the extent to which the person believes that extracting information online will save his time, and the extent to which the person believes that extracting information online will reduce the cost"* (Shih, 2004; Kumar *et al.*, 2007).

4.1.1.3 Security

Security is defined as the protection of information or systems from unsanctioned intrusions or outflows (Berdykhanova *et al.*, 2010). 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 (Berdykhanova *et al.*, 2010).

- **Transaction Security and Information Security**

Transaction security: is a critical thing for users when performing online activities (Pi *et al.*, 2012), while 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" (Ramnath and Paul, 2002).

- **Perceived Risk**

Perceived risk refers to the subjective evaluation by consumers associated with possible consequences of wrong decisions (Peter and Ryan, 1976; Yu-Shan and Ching-Hsun, 2012). According to Bélanger *et al.* (2002), online service consumers are more concerned about perceived risk when they share information and complete transactions. In addition, it has been said that the relationship between risk, trust and intention to use e-Government services reduces risk perceptions while the effect of trust on intentions is mediated by perceived risk (Bélanger and Carter, 2008).

4.1.1.4 Privacy

It is mentioned that citizens concerned with information privacy have an impact on the consumers of electronic services (Bélanger *et al.*, 2002). According to Akkaya *et al.* (2012), citizens are sensitive towards storage of their personal data, which has a negative influence on the intention to adopt and continue e-Government services.

4.1.1.5 Trust

Trust refers to "an expectancy that the promise of an individual or group can be relied upon" (Rotter, 1971; Bélanger and Carter, 2008). According to Bélanger and Carter (2008), initial trust, which refers to trust in an unfamiliar trustee, is required in a relationship between citizens, with a shortage of credible or meaningful information about the e-service and government. Citizens' trust is generally based on trust of the government, which is the assumption made about the behaviours of the trustee, and trust of the

Internet, which is the institutional factor (Grazioli and Jarvenpaa, 2000; Bélanger and Carter, 2008).

- **Trust of the Internet**

Trust of the Internet (TOI) is consistently identified as a key predictor for the adoption of e-services (McKnight *et al.*, 2002; Carter and Bélanger, 2005; Bélanger and Carter, 2008), and frequently labelled institution-based trust (Bélanger and Carter, 2008). Institution-based trust refers to "an individual's perceptions of the institutional environment, including the structures and regulations that make an environment feel safe" (McKnight *et al.*, 2002; Bélanger and Carter, 2008). According to Shapiro (1987), who has been cited by Bélanger and Carter (2008), "institution-based trust is basically trust in the Internet: trust in the security measures, safety nets and performance structures of this electronic channel". e-Government adoption depends on the belief of citizens about the capability of providing accurate information and secure transactions using the Internet as a dependable medium (Bélanger and Carter, 2008).

- **Trust of the Government**

Trust of the government (TOG) is identified as a person's perception concerning the integrity and ability of the service provider (Bélanger and Carter, 2008). The citizens' confidence in an agency's ability to provide online services is imperative for the widespread adoption of e-Government initiatives (Bélanger and Carter, 2008). It has been posited that trust in the agency has a strong impact on the adoption of a technology (Gefen *et al.*, 2005; Bélanger and Carter, 2008). According to Bélanger and Carter (2008),"in order to enable e-Government initiatives, citizens must believe government agencies possess the astuteness and technical resources necessary to implement and secure these systems".

4.1.2 Government's readiness

The attributes of the government's readiness block include E-Readiness, Quality of Services, Diffusion of Innovation, Knowledge and skills, Lack of Awareness, Technical Infrastructure, and Website design, and they are defined in the following sections.

4.1.2.1 E-Readiness

E-Readiness has been noted as a key factor that would help governments to improve the ICT in order to implement a successful e-Government (Al-Solbi and Mayhew, 2005). E-Readiness refers to the capacity and willingness to achieve ICT-led development to use e-Government (United Nations, 2004).

4.1.2.2 Quality of service

Quality of service has been suggested to play an important role in online services (Rehman and Esichaikul, 2011). To encourage citizens to adopt e-Government services, it is important for the government to provide high quality services and high quality information with the objective of speed of delivery, with due consideration of information reliability and availability (Rehman and Esichaikul, 2011). The quality of service is measured by five elements including services quality, reliability, availability, speed of delivery, and information quality (Rehman and Esichaikul, 2011). These elements are presented as follows:

- **Service Quality**

Service quality refers to the assessment done by the consumer for the overall excellence of the provided online service (Zeithaml, 1988; Bolton and Drew, 1991). The government website should be designed carefully to address customers' needs because the face-to-face interaction is lacking in online services (Liu and Arnett, 2000).

- **Reliability**

One critical issue regarding building an integral e-Government to provide online services is making it reliable. Liu and Arnett (2000) state that in customer online services, reliability is required. A system could be reliable when it has a quick error recovery (Liu and Arnett, 2000), whereas service quality would be reliable when it is delivering services to the customers as promised (Trentin *et al.*, 2011). Moreover, reliability is defined as the capability of a system to accomplish its intended function (Stevenson, 2007; Lin and Chang, 2012).

- **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 (Rehman and Esichaikul, 2011). System availability refers to the probability of the system to be ready to provide responses at a specific time (Walkowiak, 2011). In addition, Lin and Chang (2012) 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 (2011) 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 (Trentin *et al.*, 2011). Furthermore, speed of delivery refers to the elapsed time between customers requesting services and receiving them (Trentin *et al.*, 2011).

- **Information Quality**

The assessment of the government's website quality lists information quality as a key element (McKinney and Yoon, 2002). Additionally, prior research employed various measures of information systems (IS) success that result in the importance of the information quality for a website to succeed (Liu and Arnett, 2000). Bock *et al.* (2012) 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.

4.1.2.3 Diffusion of innovation

This element of the model is based on the model of Diffusion of Innovation by Rogers (1995) as discussed in Section 2.5.2. Subsequently, Carter and Bélanger (2004a) have made a modification by adopting compatibility, relative advantage and complexity, and excluding trialability and observability to replace them with image.

4.1.2.4 Knowledge and skills

Knowledge and skills factor includes here the computer and information literacy, the level of education, gender, and age. Literacy as applied to ICT is defined as "whatever a person needs to be able to use (and know about) computers" (Hunter, 1983; Cole and Kelsey, 2004), while "the ability to use information, or possibly the possession of knowledge of information is information literacy" (Behrens, 1994; Cole and Kelsey, 2004). Computer and information literacy are affected by the citizen's level of education, age and gender (Al-Sobhi *et al.*, 2010), which all bar the citizen from adopting e-Government services (AlNuaimi *et al.*, 2011). On the other hand, researchers have stated that the level of education of a person and their age can positively or negatively influence the intention to use e-Government services (Venkatesh *et al.*, 2003; AlNuaimi *et al.*, 2011; Rehman and Esichaikul, 2011). People who have grown up among an educated family and have got used to technology, have a high chance to adopt a new technology, e.g. e-Government. Furthermore, gender has played a critical role in influencing citizens' intention to use the e-Government services (Rehman and Esichaikul, 2011). It has been stated that people who are forty and below are more likely to welcome the usage of e-Government services than older people (Colesca, 2009).

4.1.2.5 Lack of Awareness

Awareness refers to how a person understands the activities of others, which provides a context for his own activity (Dourish and Bellotti, 1992). 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 (AlShihi, 2005; AlAwadhi and Morris, 2009). According to Baker and Bellordre (2004), 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.

4.1.2.6 Technical Infrastructure

Technical infrastructure can be defined as: "design and installation of local area network (LAN), 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" (Kaminski, 2010). A study by AlAwadhi and Morris (2009) found that most of the participants were worried about the technical issues. AlAwadhi and Morris (2009) 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.* (2010) state that a 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.* (2010) suggest that governments should provide a budget to build a strong technical infrastructure in order to encourage citizens to adopt e-Government services.

4.1.2.7 Website design

Website design and its features which related to the citizens' intention to use e-Government services have been presented in Section 4.1.1.2. In these subsections only those features that relate to the government's readiness are discussed.

- **Usability**

Website usability is a key aspect of website functionality (Gant and Gant, 2002). 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 (Gant and Gant, 2002; Al-Soud and Nakata, 2010). Well-designed portals are easy to use and have pleasant, consistent interfaces (Gant and Gant, 2002). Nielsen (2003) states that improving the ease-of-use of a website during the design process is achieved by using a method known as usability. However, the ease of use is also influenced by the user experience (Yoon *et al.*, 2008). Moreover, 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 (Nielsen, 2003). Additionally, the usability is related to the user experience. According to researchers, the user who has experience in similar systems is more likely to find it usable and easy to use (Nielsen, 2003; Kukulska-Hulme, 2005; Yoon *et al.*, 2008).

- **Accessibility**

Accessibility of a website is an essential factor that may affect citizens' intentions to use e-Government services (Alomari *et al.*, 2012). Website accessibility is defined as the degree to which citizens and automatic tools can access web information (Abanumy *et al.*, 2005).

- **Multi-Lingual Website and disabilities**

Rehman and Esichaikul (2011) suggest that building an e-Government website with multi-lingual web support positively influences 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 (Gant and Gant, 2002).

4.2 Concluding comments

In this chapter, based on what was argued in the literature review and what has been discussed in the discussion chapter, an initial model has been delivered. The initial model has the influential factors that have been identified and grouped previously. Furthermore, the purpose of this model is to meet the requirements of the Saudi Arabian e-Government in order to influence the citizens' intention to adopt the new online services. The identified requirements have been presented and defined to understand how these factors influence the citizens' decision to adopt the e-Government and how important they are. In addition, the model has been delivered in two forms. First, it is drawn at a high level, which has only the two main blocks, including 'intention to use e-Government services' and 'government's readiness', and then a more detailed illustration has been presented to contain all the identified factors. In the next chapter, appropriate methods for discovering which of the proposed factors are important for encouraging citizens to adopt e-Government services are investigated, and what is an appropriate method for validating the developed model is discussed. This is followed by an exploratory study which confirms the influential factors and the results. Consequently, an evaluation study is undertaken to validate the developed study, followed by its results.

Chapter 5: **Research Methodology**

In this chapter, a number of research methods are presented to give a clear picture of which techniques are suitable for validating this research. The first section is all about different techniques for research methodology and what sort of data can be gained from them. The next section details which techniques are used in this research to validate the proposed factors followed by a validation of the developed model.

5.1 Review of research methods

In this section, a review of the research methods is presented. Researches are being conducted based on certain methods, starting with the proper philosophy, followed by a research approach, then choosing an appropriate strategy after defining the research purpose, and finally defining the way of collecting the research data.

5.1.1 Research philosophy

Research is based on a philosophy which contains assumptions. These assumptions support the research strategy and the methods. There are four research philosophies, including Positivism, Realism, Interpretivism, and Pragmatism (Saunders *et al.*, 2009). According to Saunders *et al.* (2009):

- **Positivism**: for conducting research in the tradition of the natural sciences.
- **Realism**: based on the object's existence. *"The essence of realism is that what the senses show us as reality is the truth: that objects have an existence independent of the human mind".*
- **Interpretivism**: differentiating between humans as social actors. *"Interpretivism advocates that it is necessary for the researcher to understand differences between humans in our role as social actors, for instance, conducting research among people rather than objects such as trucks and computers".*
- **Pragmatism**: a combination of two philosophies. When a research question could be answered by a specific position, whereas another

position is appropriate to answer the other research question, then Pragmatism is the suitable philosophy.

5.1.2 Research approaches

There are two approaches to conduct research including deduction and induction (Saunders *et al.*, 2009). In scientific research (positivism), the deduction approach is usually used. The deduction approach is based on developing a theory and hypothesis, and then designing a research strategy to test the hypothesis (Saunders *et al.*, 2009). On the other hand, the induction approach is usually used in Interpretivism. The induction approach is based on collecting data first, and then developing a theory as a result of the data analysis (Saunders *et al.*, 2009).

5.1.3 Research strategies

Before identifying which research strategy is most appropriate for the research, the purpose of the research should be identified. The research purpose is classified under three types which are commonly used (Saunders *et al.*, 2009). These three types are defined by Saunders *et al.* (2009) as follows:

- **Exploratory studies**: is a valuable means of finding out what is happening in order to seek new insights.
- **Descriptive studies**: might be an extension of an exploratory research, or a piece of explanatory research. The key point of the descriptive study is to have a clear picture of the phenomena about which the data is collected prior to the collection of the data.
- **Explanatory studies**: explaining the relationships between variables by studying a situation or a problem.

Turning to the research strategies, according to Saunders *et al.* (2009) there are several types of research strategies, as follows:

- **Experiment**: appropriate for exploratory and explanatory studies.
- **Survey**: is a popular and common strategy and usually associated with the deductive approach. It tends to be used for exploratory and descriptive research, where quantitative data is collected.

- **Case study**: refers to "*a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence*" (Robson, 2002). This strategy is most often used in explanatory and exploratory research.
- **Action research**: focuses on action, in particular promoting change within an organisation.
- **Grounded theory**: is an appropriate strategy for the inductive approach.
- **Ethnography**: is associated with the inductive approach.
- **Archival research**: could be used in exploratory, descriptive, and explanatory studies.

5.1.4 Methods of collecting data and analysis techniques

There are two types of methods for collecting data including mono method and multiple methods (Saunders *et al.*, 2009). Mono method refers to a single data collection technique, such as quantitative data or qualitative data, while using quantitative and qualitative techniques refers to multiple methods (Saunders *et al.*, 2009). According to Saunders *et al.* (2009), the multiple methods consist of multi-methods and mixed-methods.

As this research is taking the science theme, therefore the philosophy used in this research is positivism with a deductive approach. In addition, in this research two types of the studies were used, exploratory and descriptive, alongside the survey as the research strategy. The way of collecting the research data is explained in more detail in the following sections.

5.2 General Methods for collecting data

In research studies, data is collected using different approaches to acquiring quantitative and qualitative data. When the data is in the form of numbers or could be transferred to numbers, it is called quantitative data, while qualitative data is difficult to interpret numerically, because it would give no meaningful way for the researcher to present the results or findings (Rogers *et al.*, 2011). The number of years that the participant has spent using a system is an example of quantitative data. In contrast, describing how work is done daily, the procedures to follow in event of an emergency or collecting pictures are all

forms of qualitative data. To succeed in data gathering, Rogers *et al.* (2011) suggest five key steps which should be undertaken before starting to gather data. In addition, another key step is conducting an exploratory study which is suggested to be undertaken when the goal is not clear or has not been identified (Brassington and Pettitt, 2006). These five key steps are as follows:

a) **Setting goals**: When data are being gathered, they are gathered for a purpose. So it is recommended that the first step is to set goals. This step clarifies what data to look for.

b) **Identifying Participants**: When the goals have been identified, it indicates the people who are going to be asked in order to gather data. Those people are called the population, and the people who have been chosen are called the sample.

c) **Relationship with participants**: Building a clear relationship with the population helps to illuminate the nature of the study. In order to make the relationship clear, each participant is asked to sign a form stating that they understand the purpose of the study and are happy to continue, knowing that if the findings are published it does not violate their privacy.

d) **Triangulation**: Using at least two different perspectives to investigate a phenomenon is identified as triangulation (Jupp, 2006; Rogers *et al.*, 2011). According to Rogers *et al.* (2011), there are four types of triangulation:

    i. Triangulation data refers to data that has been collected from different resources using different times, places or people.

    ii. Investigator Triangulation is defined as using different researchers to collect and interpret the same data.

    iii. Triangulation of theory means viewing the data or findings using different theoretical frameworks.

    iv. Methodological Triangulation refers to using different techniques in order to gather the data. This type has been introduced as the common form of triangulation (Rogers *et al.*, 2011).

e) **Pilot Study**: Refers to running a small trial of the main study. The aim is to discover whether the main study is viable and clear enough to be undertaken.

f) **Exploratory research**: Is defined as a type of study to collect preliminary data about a problem that is still not clearly defined (Brassington and Pettitt, 2006).

Next, different methods that have been used to gather data (quantitative and qualitative) are discussed.

5.3 Survey

Surveys are a technique used to gather information to describe, compare or explain an object (Fink, 2009). Examples of survey instruments include self-administered questionnaires, interviews, structured record reviews and structured observation (Fink, 2003b). In addition, a mixed-methods approach is a commonly used technique for gathering data.

5.3.1 Self-Administered Questionnaire

Questionnaires are used to gather demographic data and users' opinions by using a well-established technique (Rogers *et al.*, 2011). Creating a questionnaire requires effort and skill to ensure that questions obtain the right data (Rogers *et al.*, 2011), otherwise it is time consuming (Faulkner, 1998). Hence, to save time and effort, questionnaires should be examined and validated before data collection begins (Faulkner, 1998; Rogers *et al.*, 2011). There are different structures of questionnaires, but it is common to start by asking for basic demographic information (Rogers *et al.*, 2011). In addition, questions can be open-ended or closed-ended. Open-ended questions gain information on a broad basis, based on the respondent's opinion with freedom of what he/she wants to say, while the closed answer forces the respondent to choose from a given list of responses (Faulkner, 1998). Questionnaires can be delivered on paper or by using Internet tools (Rogers *et al.*, 2011). However, answer formats can be written in the form of check boxes and ranges or rating scales (Faulkner, 1998; Rogers *et al.*, 2011).

5.3.2 Interview

When a conversation has a purpose it is called an interview (Rogers *et al.*, 2011). At least two people are required to conduct an interview; one asks questions and the other gives answers (Fink, 2003b). According to Rogers *et al.* (2011), there are four types of interviews: unstructured interviews (open-ended questions), structured interviews (closed-ended questions), semi-structured interviews (mix of open- and closed-ended questions) and focus groups. Each one has a different purpose. Interviews are usually done in person but can also be performed over the telephone or online (Rogers *et al.*, 2011).

5.3.3 Structured Observation

Observation refers to gathering data visually (Fink, 2003b). It is mentioned that observation is used to guide the observer to focus on a study's object (Fink, 2003b). Moreover, it is useful to use observation to gain data during the development stage of a product or system (Rogers *et al.*, 2011). Types of observation include direct observation in the field, direct observation in controlled environments and indirect observation (tracking users' activities) (Rogers *et al.*, 2011).

5.3.4 Structured record review

Structured record review refers to a survey that has a specially created form to be used by the surveyor to guide data collection from records including financial, medical and school records (Fink, 2003b). The structured record review can be a form of electronic, written or filmed documents, such as collecting data from students' attendance records regarding how many students have more than four weeks of absence in a specific semester, for example (Fink, 2003b).

5.3.5 Mixed-Methods

Mixed-methods or combination studies can be at the level of sampling, data collection and data analysis (Sandelowski, 2000). Therefore, mixed-methods refers to a data collection technique combining at least one quantitative method and one qualitative method (Caracelli and Greene, 1993). The purpose

of mixing data collection methods is to give the researcher a clearer, broader picture (Caracelli and Greene, 1993; Sandelowski, 2000).

5.4 Structural Equation Modelling (SEM)

Structural equation modelling (SEM) is a statistical data analysis technique (Alawneh *et al.*, 2013). In the last few decades, SEM has become a popular analysis tool across many disciplines because of its generality and flexibility (Choudrie *et al.*, 2013). The Structural Equation Modelling term has been used as a description of a large number of statistical models used to evaluate the validity of fundamental theories with observed data. As a statistical tool, it represents an extension of general linear modelling (GLM) procedures, including the ANOVA and multiple regression analysis. One of the major benefits of using SEM is the possibility of using it to study the relationships between latent constructs that are indicated by multiple measures (Choudrie *et al.*, 2013). However, there are two different types of factor analysis: confirmatory factor analysis (CFA), and exploratory factor analysis (EFA) (Byrne, 2010). When the links between the proposed variables have not been determined, EFA should be applied, while in contrast CFA is designed to be used when a researcher has a basic knowledge of how the model is set out (Byrne, 2010).

5.5 Reliability

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 (Field, 2009). Reliability, which is what it is concerned with here, refers to the extent to which data analysis procedures produces consistent results (Saunders *et al.*, 2009). In addition, Field (2009) defined reliability as the capability of the measure to generate the same results in the same conditions. Before stating that a result is valid, the instrument should be reliable (Field, 2009). Furthermore, the reliability value was debated by researchers. Field (2009) stated that the reliability value of 0.7 to 0.8 is an acceptable value for Cronbach's Alpha (α). However, Nunnally (1978) and Liu and Arnett (2000) suggested that as a "rule of thumb" 0.6 could be accepted.

5.6 The minimum sample size and the response rate

Before distributing the designed survey, it is important to know the target and calculate the sample size. The minimum sample size is used to produce a reliable result that could be used and reported as an acceptable result for the study. In other words, using the minimum sample size to represent the whole population that is being tested or examined is to get a result with very low chance of error. The targets of this study are identified as the citizens of Saudi Arabia, and the Saudi government employees and experts that work in any government organisation that provides at least a basic e-Government service. In addition, the target of a study is called a population. Taking a portion or a subset of a study's population is called the sample size (Fink, 2003a). Furthermore, for a pilot study, it has been stated that ten responses per group are an acceptable minimum to analyse and present the results (Hertzog, 2008). In the regards of response rate, response rate refers to how many persons have responded to the survey (Fink, 2009). For instance, if 45 out of 50 questionnaires have been returned, the response rate is 90%. Response rates vary from one country to another, and no standard number is considered (Fink, 2003b). Researchers hope to have a high response rate. Furthermore, in similar research based on using Saudi Arabia as a case study, the response rate ranges between 60% and 75% (Al-Khaldi and Olusegun Wallace, 1999; Alawneh *et al.*, 2013).

5.7 Methods to Validate this Research

Since the factors have been integrated in the initial model, it is essential to first find out the importance of these factors on the citizens' intentions to adopt the e-Government services, followed by validating the theoretical model. Therefore, an exploratory study is undertaken first to confirm the proposed factors since there is no clear study which has been undertaken before. Second, the proposed theoretical model is going to be validated using the Structural Equation Modelling (SEM).

5.7.1 Confirming the proposed factors

In this report, these identified factors are going to be validated using the triangulation method. Triangulation is used to increase precision in empirical

research (Runeson and Höst, 2009). According to Runeson and Höst (2009), using the triangulation method by taking different angles towards the studied object provides a broader picture. Stake (1995) and Runeson and Höst (2009) also defined the four different types of triangulation as follows:

- Data (source) triangulation—using more than one data source or collecting the same data on 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 components are used. First, a detailed literature review has been done, which produced a summarized table of reviews from expert authors in this field (Appendix A). Second, questionnaires were distributed among Saudi Arabian citizens. Finally, interviews, questionnaires and expert reviews were conducted among government staff and leadership. However, the questionnaires are used as an exploratory study since there is no basic model for Saudi's e-Government. The exploratory study gives a clear picture of the important factors affecting the adoption of e-Government in Saudi Arabia.

5.7.2 Validating the proposed model

In order to validate this theoretical model, an initial analysis and test have been done. The analysis includes reliability testing and any missing values. This is to ensure that the result is constant. Moreover, the proposed model is being validated using the structural equation modelling technique (SEM). There are many applications that could be used to run SEM analysis, including, but not limited to, AMOS from IBM, Mplus, LISREL and EQS. In this research Analysis of Moment Structures (AMOS) (Byrne, 2010), was used due to its features meeting the requirements for this research and its availability. The theoretical model is created in AMOS and applies the data to it. This analysis indicates whether the data fit the model. The purpose of finding whether the data fit the model or not, is to confirm that the theoretical model is applied to the Saudi Arabian

context. In this research, the CFA approach is used, and the possibility of using EFA is just if a model needs to be amended to improve the model fit. Additionally, the data have been collected using triangulation techniques. First, the exploratory study used a detailed literature review, the opinions of citizens, government employees and experts for the study. Second, a survey gathers the citizens' views using a mixed-methods technique. Finally, the employees' and experts' opinions are gathered by a mixed-methods survey.

5.8 Concluding comments

In this chapter, different general methods for validating research are presented and discussed, followed by an exploration of the different types of surveys, including questionnaires, interviews, observations and record reviews. The mixed-methods technique is used in this research to seek out a clear picture about the research aims in order to answer the research questions of what are the factors that influence the citizens' intention to adopt e-Government in Saudi Arabia. Structural equation modelling (SEM) is also used to validate the theoretical model which would answer the research question of "How well does the developed model fit the Saudi Arabian context?" Furthermore, a clear method of how it is going to validate this research is highlighted, which is used in the following chapters.

Chapter 6: **Exploratory study and Results**

Since the factors influencing Saudi Arabian citizens are still debated, an exploratory pilot study is used to clarify the importance of the discussed factors. Therefore, after reading and discussing different techniques on how to collect data in order to discover and solve a problem, an exploratory study has been undertaken by creating questionnaires for the citizens of Saudi Arabia and the Saudi government staff who work at any government organisations. An interview of experts in the information technology field was carried out as well. The content of the questionnaires were built upon questions from similar research (Ebrahim, 2005; Altameem, 2007; Al-Shehry, 2008). The questions have been adapted, categorized, and reconstructed to suit this research. In addition, an ethical request form for this study has been applied and the University of Southampton has approved it under ID no 3213. This study uses mixed techniques, including structured and semi-structured questionnaires and interviews to validate the integrated factors of the proposed model. The surveys include a number of objectives. The first is to explore the demographic information of the citizens who take the survey in order to know their age, gender, occupation, spoken languages and overseas experience. The second objective is to identify challenges and factors valid from the citizen's view, and identify challenges and factors valid from the government employees' and expert's view. Table 6-1 gives a summary of the designed questionnaires' structures.

Table 6-1: Summary of the questionnaires' structures applying to all parties

Part No	Type of questions	Purpose
1	Closed-ended questions	Collecting demographic information
2	Closed-ended questions.	The importance of the proposed factors.
3	Open-ended questions.	Whether there are factors yet unidentified.

6.1 Questionnaire that applies to citizens

The citizens' questionnaire was designed to have both closed-ended questions and open-ended questions. The closed-ended questions are to learn demographic information including age, gender, occupation, spoken languages and overseas experience. The closed-ended questions find 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 cultural influences, security, privacy, trust and website design. The responses would rate the statements based on their opinion by choosing the appropriate value from a scale of five, where 1 represents strongly disagreed and 5 represents strongly agreed. The open-ended questions determine if the citizens have other factors as yet unidentified.

The statements used were as follows:

1. Culture in general does influence citizens to use e-Government services.
2. Culture can affect the trust of citizens who intend to use e-Government services.
3. Sending information via the network medium (e.g. the Internet) is safe, which encourages me to use e-Government services.
4. Providing critical information to e-Government websites can be risky, which prevents me from using the e-services.
5. The transaction between e-Government services and me is secure and influences my intention to use the online services.
6. The low level of the transaction security which might cause losing information, encouraging me to use the paper-based system.
7. General security about my information, which I am concerned about, affects my intention to use e-Government services.
8. Privacy is a critical issue that citizens are afraid of when they intend to use e-Government services.
9. Privacy has an indirect impact on the citizens' trust.

10. Trust in general is an important factor that influences citizens to adopt e-Government services.

11. Trust in the Internet does not affect the intention of citizens to use e-Government services.

12. Trust in the government has an impact on the intention of citizens to use e-Government services.

13. The design of a government's website increases my intention to use the e-Government services.

14. Whenever the usefulness of a website is clear and easily perceived by me, I use the e-Government services.

15. A website's perceived ease of use influences me to use the e-Government services.

6.2 Questionnaire that applies to government employees and interviewing experts

The questionnaires that are undertaken by employees who work at any government organisations and expert interviews have been designed to include open- and closed-ended questions. The closed-ended questions gather the opinions about 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 missed factors. The government staff take a questionnaire including twenty-three questions grouped under eight categories, which are quality of service, cultural influences, security, knowledge and skills, website design, lack of awareness, technical infrastructure and diffusion of innovation. The experts are asked for their opinions about all the proposed factors as closed-ended questions, while having open-ended questions to give their opinions about any other missed factors. The government staff statements were:

1. High Service Quality encourages consumers to use the e-Government.

2. The system's reliability increases the quality of service, which has an impact on E-Readiness, which encourages citizen adoption.

3. e-Government services should be available most of the time in order to influence citizens to adopt e-Government services.
4. When e-Government services are delivered in a reasonable time, E-Readiness will increase, which will help citizens adopt e-Government services.
5. The quality of information used in e-Government services has a strong impact on E-Readiness, which may affect the adoption of e-Government.
6. Culture in general does influence citizens to use e-Government services.
7. Cultural influences can affect the trust of citizens who intend to use e-Government services.
8. General security is what people are concerned about when they intend to use e-Government services.
9. Sending information via the online medium has a negative impact on the adoption of e-Government services.
10. People who have basic computer and Internet skills tend to adopt e-Government services easily.
11. Gender differentiation issues have an impact on the level of computer and information literacy, which may affect the adoption of e-Government services.
12. The level of education increases the computer literacy rate, which leads to citizens adopting e-Government services.
13. Consumers' age has a strong impact on the citizens to be literate which increases the chance to adopt e-Government services.
14. The design of a government's website increases citizens' intentions to use the e-Government Services.
15. Making the services on the government's website usable would help the government encourage citizens to use e-Government services.

16. Giving people access to general government information and services may help the government to influence citizens to adopt e-Government services.

17. Creating websites that have multiple languages would help the government to serve more people in order to encourage citizens to adopt e-Government services.

18. The government should introduce the new e-services through many channels (e.g. TV, launch campaign) to increase citizens' awareness in order to adopt e-Government services.

19. Strong technical infrastructure may be useful for the government to increase the adoption of e-Government services.

20. e-Government services should be seen as compatible with citizens' beliefs and needs.

21. The introduced services are seen as difficult to use and understand.

22. Using the e-Government services to enhance an individual's image or social status might increase the adoption of e-Government services.

23. Showing the advantages of using e-services to the citizens increases the adoption of e-Government services.

The experts had the following additional question, followed by a list of the defined factors (Table 3-1):

- How important are the following attributes to the adoption of e-Government services?

6.3 The sample size

In this study, the parameters that were used to calculate the minimum sample size were as follows:

- Effect size (ρ) refers to the lowest difference or effect that could be considered relevant by the researcher (Prajapati *et al.*, 2010). Cohen has identified three standard effect sizes described as small (0.20), medium (0.50) and large (0.80) (Cohen, 1988; Prajapati *et al.*, 2010). Since this

study is exploratory and no similar study has been done, the large effect size has been chosen (ρ)= 0.8.

- Alpha level (α) is conventionally set at 5%. Therefore, (α) err= 0.05.
- The statistical power (P) refers to P=1-β. Beta (β) value is presently the chance of accepting the null hypothesis in error which is conventionally set at 20%. Therefore, P=(1-β err)= 0.80

The calculation was run under t-test family with two tails and the result is seven fully-answered questionnaires for each group. Since this study is an exploratory pilot study, at least ten respondents are considered for the citizens' and government employees' questionnaires, while the expert interviews accept at least seven interviews.

6.4 Data analysis of the questionnaire applying to citizens

The citizens' survey has been designed as an Internet form using tools offered by a website called surveygizmo.com. The link has been sent to friends and colleagues by email and through social networking sites such as Twitter. There were 95 responses, which are more than enough at this stage.

6.4.1 Demographic Information

Age, education level, occupation, gender, languages spoken other than Arabic and overseas study or work were collected for each participant. This data is used to understand a number of factors, including the age group that most commonly used the Internet to participate, which level of education has the highest rate, people who speak more than one language, the cross-culture from work or study overseas, and gender gap. The participants who chose the age group 25 to 34 rank the highest at 53 (55.80%), whereas the age group of 50 to 60 had only 2 respondents and more than 60 had only 1, which together makes only 3.20%. With regards to the participants' education level, respondents with postgraduate degrees had the highest number, 41 (43%). Although the survey was distributed online and among friends and relatives randomly, no one with less than a high school education participated. The result of the occupation question was that more than 70% of the respondents

are working, either in administrative or technician posts, followed by students, with 19%. There were 90 male respondents and only 5 females. Moreover, 77 (81%) participants speak English as a second language and 16 respondents do not speak any language other than Arabic (17%). Regarding overseas experience, more than two-thirds of the respondents have worked or studied overseas, whereas 31 participants do not have any experience overseas. The summary of the citizens' demographic data is presented in Table 6-2, with a comparison to the general population.

6.4.2 Data Interpretation of the questionnaires applying to citizens

The survey was designed to have fifteen closed-ended questions, where the respondents could respond between 1 (strongly disagreed) and 5 (strongly agreed), and two open-ended question that sought suggestions from the citizens' experience. The results are tested using SPSS as one-sample t-test and the important value is defined at 3.5, which is compared with the result from the analysed collected data. This is an exploratory study and the scale that has been chosen has 5 possible answers. Therefore, above the average of 3, 3.5 has been identified as the lower value of importance. The closed-ended questions were about discovering that the addressed factors affect the citizens' intention positively or negatively, and they were under five categories and are presented as follows, and the summary of the results is presented in Table 6-3.

6.4.2.1 Cultural influences

Cultural influences had two questions. The first was to find out how important the culture is in affecting the citizens' intention to adopt e-Government services. The second question was to discover the relationship between culture and trust, which was presented in the integrated model as an indirect influence. The result shows that culture has a strong impact on the citizens' intention, with 51 respondents answering 'agreed' and 24 'strongly agreed', whereas respondents who answered 'disagreed' and 'strongly agreed' were 8 and 2 respectively. The analysed result was to find if culture is significantly higher than the predefined value. The probability was <0.001, which shows that culture is statistically significantly important. On the other hand, the result of the indirect relationship was 44 'agreed' and 18 'strongly agreed', whilst

respondents with the answer ‘strongly disagreed’ were only 2, and 16 chose ‘disagreed’. The statistical analysis shows that the probability for the indirect relationship between culture and the citizens’ trust was 0.222; therefore this variable is rejected and removed from the model.

Table 6-2: Citizen Participants’ Demographic Information

Variable		Compared to general population (approximately) data from (Central Department of Statistics and Information, 2012)	Frequency	Percentage
Age	18-24	19.8%	11	11.6%
	25-34	44.2%	53	55.8%
	35-49		28	29.5%
	50-60	7.1%	2	2.1%
	60+		1	1.0%
Education Level	High School	Literacy rate 86.6%	8	8.4%
	Diploma		9	9.5%
	Undergraduate		37	39.0%
	Postgraduate		41	43.1%
Occupation	Student	14.5%	18	18.9%
	Employee (administrative – Technical)	Saudi Labour Force 37.5%	40 29	42.1% 30.5%
	Self employed		3	3.2%
	Unemployed	5.2%	5	5.3%
Gender	Male	50.2%	90	94.7%
	Female	49.8%	5	5.3%
Spoken Language other than Arabic	English	-	77	81.1%
	Other	-	7	7.5%
	Only Arabic	-	16	16.8%
Overseas Experience	Study- work, Europe	8.1%	38 1	40.0% 1.1%
	Study- work, Americas	9.3%	11 1	11.6% 1.1%
	Study- work, Australia	4.77%	5 0	5.3% 0.0
	Study- work, Asia	1.0%	11 2	11.6% 2.1%

	Study- work, Arab region	6.8%	2 2	2.1% 2.1%
	Study- work, Africa	-	0 1	0.0% 1.1%
	No	-	31	32.6%

6.4.2.2 Security

The Security factor has three sub-elements including information security, risk and transaction security. It has five questions, one each for information security, risk and security in general, and two for transaction security to figure out how important these factors are in influencing the intention of Saudi citizens to use e-Government services. The analysis presents that more than 65% of the respondents agreed that information security would influence them to use e-Government once they were sure their information would be safe and not accessed by other people. Citizens who stated that their intentions might be affected by the perceived risk while submitting personal information to the e-Government website agreed, with nearly 70%. Regarding the transaction security, both questions show that less than 15% of respondents for each question say that the transaction security between citizens and the government website is safe and does not affect their intention to use e-Government services, whereas most do not agree with them. General security issues affect the intention of around 65% of the respondents. Furthermore, the probabilities of the information security and perceived risk are < 0.001, and the transaction security for both questions are < 0.001 and 0.01. In addition, the probability for security is 0.005. Therefore, these factors, including information security, risk, transaction security and security, are statistically significantly important.

6.4.2.3 Privacy

Under the privacy category, there are two questions; the first seeks the impact of privacy on the citizens' intention to use e-services, while the other investigates whether the relationship between privacy and trust might negatively affect the intentions of the citizens who want to use the e-Government services. This relationship between privacy and trust is called here indirect privacy. The result shows that just below 70% of the surveyed citizens agreed that they are afraid of losing their privacy during the online communication with the government, which affects their intention to use the

provided online services. On the other hand, the indirect relationship has been rated with less negative impact on the citizens' intention. The statistical analysis illustrates that the privacy factor is statistically significantly important with probability of 0.034, whilst the indirect privacy has the probability result of 0.509, which is seen as a rejected relation.

6.4.2.4 Trust

There are three questions asked of the citizens which determine the impact of trust in general, trust in the Internet and trust in the government on the citizens' intention to use e-Government services. The analysis demonstrates that around 90% of the respondents agreed that general trust when using the online services has a strong impact on their intentions. Similarly, trust in the Internet and trust in the government have been rated as important and have an impact on the citizens' intention with 77% and 72% respectively. The results of the t-test indicate that all three factors are statistically significantly important, with probability of < 0.001 for each element.

6.4.2.5 Website Design

In the website category, the citizens were asked to answer three questions regarding three factors: the design of the government website, its usefulness and ease of use. These questions seek how much these factors influence the citizens' intention to use the e-Government services. More than 85% of the respondents stated that the website design factor affected the intention of the public to use the online services. Furthermore, the citizens' perception of the government website's usefulness influenced the citizens' intention to use the provided online services, based on 88% of the respondents' views. Similarly, around 94% of the responses agreed that perceived ease of use influences citizens to take advantage of e-Government services. Moreover, the probability assessment shows that website design, usefulness and ease of use factors have a result of < 0.001, which indicates these factors are statistically significantly important.

Table 6-3: The summary result of the data analysis of the citizens' questionnaire, the detailed Cronbach's Alpha.

Items	Mean	Standard Deviation	Revised Cronbach's Alpha value if Item Deleted	Significant analysis	Result
Culture	3.92	0.942	0.564	<0.001	Statistically Significantly
Indirect culture	3.63	1.042	0.570	0.222	Not Statistically Significantly
Security	3.94	1.174	0.624	0.005	Statistically Significantly
Transaction Security 1	3.99	1.077	0.637	<0.001	Statistically Significantly
Transaction Security 2	3.87	0.878	0.601	0.010	Statistically Significantly
Information Security	3.78	1.033	0.625	<0.001	Statistically Significantly
Risk	3.83	1.117	0.642	<0.001	Statistically Significantly
Privacy	3.74	1.074	0.570	0.034	Statistically Significantly
Indirect Privacy	3.57	1.007	0.608	0.509	Not Statistically Significantly
Trust	4.27	0.831	0.597	<0.001	Statistically Significantly
Trust in Internet	4.05	1.056	0.617	<0.001	Statistically Significantly
Trust in Government	3.85	0.875	0.576	<0.001	Statistically Significantly
Website Design	4.27	0.778	0.589	<0.001	Statistically Significantly
Usefulness	4.43	0.781	0.591	<0.001	Statistically Significantly
Ease of Use	4.53	0.682	0.595	<0.001	Statistically Significantly

6.4.3 The reliability of the citizens' results

After presenting the analysis of the citizens' questionnaire, an assessment of the reliability was carried out using Cronbach's Alpha. The value of Cronbach's Alpha is acceptable (α=0.618), which indicates that the reliability coefficient for the questionnaire results could be seen as adequate. The summary result for the Cronbach's Alpha for each element is presented in Table 6-3.

6.4.4 Summarising the collected comments and suggestions

At the end of the questionnaires, there is a question asking for feedback about the questioned factors and comments based on experience. Most comments are repeated, such as "government should increase security, trust and introduce a clear and strict law about violation of privacy in order to increase the citizens' intention to use e-Government services" a respondent said. Another respondent said, "Increasing cultural awareness about the benefits of using e-Government services among citizens would increase the citizens' intention to use the online services".

6.5 Data analysis of the questionnaire applying to the Government employees

The survey is designed to be conducted in person. Two government organisations have been chosen to be part of this study. These organisations were selected because one has launched its website, which is the General Director of Passports, and started to provide basic online services, while the second, which is Al-Qassim Municipality, is trying to implement an e-service to serve citizens. Thirty-five questionnaires were handed out personally and thirty-one responses have been received, which was seen as enough for the exploratory study. The response rate for the government employees is 88.6%.

6.5.1 Demographic Data

Basic data has been collected including age, education level, job level and type. These data produce clear information about the respondents' experience. Most notable is that around 60% of respondents were between 35 and 49 in age, and no one has less than a high school certificate. Additionally, the Saudi job scale

has 15 levels, starting from level 1, which is the lowest, and going up to the highest, 15. More than 60% of the respondents occupied jobs between levels 5 and 8, followed by 10 respondents who held jobs between levels 9 and 12. On the other hand, the job types are administrative and technical. The majority of the respondents (74%) have administrative jobs, while 26% deal with technical issues. The summary of the government employees' demographic data is presented in Table 6-4, with a comparison to the general population.

Table 6-4: Government employees Participants' Demographic Information

Variable		Compared to general population (approximately) data from (Central Department of Statistics and Information, 2012)	Frequency	Percentage
Age	18-24	19.8%	1	3.0%
	25-34	44.2%	9	29.0%
	35-49		18	58.0%
	50-60	7.1%	3	10.0%
	60+		0	0.0%
Education Level	High School	Literacy rate 86.6%	16	52.0%
	Undergraduate		14	45.0%
	Postgraduate		1	3.0%

6.5.2 Data Interpretation of the questionnaire applying to the Government employees

The first part of the government employee's questionnaire was designed to have twenty-three closed-ended questions under eight categories, which are quality of service, cultural influences, security, knowledge and skills, website design, lack of awareness, technical infrastructure and diffusion of innovation. The respondents were able to choose answers which ranged from 'strongly disagreed' (1) to 'strongly agreed' (5). These questions ascertain the government staff's experience regarding how important they see the factors about which they have been asked. The level of importance has been defined as 3.5 as well. On the other hand, an open-ended question that has two parts has been asked; the first to seek whether they have any suggestion for factors that could influence the adoption of the e-Government services, and the second part to see if any factor should be excluded and why. The data has

been exported to SPSS and tested using a sample t-test to find out how statistically significantly important the proposed factors are. The results were as follows, and presents the summary results of the government employees questionnaire analysis:

6.5.2.1 Quality of service

The quality of service category has five questions, each one representing a variable. These questions seek how important these variables are in order to encourage citizens to adopt e-Government services. First, more than 95% of respondents agreed that the factors service quality and reliability influence citizens to adopt e-Government services. Regarding availability, 30 respondents agreed that citizens' adoption of the e-Government services is influenced by the availability factor. Furthermore, around 75% agreed that the speed of delivery and information quality factors have an impact on citizens' adoption of online provided services. On the other hand, running a one sample t-test assessment on service quality, reliability, availability, speed of delivery and information quality shows that service quality, reliability and availability each have < 0.001 probabilities. Additionally, the assessment of speed of delivery and information quality factors scored a probability value of 0.036 and 0.016 respectively. Therefore, the probabilities of the service quality, reliability, availability, speed of delivery and information quality factors are statistically significantly important.

6.5.2.2 Cultural influences

Two questions were asked under the cultural influences category to determine whether culture might influence the citizens to adopt the e-Government services and whether culture has an indirect impact on the citizens' trust. Culture is seen as an influencing factor in adopting e-Government services by the Saudi citizens, based on 26 respondents who agreed. In addition, 21 agreed with the indirect relationship question that culture has an impact on the citizens' trust. Subsequently, the probability value for the culture factor is 0.006, whereas the indirect relation received 0.252 for the probability value. Therefore, it is seen that culture is statistically significantly important while the indirect impact of culture on citizens' trust has been rejected, as it is not statistically significantly important.

6.5.2.3 Security

Under the security category, there are two questions that try to find the importance of security and information security factors on encouraging citizen adoption of e-Government services. The first question regarding general security is what people are concerned about when they want to adopt e-Government. The government employees, who agreed with this question, reached more than 95% of the respondents. On the other hand, the information security factor has an impact on e-Government services adoption based on approximately 77% of the respondents' answers. Consequently, the probability value of the one sample t-test assessment on the security and the information security factors are < 0.001 and 0.016 respectively.

6.5.2.4 Knowledge and skills

The knowledge and skills category has four questions seeking how important the asked factors are in encouraging the citizens to adopt the e-Government services. These factors are computer and information skills, user's gender, the level of education and the age of the consumer. Computer and information skills was agreed on, based on 90% of the staff's view that citizens are influenced to use and adopt e-Government services when they have at least basic knowledge of how to use a computer. Similarly, around 90% of the respondents agreed that the education level of the e-Government's users has an impact on adopting the online services. In addition, the age and the gender of the users would affect the citizens' adoption of the e-Government, according to approximately 80% of the respondents. With regards to the t-test assessment, the probability value of the computer and information literacy, and the education level factors are < 0.001 each, whilst gender and age factors received 0.009 and 0.005 for the probability's values respectively. The probability values show that computer and information skills, user's gender, the level of education and the age of the consumer factors are statistically significantly important.

6.5.2.5 Website Design

In the website design section four questions were asked to determine the importance of the proposed factors including website design, usability, accessibility and multiple languages in influencing the citizens to adopt the e-

Government services. The website design and accessibility factors are seen as influential factors in adopting e-Government services by around 85% of the respondents. The majority of the respondents (97%) agreed that the website's usability would encourage citizens to use the online services. Furthermore, about 80% of the respondents agreed that multi-lingual websites increase the chances of helping the citizens adopt e-Government services. Consequently, running the t-test assessment shows that the probability values of website design and multi-lingual website factors are 0.001 and 0.008, whereas usability and accessibility received < 0.001. This indicates that website design, usability, accessibility and multi-lingual website factors are statistically significantly important.

6.5.2.6 Lack of Awareness and Technical Infrastructure

One question under each category was asked to determine the respondents' views about the importance of the lack of awareness and technical infrastructure factors in helping the government to influence their citizens to adopt the online services. The result is 90% of the respondents say that the lack of awareness factor has an impact on the citizens who intend to adopt e-Government services. Moreover, technical infrastructure would help the citizens to adopt e-Government services based on the views of 84% respondents. Regarding the one sample t-test, the probability values of the lack of awareness and technical infrastructure factors are < 0.001 and 0.001 respectively. Therefore, these factors are found to be statistically significantly important.

6.5.2.7 Diffusion of Innovation

This category has four questions seeking the importance level of compatibility, complexity, image and relative advantage factors in adopting the e-Government services. Compatibility and relative advantage factors impact the adoption of online services based on the majority of the respondents. Furthermore, around 75% of the respondents agreed that complexity and image factors would influence citizens to adopt the e-Government services. Subsequently, the result of the t-test assessment for compatibility and relative advantage factors is < 0.001, whilst the probability value for complexity and image factors are 0.014 and 0.001 respectively. Thus, the importance level of

compatibility, complexity, image and relative advantage factors are significantly high.

Table 6-5: The summary results of the data analysis of the government employees' questionnaire.

Item	Mean	Standard Deviation	Revised Cronbach's Alpha value if item deleted	Significant analysis	Result
Service Quality	4.48	0.811	0.829	<0.001	Statistically Significantly
Reliability	4.39	0.803	0.827	<0.001	Statistically Significantly
Availability	4.48	0.811	0.829	<0.001	Statistically Significantly
Speed of delivery	3.84	0.860	0.832	0.036	Statistically Significantly
Information quality	3.87	0.806	0.842	0.016	Statistically Significantly
Culture	4.06	1.063	0.826	0.006	Statistically Significantly
Indirect Culture	3.74	1.154	0.864	0.252	Not Statistically Significantly
Security	4.45	0.810	0.836	<0.001	Statistically Significantly
Information Security	4.00	1.095	0.847	0.016	Statistically Significantly
Computer and Information Literacy	4.16	0.898	0.832	<0.001	Statistically Significantly
Education	4.13	0.763	0.842	<0.001	Statistically Significantly
Gender	4.10	1.193	0.858	0.009	Statistically Significantly
Age	4.06	1.031	0.850	0.005	Statistically Significantly
Website Design	4.19	1.046	0.828	0.001	Statistically Significantly
Multi-Lingual	4.03	1.048	0.841	0.008	Statistically Significantly
Usability	4.48	0.677	0.834	<0.001	Statistically Significantly

Accessibility	4.19	0.792	0.835	<0.001	Statistically Significantly
Lack of Awareness	4.29	1.039	0.840	<0.001	Statistically Significantly
Technical Infrastructure	4.16	0.969	0.840	0.001	Statistically Significantly
Relative Advantage	4.29	0.783	0.826	<0.001	Statistically Significantly
Compatibility	4.35	0.608	0.839	<0.001	Statistically Significantly
Image	4.10	0.908	0.853	0.001	Statistically Significantly
Complexity	4.10	1.274	0.859	0.014	Statistically Significantly

6.5.3 The reliability of the Government employee's result

The result of the analysis of the government's questionnaire has been assessed using Cronbach's Alpha to determine whether the results are reliable. The assessment's result is (α=0.846), which indicates that the reliability coefficient for the questionnaire result could be seen as adequate.

6.5.4 Summarising the collected comments and suggestions

The government employees were asked to give feedback about the questioned factors and comments based on their experience. Respondents provided comments and suggestions. Additionally, the majority 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 were quoted as follows:

- "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".

- The communication channels between the government and citizens to deliver the services are insufficient, such as sending the document by post. The participant stated that the "the Post Office are not reliable which may cause loss of the documents".

6.6 Data analysis of the interview applying to the Experts

The interview survey is designed to have all the proposed factors that have been discussed in Section 4.1: the proposed model. This survey obtains information from experts who work on the Saudi's e-Government project. The experts have been selected based on their positions which are all working in the Saudi e-Government program.

6.6.1 Data Interpretation of the Experts' interview

The question is "How important are the following attributes to the adoption of e-Government services?" which seeks out the experts' view of how important these factors should be considered to the citizens' decision to adopt the e-Government services. In addition, comments and suggestions from the experts' perspective on the proposed factors is asked for. Ten invitations were sent and eight experts accepted and were interviewed, giving a response rate of 80%. The collected data was assessed using one sample t-test and the results are presented in the following table, Table 6-3.

It can be seen from

Table 6-6 that the proposed factors are statistically significantly important from the experts' view, except for trust in the government and multiple languages. Although experts state that citizens' intention might not be affected by trust in the government and multi-lingual factors, researchers from the addressed literature review, citizens and government employees see trust in the government and multiple languages as influential factors. Therefore, trust in the government and multi-lingual factors are kept in the proposed model.

Table 6-6: The result of the one sample t-test for data from the Experts' questionnaires

Factors	Significant analysis	Result
Security	0.013	Statistically Significantly important
Transaction security	<0.001	Statistically Significantly important
Information security	<0.001	Statistically Significantly important
Perceived risk	0.013	Statistically Significantly important
Privacy	<0.001	Statistically Significantly important
Trust	0.007	Statistically Significantly important
Trust in internet	<0.001	Statistically Significantly important
Trust in government	0.080	Not Statistically Significantly important
Cultural influences	0.004	Statistically Significantly important
Usefulness	0.031	Statistically Significantly important
Ease of use	0.020	Statistically Significantly important
Multi-lingual	0.052	Not Statistically Significantly important
Usability	0.007	Statistically Significantly important
Accessibility	0.004	Statistically Significantly important
Relative advantage	0.013	Statistically Significantly important
Compatibility	0.031	Statistically Significantly important
Image	0.020	Statistically Significantly important
Complexity	0.013	Statistically Significantly important
Computer and information literacy	0.033	Statistically Significantly important
Gender	0.013	Statistically Significantly important
Education	0.013	Statistically Significantly important
Age	0.020	Statistically Significantly important
Technical infrastructure	0.013	Statistically Significantly important
Lack of awareness	0.048	Statistically Significantly important
Service quality	0.013	Statistically Significantly important
Reliability	0.007	Statistically Significantly important
Availability	0.007	Statistically Significantly important
Speed of delivery	0.007	Statistically Significantly important
Information quality	0.013	Statistically Significantly important

6.6.2 The reliability of the Experts' results

Subsequently, the analysis of the experts' interviews should be examined to determine how reliable this result could be by retrieving the value of Cronbach's Alpha. The reliability analysis returned (α=0.664), which indicates that the reliability coefficient for the interview result could be seen as sufficient.

6.6.3 Summarising Experts' feedback

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 demonstration 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, in malls for example, would help citizens to become familiar with how to use the services and the benefits as well," one expert says.

6.7 Discussion on the Results

From the analysis of the surveys, the proposed factors have been found statistically significantly important except for the multi-lingual and the trust in government based on the expert view. Although the statistical analysis for the expert data reported that the items multi-lingual and trust in government were not statistically significant, the citizens' and government employees' view along with the previous research from the literature review saw that these two items were important. Therefore, the items multi-lingual and trust in government were kept at this stage to be investigated in the evaluation study in the following chapter. These factors are integrated in the proposed model in order to be introduced to use by the Saudi Arabian government. Furthermore, since the author is a Saudi citizen and has experienced how the services are delivered in Saudi Arabia, he found that there is a problem with delivering services due to the postal infrastructure, which is supported by the participant's comment in Section 6.5.4. Saudi citizens do not have a clear address, such as a house number or a clear street name, or a secure postal address which is usually available in front of their house or a box beside their doors. Although there are post office boxes available for the citizen to rent,

not many Saudis have one, which makes communication between the citizens and the government hardly possible. 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. In the evaluation study, postal address is examined to determine how much this factor influences the citizens' adoption of e-Government services. Moreover, due to the short time of being a Minister of an organisation, the government should create a long road map to help the development of government organisations and services, such as e-Government. Additionally, government organisations should improve the communication system by replacing the paper-based system with an electronic one in order to increase the delivery speed of the online services.

6.8 Limitation of the study

As most studies have limitations, this study also has a limitation. Although the questionnaires have been analysed and the results were reliable, the questionnaires' instruments might be improved to get better results in future studies. Therefore, it is suggested that some statements which have been used in the questionnaires would be better to be rewritten in a clearer form.

Chapter 7: The methods of the Evaluation Study

In this chapter, the evaluation of the theoretical model is reported. After confirming the proposed factors in the exploratory study, the initial developed model in Figure 4-2 has been modified and presented in Figure 7-1. The model has been broken down into two separate versions to ease the validation process. The first part mainly presents the factors that are seen as the citizen's concerns, whereas the other factors that are seen as barriers facing citizens to be overcome by government in order to influence the public to adopt e-Government services. However, the two separate versions estimated the citizens' intention to adopt e-Government services. The first model is for the Saudi citizens, which in this research is called the *Citizens model* and shown in Figure 7-2, while Figure 7-3 represents the second model known as the *Government model,* which is applied to the Saudi government's employees and experts in the e-Government field. As discussed in the methodology chapter, the model is analysed and validated using Structural Equation Modelling (SEM) in order to answer the subdivided research questions:

a. Which of the identified factors in Table 3-1 have an impact on the citizens' intention?
b. How well does the proposed theoretical model of intention to adopt e-Government services fit the Saudi context?
c. According to the proposed theoretical model, which relations are significant in explaining the users' intention to adopt e-Government services in Saudi Arabia?
d. Are there any other relationships between the proposed factors that might affect the intentions of citizens?

The data used for this study is collected using triangulation methods and the surveys were undertaken using a mixed-methods approach. The data sources were, first, a detailed literature review which proposed factors and it has been confirmed using an exploratory study. Secondly, questionnaires were circulated to some Saudi citizens. Finally, some Saudi government's employees and experts participated in the questionnaires that apply to them. In addition, an ethical request form for this study has been applied and the University of

Southampton has approved it under ID no 6859. In the following sections, a discussion on how the questionnaires were built, the sample size that was required for this study and the data analysis are reported, followed by the requirement of SEM to state that the model fits, and in which cases the model would be modified to bring up the level of the model fit.

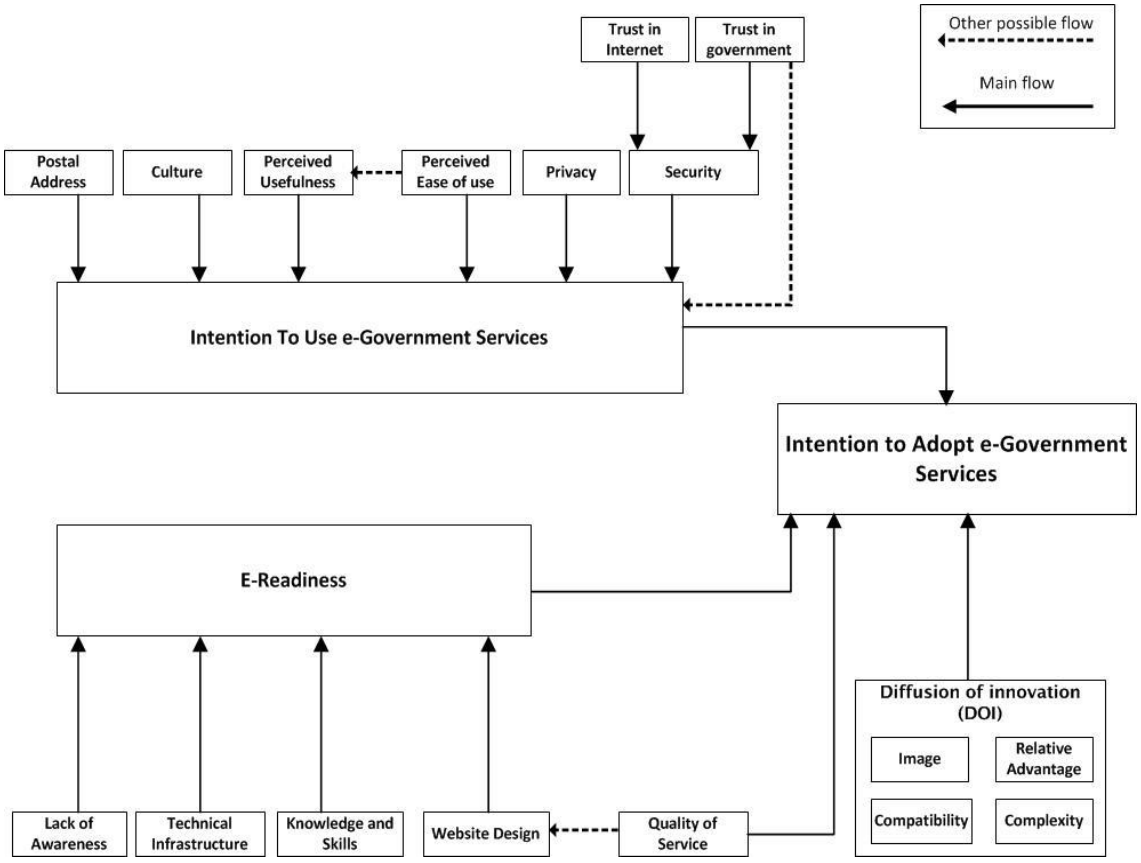


Figure 7-1: The breakdown of the high level overview of the theoretical model

7.1 Development of Questionnaire taken by Saudi citizens

The citizens' questionnaire was built using mixed-methods, including quantitative (closed-ended questions) and qualitative (open-ended questions) data to validate the Citizens model (Figure 7-2). The quantitative data is used to prove that the theoretical model is applicable in the Saudi context, whereas the qualitative data is used to gather opinion from the participants regarding the model and whether there are any other possible factors that would increase their intention to adopt e-Government services. However, the qualitative data is used in this study for gaining the participants' opinion, and is not used to

validate the model. Furthermore, the surveys included four main parts: demographic data, computer and internet skills, closed-ended questions about the proposed model, and the final section had an open-ended question that sought opinions and suggestions. There were 49 closed-ended questions that have been adapted from different previous studies. The questions have been modified to suit the Saudi Arabian context and have been translated into Arabic. The questionnaire was examined by a number of experts in the Arabic language to resolve any possible misunderstanding of the questions. Therefore, the data should be evaluated by running a reliability analysis to prove that the questions are seeking the right information. Furthermore, the questions have been categorised under ten factors. These categories were perceived usefulness (PU), perceived ease of use (EOU), privacy (PV), trust in internet (TRUSTI), trust in government (TRUSTG), postal address (ADD), cultural influences (CL), security (SEC), intention to use e-Government services (USE), and intention to adopt e-Government services (ADOPT). Consequently, each category is presented as a factor, and it has a number of questions which are used to predict the factor. Each question (item) has been assigned with a unique code which includes the factor short name plus a number. For instance, intention to adopt e-Government services (ADOPT) has five items starting with ADOPT1 to ADOPT5. In addition, the questionnaire has been created electronically using the "Survey Gizmo" web tool. This was selected by the researcher because of its ease of use and the researcher's familiarity with the tool.

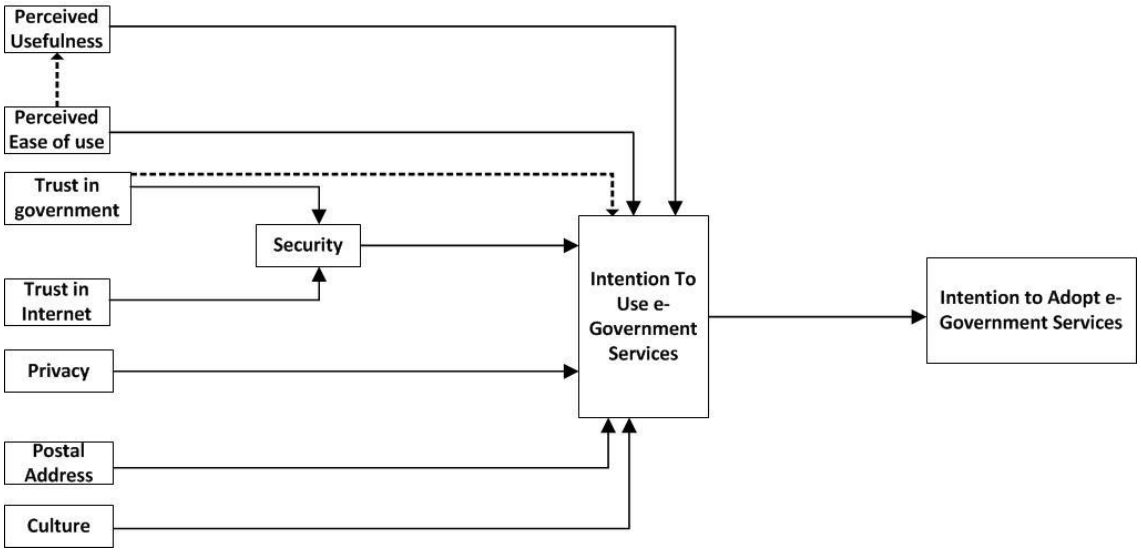


Figure 7-2: Citizens Model

The layout of the questionnaire and the questions' coding are included in Appendix D. The 49 closed-ended questions are:

1. It is likely that I would keep interacting with the government website in the near future.
2. In future, I would not hesitate to provide my information to e-Government websites.
3. To retrieve a government's information I would use the online services.
4. In the near future I would inquire about the government's services online.
5. It is likely that I would use the online payment when using e-Government services in the near future.
6. For gathering information about the Saudi government, I would use the web.
7. I would use the online government's services provided over the web.
8. Using the web for interacting with the government is something that I would do.
9. When using a government's website, I would not hesitate to provide the required information.
10. I would use the web for inquiring about the government's services.
11. It would be easy for me to learn to interact with a government website.
12. I believe that the process for interacting with a government website would be a clear and understandable.
13. Interacting with most government websites would be flexible for me.
14. I found that becoming skilful at using a government website would be easy for me.
15. I would find that it is difficult to use the online services.
16. I would be able to complete transactions with the government more quickly by using an e-Government website.
17. The e-Government website would provide me a valuable service.
18. I found that the content of the government website was useless.
19. My effectiveness in searching for and using e-Government services would be enhanced with the government website.
20. I think the government website is useful.
21. There are enough safeguards in the Internet which makes me feel comfortable when using services online by transacting personal business with the government or its agencies.

22. I feel assured that I am protected from problems on the Internet due to the adequate legal and technological structures.
23. In general, todays Internet is becoming a robust and safe environment in order to transact with government or its agencies.
24. I feel confident that my data which I submit through an e-Government website would not be misused and would be treated confidentially.
25. It is likely that I would trust government or its agencies.
26. My government or its agencies could be trusted to deal with online transactions faithfully.
27. I trust my government or its agencies in keeping my best benefits in mind.
28. I would find my government or its agencies trustworthy.
29. The government may share my personal information which I have given to them with other government agents whom I do not want to provide the information.
30. A third party may be allowed by the government to access my personal information without my consent.
31. My personal information may be used by the government without my consent.
32. My personal information could be snatched by someone while I am sending the information to a government website.
33. Hackers may be able to steal my personal information stored on the government's website by intruding on their websites.
34. The government agency may use my personal information in an unintended way.
35. My personal information could be hacked while I am sending the information to a government website.
36. I feel a transaction with an e-Government service is unsafe.
37. Usually government ensure that the online information transactions are secured from being destroyed or altered by accident during transmission on the internet.
38. In general, I believe it is risky to use e-Government services over the Internet.
39. I feel that the benefits of using an e-Government service are outweighed by the risks.

40. It is thought by people who influence my behaviour that I should use the e-Government services.
41. It is thought by people who are important to me that I should use the e-Government services.
42. I use the e-Government services because of the number of colleagues who use them.
43. I would use the online services only when I needed to.
44. Only if my friends used the e-Government services would I use them.
45. I would use the e-Government services if I have a permanent address.
46. I would use the e-Government services if I have a clear and certified address.
47. There is no secure communication channel between me and the government.
48. The mail services in my country are not performing well.
49. I would not use the e-Government services because I am afraid of losing personal documents, since the current mail services do not perform well.

7.2 Development of Questionnaire taken by government employees and experts

The questionnaire taken by government employees and experts was built in the same way as the citizens' questionnaire by using mixed-methods, with the purpose of validating the employees' and experts' model (Figure 7-3). In addition, the questionnaires also have been designed to have four sections, like the citizens' questionnaire, which are: demographic data, computer and internet skills, closed-ended questions about the proposed model, and the last section has an open-ended question that is seeking opinion and suggestions. However, the qualitative data, which is gathered by the open-ended questions, is used in this study for gaining the participants' opinion, and is not used to validate the model. The questions have been adapted from different previous research and have been processed as the citizens' questionnaire, which has been mentioned in Section 7.1. Moreover, in this questionnaire, there are 58 closed-ended questions which were categorized under eleven variables. The variables were, website design (WD), lack of awareness (AW), technical infrastructure (IN), relative advantages (RA), compatibility (CT), complexity

(CX), image (IM), knowledge and skills (KNS), quality of services (QS), E-Readiness (ER), intention to adopt e-Government services (ADOPT). Furthermore, the employees' data have been gathered by a paper-based survey as well as an online version. The layout of the questionnaire with the code book is included in Appendix D. The list of the closed-ended questions is as follows:

1. It is likely that I would keep interacting with the government website in the near future.
2. In future, I would not hesitate to provide my information to e-Government websites.
3. To retrieve a government's information I would use the online services.
4. In the near future I would inquire about the government's services online.
5. It is likely that I would use the online payment when using e-Government services in the near future.
6. The physical infrastructure in Saudi Arabia is sufficient to influence citizen's intention to adopt e-Government.
7. Human capacity including literacy, ICT skill level and vocational training, would influence citizen's intention to adopt e-Government.
8. Because the legal and regulatory environment affecting the ICT sector and ICT use, including telecommunications policy, consumer protection, and privacy, citizen's intention is affected negatively.
9. The ICT infrastructure in Saudi Arabia is on high standard which helps citizens to adopt e-Government services.
10. The speed of online communication would affect the citizen's intention to adopt e-Government services.
11. My efficiency would be enhanced by using the web in gathering information from government or its agencies.
12. It is likely that my efficiency would be enhanced when using the web in interacting with government or its agencies.
13. It would be easy to interact with government or its agencies when using the web.
14. I would feel when using the web that I have greater control over my interaction with government or its agencies.
15. I think using the Internet would fit well with the way that I like to gather information from the government.

16. I think using the Internet would fit well with the way that I like to interact with the government.
17. Interacting with the government using the Internet would fit into my lifestyle.
18. Interacting with the government using the Internet would be incompatible with how I like to do things.
19. People who gather information about the government by using the Internet have a high profile.
20. People who use e-Government services on the web have a high profile.
21. People who gather information about the government by using the Internet have more prestige than those who do not.
22. Interacting over the web with the government enhances the social status of the person.
23. Learning to use the web for using e-Government services is easy for me.
24. I believe that getting the web to do what I want it to do is easy to me.
25. It is clear and understandable when interacting with the web to use e-Government services.
26. Overall, I believe that using the web to use the e-Government services is easy.
27. There are adequate facilities (e.g. ICT hubs, service centres or internet cafes) provided by government to access e-Government services.
28. I have the required resources at home to use e-Government services such as a computer and internet access.
29. At work, I have the required resources to use e-Government services such as a computer and internet access.
30. I have enough knowledge to use e-Government services such as skills for using e-Government services.
31. The responsibility for making people aware and educated about the existence of e-Government services is fulfilled by the government.
32. The citizens are receiving training from their government to make best use of online services.
33. At any time that I need to access government information, i.e. 24/7, e-Government services enable me.
34. Dealing with government through e-Government services are more reliable compared to the traditional way.

35. It is able to respond to citizens' needs quickly when applying e-Government services.
36. The precise information you need is provided by e-Government services.
37. The information provided by e-Government services is up-to-date.
38. It is easy to access e-Government services contents through the government's website.
39. The support of local languages on the government's website would be helpful to understand the contents of the service.
40. Providing language support on the government website would encourage more users to use the e-Government services.
41. Supporting the government website with different languages (e.g. local languages, English, French, and Chinese) would affect the users' intention positively to use e-Government services.
42. I would be confident to use government's websites which are adequately designed to serve my needs.
43. The information in e-Government websites should be presented in a simple and understandable manner.
44. The access to the e-Government website is provided for full time, at anytime and anywhere.
45. Providing support to users who have a disability would encourage more people to use the online services.
46. It is easy for me to use the e-Government services at anytime and anywhere.
47. Making e-Government websites usable would affect the citizen's intention positively.
48. I have enough skills and experience to use the internet.
49. I would find that navigating within the government's websites easy for me without having internet or computer skills.
50. Without having the required skills to use the internet, it is not easy for me to understand and be aware of internet benefits.
51. Having enough internet and computer skills would enable me to navigate within the government's websites to use different online services.

52. Having the required internet and computer skills would improve my interaction online with government through using different government's websites.
53. Age group (18-40) are more likely to use e-Government services.
54. Age group (18-40) have enough knowledge and skills to use e-Government services.
55. Users with high-level education are more likely to use e-Government services.
56. Age group (18-30) have been educated and provided with information and computer skills.
57. Users' gender restricts their intention to use e-Government services.
58. Users' gender would increase more users to use the online services.

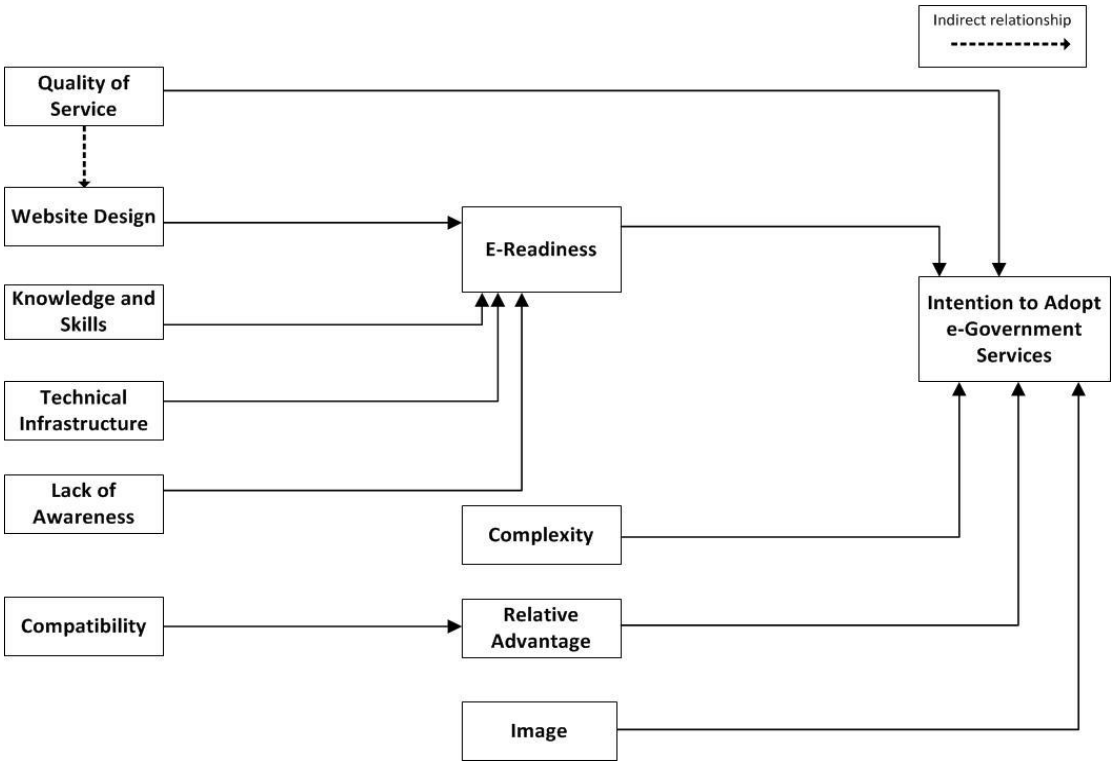


Figure 7-3: Government Model

7.3 Sample size

In this section, the minimum sample size for the main study was calculated using the G*Power calculator with the following parameters which have been mentioned in Section 6.3:

- Effective size was chosen to be, ρ= 0.2.

- Alpha level (α) was conventionally set at 5%. Therefore, |α| err= 0.05.
- The statistical power was chosen to be, P= 0.90

The calculation was run under t-test family with two tails and the result is two hundred and sixty five fully-answered questionnaires for each group as the minimum sample size. On the other hand, it has been stated that the minimum required sample size per factor could be five responses (Bentler and Chou, 1987), 10 responses (Joseph *et al*., 1992), or 15 responses (Stevens, 2002). In addition, it is suggested that 20 fully-answered questionnaires per variable is required as a minimum sample size when using SEM (Stevens, 2002). Accordingly, the sample size for the citizens' part and the government employees' part would be 200 and 210 fully-answered responses respectively. In conclusion, the lowest boundary is 50 and 55 when applying 5 responses per variable, while the highest minimum sample size could be 265 completed questionnaires.

7.4 Response rate and responses' selection

The response rate for this study met the required rate, and in the next chapter each response rate to the questionnaires is discussed in more detail. With regards to the responses' selection, the citizens' questionnaires were distributed in two ways. As the questionnaire was an electronic version, first, invitations were sent by email to colleagues and friends. Second, the survey's link was posted using social networking websites such as Twitter. Regarding the employees' questionnaire, some government organisations were contacted officially in person to obtain their permission for allowing their employees to participate in this study. Those who accepted to be part of this research were sent the questionnaires. However, the organisations were given two options to select in which form they want to receive the questionnaires, the electronic version or the traditional paper-based questionnaire. The organizations who participated are: Ministry of Interior (General Director of Passports), Ministry of Education, Ministry of Higher Education, and Ministry of Municipality.

7.5 Data analysis

The questionnaires have been constructed using Likert scales. Likert scales are widely used to gather data for evaluating how satisfied the users are with the

new provided services (Rogers *et al.*, 2011). The Likert scale in this study has five values: one is the lowest indicating 'strongly disagree', while five is the highest representing 'strongly agree'. In the following sections, the analysis processes which have been used in this study are presented.

7.5.1 Demographic data

In the demographic data section, the respondents' gender, age, level of education, employee status, and overseas experience are required. This information is to give a clear view about who is responding to this study. However, the comparison between the general population and the demographic data group is presented in Table 6-2.

7.5.2 Computer and internet skills

The knowledge about using the computer and the internet usage experience is asked in this section of the questionnaire. It represents the level of understanding of how to use the basic technology and the lowest level of internet experience in order to use the new services. Moreover, the gathered data is compared with the level of computer and internet experience among the Saudi citizens, and the results are given in Sections 8.2 and 9.2.

7.6 Pre-process SEM evaluation

In order to run the SEM analysis test, there are some steps which have been followed to increase the reliability and validity of the study.

7.6.1 Missing values

One of the major problems facing data analysis is missing data (Acuna and Rodriguez, 2004). It has been classified that missing less than 1% of data is considered trivial, is manageable if 1-5%, 5-15% is sophisticated to analyse, and above 15% may lead to misinterpretation (Hall *et al.*, 2012). Therefore, running missing values analysis has been done to find if there are any responses which have an unacceptable missing data rate. Responses that have a high rate of missing values which might affect the study have been excluded. In this research, the maximum accepted missing value is 5%. Therefore, some returned questionnaires were removed from the study which exceeded the

maximum accepted rate. In the following chapter, the number of excluded questionnaires is mentioned in detail.

7.6.2 Reliability analysis

In this section, a reliability analysis process is presented. This type of analysis is to explore the effect of the items on the study. However, these processes are for guidance and it is not necessary that all of these steps should be followed. In addition, the reliability analysis brings some statistical results, and these results include the Cronbach's Alpha, standard deviation, squared multiple correlation, corrected item total correlation, and Cronbach's Alpha if Item deleted. However, the effect of unreliable data on a study has been discussed in Section 5.4. The squared multiple correlation refers to "the coefficient of determination when the item is regressed on the others", while "the simple correlation between the item and the sum of the rest refers to corrected item total correlation" (Blunch, 2008). According to Blunch (2008) items that would increase the reliability if deleted might be nominated to be excluded. Additionally, items which have a low score in standard deviation as well as a score for squared multiple correlation lower than 0.4 are candidates for elimination (Blunch, 2008). Thus, the reliability analysis of the whole study was undertaken to ensure that the data is reliable and to determine items that might be excluded. Moreover, as well as unreliable items, items which have a small standard deviation might decrease the chance of representing a well fit model (Blunch, 2008). Lastly, a reliability test for each factor has been performed, to predict any possible item that would cause a problem to the measurement models (Blunch, 2008). The reliability analysis and its results are presented in detail in Chapter 8 and Chapter 9.

7.6.3 Measurement model

Each factor with its items is called a measurement model, and should be tested before running the full model analysis. The result of a measurement model would determine goodness of fit and the estimation for each item. In addition, any possibilities of excluding an item or factor might be predicted by using the measurement model along with reliability analysis. In the next section, the detail of reading goodness-of-fit statistics and which of them would be used in this research is presented.

7.7 Goodness-of-fit statistics in SEM

One of the key tasks of testing a proposed model is to determine the goodness-of-fit between the theoretical model and the gathered data (Acuna and Rodriguez, 2004). It is noted that the hypothesized model is tested using the sample data by the researcher (Acuna and Rodriguez, 2004). Furthermore, AMOS is using Maximum Likelihood (ML) estimation as the preferred approach to analyse the data (Blunch, 2008). The result of the estimation could be presented by chi-squared ,χ^2, and with a probability (p-value) greater than 0.05, and it is called absolute fit measure (Blunch, 2008). However, these values might be hard to achieve due to the sensitivity of the Maximum Likelihood test and chi-squared ,χ^2, distribution; these issues now are known widely (Acuna and Rodriguez, 2004). Therefore, an alternative goodness-of-fit would be used instead when the model does not meet the first requirements, χ^2, and p-value. There are many statistical results in the alternative goodness-of-fit. In this study, only a selection of the common fit statistics are presented, such as the Root Mean Square Residual (RMR), the Goodness-of-Fit Index (GFI), Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA). In addition, according to Acuna and Rodriguez (2004), all four statistics fit are ranged from zero to 1.00. In the following sections the accepted values are discussed in detail.

7.7.1 Root Mean Square Residual (RMR) and Root Mean Square Error of Approximation (RMSEA)

RMR statistic fit would be accepted if its value is less than 0.1, whereas it is reported as a perfect fitting model with a value of 0.05 or less (Acuna and Rodriguez, 2004). On the other hand, RMSEA statistic fit could be reported as a poor fit with a value greater than 0.1 and the value ranging from 0.8 to 0.1 is reported as mediocre (MacCallum *et al.*, 1996; Acuna and Rodriguez, 2004). Although a value of 0.06 indicates a good fit (Bentler and Yuan, 1999), a score of 0.05 or less represents a perfect fit model (Acuna and Rodriguez, 2004).

7.7.2 Goodness-of-Fit Index (GFI) and Comparative Fit Index (CFI)

As mentioned earlier, GFI and CFI are ranged between zero and 1. In contrast to RMR and RMSEA, the close value to 1 of GFI and CFI represents a perfect

match while zero represents no match at all (Schumacker and Lomax, 1996). Although some researchers indicated that the cut-off of GFI and CFI are 0.9 or higher (Hu and Bentler, 1999; Acuna and Rodriguez, 2004; Blunch, 2008), Schumacker and Lomax (1996) stated that values close to 0.9 indicates a good fit.

7.8 Cases of modifying the model

In this section, some cases are discussed that would be used to modify the hypothesis model in order to increase the chances of the model fitting the data. As mentioned in the methodology chapter, a confirmatory factor analysis (CFA) approach is used to validate the theoretical model. In the case of low model fit, the AMOS presented some suggestions called modification indices to improve the model fit, which inform the researcher that there is a possible correlation between errors of the variable in the same latent variable (factor). For instance, two items have to be correlated. The correlation could be explained by a theory or sometimes the questions have been biased created by wording similarly or misinterpretation (Marks *et al.*, 2005). However, if the modification indices do not bring the model to the level of good fit, the exploratory factor analysis approach is used. This would happen when the model is a poor fit and the researcher could not apply any modification indices, or an item or a factor is not significant or has a low correlation.

7.9 Concluding comments

This chapter presents the way in which the developed model is evaluated. Two sets of questionnaires were developed using mixed-methods to gather data. The two sets of questionnaires were applied first to the Saudi Arabian citizens and then to the government's employees and experts. In addition, the sample size for this study has been calculated. The response rate is presented, as well as the selection of the responses. Moreover, the way in which the data is analysed and processed is addressed. As the SEM approach is used to evaluate the model, some analysis steps have been followed to increase the reliability and validity of this research, such as missing values, a reliability analysis, and measurement models. Additionally, the statistical results for the estimation of the model are represented by goodness-of-fit, which represents how well the model fits the data. Finally, some cases that could be used to modify the

theoretical model in order to increase the likelihood of fitting the data are discussed.

Chapter 8: Data analysis and results of the Citizens model

This section is presenting the process of the data analysis of the citizens' questionnaires and the results of applying the SEM approach on the Citizens model. First, the respondents' demographic data is presented, followed by the knowledge and experience of the respondents. The process of running the SEM approach on the Citizens model is shown next.

8.1 Demographic data

In the first part of the questionnaire, there were some questions which asked the participants to describe their characteristics such as gender, age group, highest level of education that they had achieved, current employment, and overseas experience. As mentioned in Section 7.4, the questionnaire was distributed electronically by sending invitations via email and then posted on Twitter. The number of people who accessed the link was greater than 750, while the number of completed questionnaires was 537. However, some notes have been received from participants who stated that due to the poor internet connection they could not complete the questionnaire, and some others have exceeded the session's time. Therefore, only the questionnaires which were marked as completed were analysed. In addition, there were two responses which were marked as completed having missing values that exceeded the accepted rate. Four returned questionnaires were also having missing values (<5%) but fell inside the accepted rate which was mentioned in Section 7.6.1. Therefore, the responses which exceeded the accepted rate were excluded (2 questionnaires), whereas the missing values in the rest were replaced by the mean of the same question. Furthermore, there were 388 (73%) males who responded to this study while the number of the females who participated was 147 (27%). The highest number on the age group was participants who were aged between 30-39 with 207 followed by the youngest group (18-29) with 206, while there were only three people who took this questionnaire who were aged 60 and above. Regarding the education level, there were only 14 (3%) who left before finishing high school, whereas the highest percentage was from people who have got an undergraduate certificate with 45%, followed by 21% of

participants who achieved postgraduate level. Moreover, 256 participants were working in the public sector, 56 were unemployed, and 17 for each group of people who were retired or were self-employed. Additionally, about 40% of the participants did not have any overseas experience, while 315 persons have travelled overseas for study, work, business, or leisure.

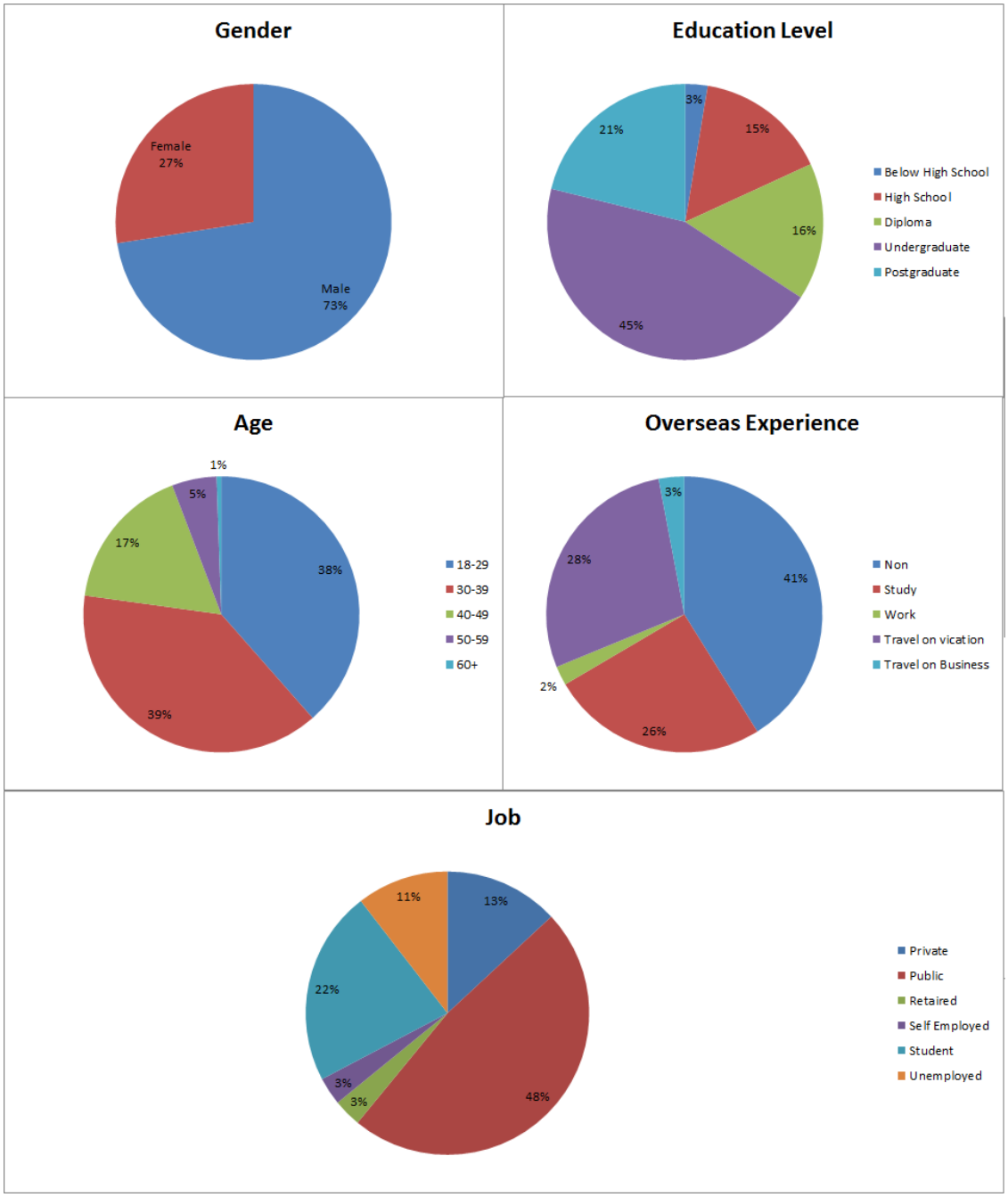


Figure 8-1: Full details of the demographic data of the citizens

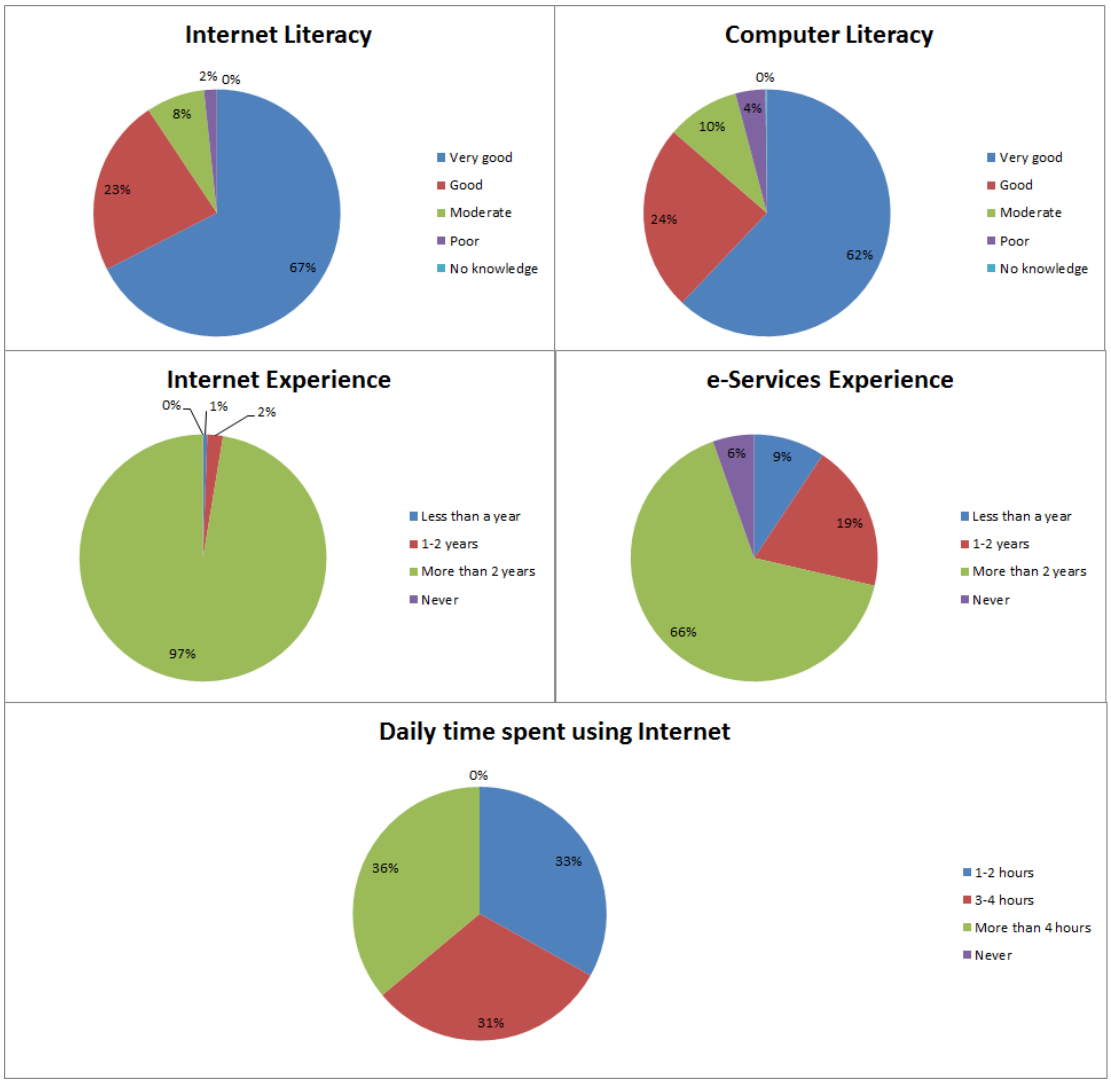


Figure 8-2: Summary of the citizens' skills and knowledge data

8.2 Computer and internet skills and knowledge

The second section in the questionnaire was gathering data about the computer and internet skills and knowledge, as well as the participants' experience in using internet and electronic services, internet banking for example. The daily internet usage also was gathered. Most of the participants described themselves as having very good skills and knowledge in using a computer and the internet with 332 and 361 respectively. There were only 22 people who were having poor or no knowledge at all in using a computer, while only 9 were having poor knowledge in surfing the internet. No one replied that they never used the internet, and 97% stated that they have been using the internet for more than two years. Participants who have used e-

services for more than two years were 353, while there were 29 who did not use it at all. Additionally, the daily time that participants spent in using the internet were: 36% spending more than 4 hours, 33% and 31% who spent 1-2 hours and 3-4 hours respectively. However, from the responses no-one stated that they never used the internet from either computers or smart devices.

8.3 The process and results of applying the SEM approach on the Citizens model

The Citizens model, as shown in Figure 7-2, was hypothesised to be tested in order to answer the research questions in Section Chapter 7: Chapter 7. In SEM this type of model is called an indirect model. The indirect model refers to when a factor or a set of factors has an effect on a factor through other variables (Byrne, 2010). In the Citizens model, the latent variables Trust in Government (TRUSTG), Trust in Internet (TRUSTI), Privacy (PV), Perceived Ease of Use (EOU), Perceived Usefulness (PU), Security (SEC), Postal Address (ADD), and Cultural influences (CL) are affecting the Intention to Adopt e-Government services factor through the variable Intention to Use e-Government services. However, the model has been developed based on the literature review, and then confirmed by the study in Chapter 6. Therefore, the hypotheses have been addressed based on the confirmed model. Moreover, the main hypotheses for the Citizens model are:

1HA1: the variable trust in government has an indirect or direct effect on the Intention to Adopt e-Government services factor.

1HA0: the variable trust in government does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

2HA1: the variable trust in internet has an indirect or direct effect on the Intention to Adopt e-Government services factor.

2HA0: the variable trust in internet does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

3HA1: the variable privacy has an indirect or direct effect on the Intention to Adopt e-Government services factor.

3HA0: the variable privacy does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

4HA1: the variable perceived ease of use has an indirect or direct effect on the Intention to Adopt e-Government services factor.

4HA0: the variable perceived ease of use does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

5HA1: the variable perceived usefulness has an indirect or direct effect on the Intention to Adopt e-Government services factor.

5HA0: the variable perceived usefulness does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

6HA1: the variable security has an indirect or direct effect on the Intention to Adopt e-Government services factor.

6HA0: the variable security does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

7HA1: the variable postal address has an indirect or direct effect on the Intention to Adopt e-Government services factor.

7HA0: the variable postal address does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

8HA1: the variable cultural influences has an indirect or direct effect on the Intention to Adopt e-Government services factor.

8HA0: the variable cultural influences does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

9HA1: the variable intention to use e-Government services has an indirect or direct effect on the Intention to Adopt e-Government services factor.

9HA0: the variable intention to use e-Government services does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

Next, the evaluation and estimation for the latent variables in the Citizens model are reported, followed by the whole model estimation.

8.3.1 Latent variable estimation and item analysis

In this section, each latent variable with its items, which is called a measurement model, were evaluated and estimated separately. The reason for evaluating the measurement models is to explore any suspect item that might be excluded from the whole model validation, whereas the estimation is to prove that the factor is predicted by its items. Furthermore, the processes have been done in two steps. First, run a reliability analysis to get statistical results, such as Cronbach's Alpha, standard deviation and squared multiple correlation. Second, estimate the measurement models to see how well the measurement model fits the data. In the estimation, there is a major action that should be taken before running the estimation. The action is to set up at least one item as an anchor variable and assign regression coefficient 1 as a standard for the model to converge. In the next sections, only the result of the analysis and estimation are presented and mentioning any modification that has been done on the model.

8.3.1.1 Trust in Government

Trust in Government (TRUSTG) is predicted by the items TRUSTG1, TRUSTG2, TRUSTG3 and TRUSTG4. However, these items are representing the code for the statements on the questionnaires which are shown in the code book in Appendix E. Regarding the item analysis, the result shows that the overall Cronbach's Alpha is 0.896 which indicates that the items are consistent. In addition, all results of the squared multiple correlation for the items are above 0.4 with high standard deviation, and no item improves the result if it is deleted. The summary of the items' statistical analysis is presented in Table 8-1.

TRUSTG1 was the anchor variable. On estimation of the measurement model, it was found that all paths that predict Trust in Government were significant at the 1% level. In addition, the statistical result shows that the $p<0.05$ which should reject the hypothesis. Therefore, by looking to the modification indices, there was a possible correlation between the errors of TRUSTG3 and TRUSTG4. The estimation result after applying the modification showing that the measurement model is perfectly fit with Chi-square, χ^2, =2.959 and a p-value of 0.085. The goodness-of-fit results are shown in Table 8-2.

Table 8-1: Summary of the Statistical analysis for Trust in Government based on a Cronbach's Alpha of 0.896 for 4 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
TRUSTG1	0.956	0.673	0.870
TRUSTG2	0.932	0.676	0.866
TRUSTG3	1.130	0.631	0.882
TRUSTG4	1.056	0.704	0.847

Table 8-2: Fit indices for the measurement model of Trust in Government

Chi-square	p-value	CFI	GFI	RMR	RMSEA
2.959	0.085	0.999	0.997	0.006	0.061

8.3.1.2 Trust in Internet

TRUSTI1, TRUSTI2, TRUSTI3 and TRUSTI4 predict the latent variable Trust in Internet (TRUSTI). Furthermore, Trust in internet has been tested using the reliability analysis. The Cronbach's Alpha for all items is 0.852. The result explains that all items are holding together and consistent. With regard to the squared multiple correlation and means, all items show a high standard deviation with no item scored less than 0.4 in the squared multiple correlation, except TRUSTI4. The item TRUSTI4 result was 0.361 in the squared multiple correlation, which makes the item suspicious. Therefore, TRUSTI4 is going to be watched during the confirmatory factor analysis for the Citizens model. The total statistics for the four items are presented in Table 8-3.

Table 8-3: Summary of the Statistical analysis for Trust in Internet based on a Cronbach's Alpha 0.852 for 4 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
TRUSTI1	1.027	0.551	0.796
TRUSTI2	1.092	0.580	0.785
TRUSTI3	1.027	0.484	0.813
TRUSTI4	0.979	0.361	0.849

The anchor variable was set to be TRUSTI1. It is found in the estimation of the measurement model that all paths that predict Trust in Internet were significant at 1% level. Furthermore, the statistical result illustrates that the χ^2 = 0.752 with p-value (0.686)>0.05, which indicates that the hypothesis should not be rejected. Table 8-4 presents the model fit indices.

Table 8-4: Fit indices for the measurement model of Trust in Internet

Chi-square	p-value	CFI	GFI	RMR	RMSEA
0.752	0.686	>0.99	0.99	0.005	<0.001

8.3.1.3 Privacy

The predictor items of the latent variable privacy (PV) are PV1, PV2, PV3, PV4 and PV5. In the item analysis, the reliability analysis of the factor was undertaken. The overall Cronbach's Alpha result was 0.826.This result indicates that the items are holding together. Additionally, the analysis result shows that the reliability could be improved to 0.841 by deleting PV1. Consequently, the squared multiple correlation for the items PV2, PV3 and PV4 were far from 0.4, while PV1 is 0.241 and PV5 0.4. Moreover, all items represented a high standard deviation. Therefore, PV1 is a highly suspect item, whereas PV5 might be a suspect item as well. During the full model analysis, an eye should be kept on those items. The summary of the Statistical analysis for Privacy is presented in Table 8-5.

Table 8-5: based on a Cronbach's Alpha of 0.826 for 5 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
PV1	1.154	0.241	0.841
PV2	1.250	0.548	0.766
PV3	1.114	0.607	0.756
PV4	1.117	0.543	0.776
PV5	1.103	0.402	0.810

Prior to running the estimation of the measurement model, the anchor variable was PV1. During the estimation, it was discovered that all paths that predict Privacy were significant at 1% level. However, the statistical result showed that the p<0.05, which should reject the hypothesis, and the alternative result also

indicated a poor fit with respect to the high value of CFI and GFI > 0.9. Therefore, the measurement model has been adjusted based on the modification indices which reported that there was a correlation between the errors of PV1 and PV2, as well as the errors of PV4 and PV5. After the modifications have been applied, the estimation result presented that the measurement model is perfectly fit with CFI and GFI >0.99, while RMR and RMSEA were 0.020 and 0.059 respectively. The goodness-of-fit result is shown in Table 8-6.

Table 8-6: Fit indices for the measurement model of Privacy

Chi-square	p-value	CFI	GFI	RMR	RMSEA
8.491	0.037	0.995	0.994	0.020	0.059

8.3.1.4 Perceived Ease of Use

Perceived Ease of Use (EOU) was predicted by EOU1, EOU2, EOU3, EOU4 and EOU5. Moreover, the reliability analysis for the latent variable has been undertaken. The result illustrated that the Cronbach's Alpha for all items was not adequate (0.376). The result clarified that all items were not consistent and may not be holding together. A close look at the items has been taken, and it was found that the item EOU5 brought down the Cronbach's Alpha result and also the squared multiple correlation for the same item was lower than 0.4. In addition, by deleting EOU5 the Cronbach's Alpha result is improved to 0.799. Besides that, it has been found that EOU3 is a suspect, since the item scored less than 0.4 in the squared multiple correlation and the overall Cronbach's Alpha result is improved to 0.825 by deleting the item. However, the rest of the items showed an acceptable result in the overall statistics. Therefore, EOU3 and EOU5 were suspect items and might be excluded during the whole model analysis. The detailed reliability test and the total statistics for the items are shown in Table 8-7 and Table 8-8.

Table 8-7: Reliability Statistics and the improvement of the Cronbach's Alpha result for Perceived Ease of Use

Cronbach's Alpha	Number of Items	When EOU5 excluded	When EOU3 excluded
0.376	5	0.799	0.825

Regarding the evaluation process, EOU1 has been set as the anchor variable. It was found that all paths that predict Perceived Ease of Use were significant at 1% level during the estimation of the measurement model. Additionally, the statistical result illustrated that p-value <0.05 which indicates that the hypothesis should be rejected, whereas the alternative model fit results indicated that all results were acceptable, except RMSEA above the range (0.145). Therefore, the model should be modified with the modification indices suggestions. In the modification indices, the errors of EOU1 and EOU5 items should be correlated. Although the modification has been done, RMSEA was still not acceptable with value of 0.120 and the p-value <0.05. Therefore, a further modification has been taken, and the errors of EOU1 and EOU3 were correlated. By applying the modifications, the result of the measurement model has been found acceptable and the model perfectly fit with χ^2=6.716 and a probability level of 0.82. The model fit indices are shown in Table 8-9.

Table 8-8: Summary of the Statistical analysis for Perceived Ease of Use

Item	Std. Deviation	Squared Multiple Correlation
EOU1	0.874	0.563
EOU2	0.940	0.576
EOU3	1.118	0.293
EOU4	0.850	0.443
EOU5	1.029	0.322

Table 8-9: Fit indices for the measurement model of Perceived Ease of Use

Chi-square	p-value	CFI	GFI	RMR	RMSEA
6.716	0.082	0.996	0.995	0.015	0.048

8.3.1.5 Perceived Usefulness

The predictor items of the latent variable Perceived Usefulness (PU) were identified as PU1, PU2, PU3, PU4 and PU5. The reliability analysis of the factor was undertaken, and it has been found that the overall Cronbach's Alpha result was not reliable with a value of 0.489. In the details of the statistics, the item PU3 was found suspect by reporting a low value in the squared multiple correlation (0.191) and rockets the Cronbach's Alpha to 0.808 if it is deleted. Additionally, the analysis results also showed that the squared multiple correlation for the items PU1 and PU4 were slightly lower than the range which

might have made them suspect as well. Moreover, all items were represented by high standard deviation and Table 8-10 illustrates the overall statistics for Perceived Usefulness.

Table 8-10: Summary of the Statistical analysis for Perceived Usefulness based on a Cronbach's Alpha of 0.489 for 5 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
PU1	0.956	0.379	0.241
PU2	1.030	0.470	0.201
PU3	1.020	0.191	0.808
PU4	0.956	0.388	0.263
PU5	0.916	0.438	0.269

In the early steps of running the estimation of the measurement model, PU1 was the anchor variable. In the estimation process, it was seen that all paths that predict Perceived Usefulness were significant at 1% level. Nevertheless, the hypothesis should be rejected because the statistical result showed that the $p<0.05$. Although the alternative result indicated a moderate fit with good values of CFI (0.971), GFI (0.981) and 0.28 for RMR, the value of RMSEA (0.92) was slightly outside the range. Subsequently, the measurement model has been adjusted based on the modification indices which reported that there was a correlation between the errors of PU1 and PU5. The estimation result after the modification has been applied found that the measurement model is perfectly fit with χ^2= 8.604 and p=0.72. The alternative model fit results were CFI and GFI >0.99, whereas RMR and RMSEA were 0.019 and 0.046 respectively. Table 8-11 illustrates the goodness-of-fit result.

Table 8-11: Fit indices for the measurement model of Perceived Usefulness

Chi-square	p-value	CFI	GFI	RMR	RMSEA
8.604	0.072	0.994	0.994	0.019	0.046

8.3.1.6 Security

Security (SEC) is predicted by SEC1, SEC2, SEC3, SEC4, SEC5 and SEC6. A reliability analysis was undertaken during the item analysis. The result showed that the overall Cronbach's Alpha is 0.715 which indicates that the items are

consistent. Moreover, all results of the squared multiple correlation for the items were above 0.4 with a high standard deviation, and no item improves the result if it is deleted, except SEC3. The squared multiple correlation for the item SEC3 was far from 0.4 (0.021) with an improvement in the overall reliability by deleting the item. The Cronbach's Alpha is improved from 0.715 to 0.808 if the item is deleted. Therefore, SEC3 has been added to the suspect items. Table 8-12 presents the item total statistics.

Table 8-12: Summary of the Statistical analysis for Security based on a Cronbach's Alpha of 0.715 for 6 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
SEC1	1.138	0.437	0.637
SEC2	1.128	0.443	0.616
SEC3	0.934	0.021	0.808
SEC4	1.103	0.480	0.626
SEC5	1.109	0.407	0.655
SEC6	1.066	0.415	0.653

As declared in the evaluation process earlier, the anchor variable here was set to be SEC1. In the estimation of the measurement model, it has been found that all paths that predict Security were significant at 1% level, except SEC3 which was significant at 0.006. Furthermore, the statistical results illustrate that the χ^2= 148.878 with p-value <0.05, with alternative model fit values CFI=0.848, GFI =0.913, RMR=0.090 and RMSEA= 0.171. This result indicated that the hypothesis should be rejected. In the modification indices, it has been found that there is a correlation between the errors e1 and e5 of the items SEC1 and SEC5.Therefore, the modification has been done and the measurement model was found significant with values CFI= 0.984, GFI= 0.986, RMR= 0.035 and RMSEA= 0.058. In Table 8-13 the model fit indices are presented.

Table 8-13: The model fit indices after applying the modification indices for the Security's measurement model

Chi-square	p-value	CFI	GFI	RMR	RMSEA
22.458	0.004	0.984	0.986	0.035	0.058

8.3.1.7 Postal Address

The predictor items for the Postal Address (ADD) were identified as ADD1, ADD2, ADD3, ADD4 and ADD5. In addition, the reliability analysis for the latent variable has been undertaken, and the result reported a low value (0.646). The result might be seen as acceptable. By exploring the items, it was found that there was not any item which could be deleted to improve the Cronbach's Alpha. Furthermore, all items were scored with high values in the Standard Deviation. However, the items ADD3, ADD4 and ADD5 were seen as suspect items based on the low values of the squared multiple correlation (0.189, 0.268 and 0.322), while ADD1 and ADD2 reported values greater than 0.4 (0.552 and 0.554). Therefore, ADD3, ADD4 and ADD5 were suspect items and might be excluded during the whole model analysis. The total statistics for the items are shown in Table 8-14.

Turning to the evaluation process, ADD5 was the anchor variable. It was found that all paths that predict Postal Address were significant at 1% level during the estimation of the measurement model. Moreover, the statistical result indicates that the hypothesis should be rejected (p-value <0.05), and the alternative model fit results indicated poor model fit (CFI= 0.407, GFI= 0.809, RMR= 0.199 and RMSEA= 0.393). Therefore, the model should be modified by applying the modification indices' suggestions. In the modification indices, the errors of ADD1 and ADD2 items have been suggested to be correlated. The result after adding the suggested correlation was found that the measurement model perfectly fit with values CFI= 0.992, GFI= 0.993, RMR= 0.046 and RMSEA= 0.052. The model fit indices are demonstrated in Table 8-15.

Table 8-14: Summary of the Statistical analysis for Postal Address based on a Cronbach's Alpha of 0.646 for 5 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
ADD1	1.057	0.552	0.593
ADD2	1.039	0.554	0.589
ADD3	1.195	0.189	0.596
ADD4	1.089	0.268	0.612
ADD5	1.108	0.322	0.573

Table 8-15: Fit indices for the measurement model of Postal Address

Chi-square	p-value	CFI	GFI	RMR	RMSEA
9.689	0.046	0.992	0.993	0.046	0.052

8.3.1.8 Cultural influences

Cultural influences (CL) was predicted by the items CL1, CL2, CL3, CL4 and CL5. The reliability analysis of the factor was undertaken, and it has been found that the overall Cronbach's Alpha result was not reliable with a value of 0.585. The reliability results could be improved to an acceptable value (0.617) by deleting CL4. Further investigation has been undertaken and it was found that the Cronbach's Alpha could be enhanced to 0.768 if CL5 and CL3 were excluded. In the details of the statistics, the items CL1 and CL2 reported values above 0.4 in the squared multiple correlation, while CL3, CL4 and CL5 were far lower than the accepted value. Therefore, the items CL3, CL4 and CL5 were added to the suspect list which might be deleted during the final analysis. Moreover, all items were represented by high standard deviation. The reliability results and overall statistics are presented in Table 8-16 and As the first step of running the estimation of the measurement model, CL1 was assigned as the anchor variable. It can be seen from the estimation process that all paths that predict Cultural influences were significant at 1% level, except CL4 was not significant. Nonetheless, the hypothesis should be rejected as the statistical result showed that the $p<0.05$, and the alternative model fit result also indicated that the model was poorly fit. Consequently, the measurement model has been adjusted based on the modification indices which reported that there were a number of correlations which should be added in order to improve the model fit. CL5 was correlated with CL2, CL3 and CL4. In addition, there was a possible correlation between the errors of CL3 and CL4. By drawing the suggested relations, the result was found that the measurement model is perfectly fit with $\chi^2= 0.490$ and $p=0.484$. Regarding the alternative model fit, the results were CFI and GFI > 0.999, whereas RMR= 0.006 and RMSEA < 0.001. Table 8-18 illustrates the goodness-of-fit results.

Table 8-17.

Table 8-16: Reliability Statistics and process in improving the result for Cultural influences

Cronbach's Alpha	Number of Items	When CL4 excluded	When CL5 excluded	When CL3 excluded
0.585	5	0.617	0.657	0.768

As the first step of running the estimation of the measurement model, CL1 was assigned as the anchor variable. It can be seen from the estimation process that all paths that predict Cultural influences were significant at 1% level, except CL4 was not significant. Nonetheless, the hypothesis should be rejected as the statistical result showed that the $p<0.05$, and the alternative model fit result also indicated that the model was poorly fit. Consequently, the measurement model has been adjusted based on the modification indices which reported that there were a number of correlations which should be added in order to improve the model fit. CL5 was correlated with CL2, CL3 and CL4. In addition, there was a possible correlation between the errors of CL3 and CL4. By drawing the suggested relations, the result was found that the measurement model is perfectly fit with $\chi^2= 0.490$ and $p=0.484$. Regarding the alternative model fit, the results were CFI and GFI > 0.999, whereas RMR= 0.006 and RMSEA < 0.001. Table 8-18 illustrates the goodness-of-fit results.

Table 8-17: Summary of the Statistical analysis for Cultural influences

Item	Std. Deviation	Squared Multiple Correlation
CL1	0.929	0.427
CL2	0.949	0.421
CL3	1.071	0.251
CL4	1.119	0.088
CL5	1.054	0.228

Table 8-18: Fit indices for the measurement model of Cultural influences

Chi-square	p-value	CFI	GFI	RMR	RMSEA
0.490	0.484	>0.999	>0.999	0.006	<0.001

8.3.1.9 Intention to use e-Government services

USE1, USE2, USE3, USE4 and USE5 were the predictor items for the latent variable Intention to use e-Government services (USE). Furthermore, Intention to Use e-Government services has been evaluated using the reliability analysis.

The Cronbach's Alpha for all items was 0.774. The result explained that all items are holding together and consistent. With regard to the squared multiple correlation, some items have been noticed that they scored just slightly lower than the range including USE2, USE4 and USE5. Moreover, USE3 was reported above 0.4, whereas USE1 was a suspect item with only 0.212 and with a possibility to improve the Cronbach's Alpha if the item is excluded. The standard deviations for all items were found adequate. The total statistics for the items are presented in Table 8-19.

Table 8-19: Summary of the Statistical analysis for Intention to use e-Government services based on a Cronbach's Alpha of 0.774 for 5 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
USE1	0.936	0.212	0.800
USE2	0.706	0.397	0.710
USE3	0.696	0.488	0.679
USE4	0.752	0.366	0.741
USE5	0.666	0.384	0.718

Table 8-20: Fit indices for the measurement model of Intention to use e-Government services

Chi-square	p-value	CFI	GFI	RMR	RMSEA
5.857	0.119	0.996	0.996	0.010	0.042

Prior to the evaluation process, the anchor variable was set to be USE1. All paths that predicted the Intention to use e-Government services were found in the estimation of the measurement model significant at 1% level. Additionally, the statistical result illustrated that the χ^2= 38.439 with p-value <0.05 which indicates that the hypothesis should be rejected. However, all the statistical results in the alternative model fit represented poor fit. Therefore, a modification has been done to improve the model fit. The suggested modifications found that the error of the item USE1 should be correlated with the errors of the items USE2 and USE5. The model was found perfectly fit after adding the relations. The results were found that χ^2= 5.857with p-value= 0.119. Table 8-20 illustrates the model fit indices.

8.3.1.10 Intention to Adopt e-Government services

From the hypothesis earlier, the Intention to Adopt e-Government services (ADOP) factor is influenced by a set of factors including Trust in Government, Trust in Internet, Privacy, Perceived Ease of Use, Perceived Usefulness, Security, Postal Address and Cultural influences through the Intention to Use e-Government services variable. The latent variable intention to adopt e-Government services was predicted by the items ADOP1, ADOP2, ADOP3, ADOP4 and ADOP5. In the item analysis process, the reliability analysis of the factor was undertaken. The overall Cronbach's Alpha result was 0.883.This result indicates that the items are consistent and there would be no further improvement if an item were deleted. Consequently, the squared multiple correlation for all items were greater than 0.4, with a high standard deviation. However, there is no suspect item among this factor to be nominated for exclusion during the full model analysis. In Table 8-21 the item total statistics are shown.

Table 8-21 Summary of the Statistical analysis for Intention to Adopt e-Government services based on a Cronbach's Alpha of 0.883 for 5 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
ADOP1	0.841	0.601	0.848
ADOP2	0.854	0.476	0.866
ADOP3	0.820	0.583	0.849
ADOP4	0.696	0.576	0.855
ADOP5	0.810	0.441	0.871

Before running the estimation of the measurement model, the anchor variable was set to be ADOP1. During the estimation, it was discovered that all paths that predict Intention to Adopt e-Government services were significant at 1% level. Although the statistical result showed that the p-value (0.009) <0.05 and the hypothesis should be rejected, the alternative model fit statistics results indicated a good fit values of CFI= 0.993, GFI= 0.988, RMR= 0.013 and RMSEA= 0.062. Therefore, the measurement model was found perfectly fit with

no need for any modification. The goodness-of-fit result is shown in **Error! Not a valid bookmark self-reference.**.

Table 8-22: Fit indices for the measurement model of Intention to Adopt e-Government services

Chi-square	p-value	CFI	GFI	RMR	RMSEA
15.322	0.009	0.993	0.988	0.013	0.062

8.3.2 The overall estimation and item analysis for the Citizens model

Previously, each latent variable has been evaluated and analysed in order to predict any suspect items. In this section, all the latent variables with their items were evaluated and analysed. This step is also to predict the suspect items in order to confirm which items are excluded. After excluding suspect items, the results have been confirmed by running factor analysis.

8.3.2.1 The overall reliability analysis for the Citizens model

The reliability analysis for each factor has been done so far in section 8.1.3.1. Therefore, in this section the reliability analysis for all items has been undertaken. There were 49 items and the overall Cronbach's Alpha was 0.748. Additionally, the standard deviation results were adequate with no item scored less than 0.4. On the other hand, some items have reported low scores in the squared multiple correlation, with a possibility to improve the overall Cronbach's' Alpha if the item is deleted. The summary of the overall results of the statistical analysis of the Citizens model are shown in Table 8-23 and the suspect items are highlighted.

Table 8-23: Summary of the overall results of the statistical analysis of the Citizens model with a Cronbach's Alpha of 0.748 for 49 items, where the suspect items are highlighted.

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
ADOP1	0.841	0.649	0.740
ADOP2	0.854	0.553	0.740
ADOP3	0.820	0.627	0.739
ADOP4	0.696	0.630	0.742
ADOP5	0.810	0.485	0.739
ADD1	1.057	0.588	0.744
ADD2	1.039	0.606	0.741
ADD3	1.195	0.342	0.752
ADD4	1.089	0.362	0.748
ADD5	1.108	0.400	0.751
CL1	0.929	0.482	0.741
CL2	0.949	0.472	0.741
CL3	1.071	0.328	0.744
CL4	1.119	0.183	0.749
CL5	1.054	0.375	0.749
SEC1	1.138	0.552	0.751
SEC2	1.128	0.544	0.754
SEC3	0.934	0.206	0.743
SEC4	1.103	0.539	0.753
SEC5	1.109	0.501	0.748
SEC6	1.066	0.512	0.757
USE1	0.936	0.301	0.739
USE2	0.706	0.464	0.739
USE3	0.696	0.588	0.740
USE4	0.752	0.497	0.741
USE5	0.666	0.480	0.739
EOU1	0.874	0.624	0.736
EOU2	0.940	0.630	0.736
EOU3	1.118	0.489	0.740
EOU4	0.850	0.545	0.738
EOU5	1.029	0.470	0.759
PU1	0.956	0.498	0.737

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
PU2	1.030	0.539	0.739
PU3	1.020	0.329	0.757
PU4	0.956	0.477	0.737
PU5	0.917	0.491	0.739
TRUSTI1	1.027	0.621	0.739
TRUSTI2	1.092	0.642	0.739
TRUSTI3	1.027	0.557	0.740
TRUSTI4	0.979	0.671	0.742
TRUSTG1	0.956	0.750	0.741
TRUSTG2	0.932	0.745	0.738
TRUSTG3	1.130	0.675	0.738
TRUSTG4	1.056	0.742	0.741
PV1	1.154	0.333	0.744
PV2	1.250	0.595	0.753
PV3	1.114	0.667	0.748
PV4	1.117	0.643	0.750
PV5	1.103	0.486	0.751

It can be seen from Table 8-23 that some items were being repeated as suspect in the measurement models' evaluations and in the overall evaluation. The list of the suspect items includes, ADD3, ADD4, ADD5, CL3, CL4, CL5, EOU5, PU3, PV1, SEC3 and USE1. Therefore, these items were excluded from the whole model as well as the factor analysis. Consequently, a factor analysis has been run to confirm that the number of the proposed factors is matched and the items are grouped correctly and loaded successfully. In the factor analysis the repeated suspect items have been removed. The result is shown in Table 8-24.

Table 8-24: The confirmation result of the factor analysis for the Citizens' model using Maximum Likelihood as the extraction method

Item	Factor									
	1	2	3	4	5	6	7	8	9	10
ADOP1	0.868									
ADOP3	0.847									
ADOP4	0.830									
ADOP2	0.672									
ADOP5	0.633									
PV3		0.898								
PV2		0.829								
PV4		0.723								
PV5		0.571								
SEC4			0.784							
SEC2			0.772							
SEC6			0.665							
SEC1			0.509							
SEC5			0.423							
PU2				0.899						
PU5				0.644						
PU1				0.642						
PU4				0.557						
TRUSTG1					0.893					
TRUSTG4					0.809					
TRUSTG2					0.795					
TRUSTG3					0.686					
TRUSTI2						0.831				
TRUSTI3						0.790				
TRUSTI1						0.784				
TRUSTI4						0.222				
USE3							0.807			
USE2							0.619			
USE4							0.616			
USE5							0.614			

Item	Factor									
	1	2	3	4	5	6	7	8	9	10
EOU1								0.868		
EOU2								0.784		
EOU4								0.615		
EOU3								0.393		
ADD2									0.986	
ADD1									0.740	
CL1										0.935
CL2										0.664

It can be seen from Table 8-24 that the number of the extracted factors is ten which exactly match the number of the proposed factors in the Citizens model which is shown in Figure 7-2. Accordingly, the model has been built in AMOS software and has been estimated. The estimation process and results are shown in the following section.

8.3.2.2 The estimation process for the Citizen model

In this section, the process of estimating the model is presented. The model has been constructed in AMOS based on the proposed model. The data which has been used contains 535 records. As it has been hypothesized earlier, the proposed factors are affecting the citizen's intention to adopt e-Government services in Saudi Arabia either directly or indirectly. From the estimation, it was found that all paths are significant at different level Table 8-26. However, it was found that in the statistical result p-value <0.005, which should be reported as poor fit, due to the sensitivity of the Chi-square, p-value and the likelihood ratio test as mentioned in Section 7.7. Therefore, the alternative fit indices were used to assess the model fit. From the alternative statistical result, it was found that the model fits the data well. The results are RMSEA= 0.055, CFI= 0.903, GFI= 0.855 and RMR= 0.077. Turning to path estimation in detail, the path from Intention to Use Services to Intention to Adopt e-Government scored the highest value (0.794), whereas the lowest value (0.079) was reported by the path from Address to Intention to Use e-services.
Table 8-25 illustrates the model fit indices, while the paths' estimation values are presented in Table 8-26.

Table 8-25: Fit indices for the Citizens' model

Chi-square	p-value	CFI	GFI	RMR	RMSEA
1672.168	<0.001	0.903	0.855	0.077	0.055

Table 8-26: Summary result of estimating paths in the Citizens' model, where *** indicate that p<0.001

Path			Estimation	P-value
Security	<---	**Trust in Government**	**0.304**	***
Security	<---	**Trust in Internet**	**0.324**	***
Usefulness	<---	**Ease of Use**	**0.644**	***
Intention to Use	<---	**Security**	**0.292**	***
Intention to Use	<---	**Usefulness**	**0.092**	0.047
Intention to Use	<---	**Privacy**	**0.113**	0.002
Intention to Use	<---	**Address**	**0.079**	0.005
Intention to Use	<---	**Cultural influences**	**0.089**	0.025
Intention to Adopt e-Government	<---	**Intention to Use**	**0.794**	***
Intention to Use	<---	**Ease of Use**	**0.289**	***
Intention to Use	<---	**Trust in Government**	**0.110**	0.022

8.4 Participants' suggestions

This section discussed the participants' opinions and what other possible challenges that are facing the citizens to adopt e-Government services. The last part of the citizens' questionnaire was seeking citizens' views about other factors that would affect the citizens' intentions, and asked them to give comments and suggestions about barriers to be overcome in order to encourage people to use the online services. The comments could be classified under three categories, which are: emphasise the proposed factors, citizens' challenges and duties, and actions which should be taken by government.

Some participants emphasised some of the proposed factors, and stated that they will use the online services when these barriers are overcome or reduced. With regard to the security issue, for instance, participants stated that “the level of online security is a serious matter, and if the government increase the security level we will use the online services”. In addition, a participant stated that “I do not trust the online services, and I will not provide any personal information which could be misused or being hacked due to the level of security and the lack of trust in government due to the unclear policy”. Another participant stated that one of the major barriers facing citizens is the address. There is no clear and registered postal address, especially in small cities and rural areas. Moreover, the computer and internet literacy is reducing the citizens’ perception of the ease of use the services and the perception of finding the online services useful. Some participants stated that due to insufficient skills and knowledge of using the internet and devices such as personal computers, tablets, or smart phones makes the online services hard to use and useless. Additionally, the cultural influences which include social influences, mores and religious issues could influence citizens to use the online services, or being barriers to adopt e-Government. A female participant stated that due to religious matters and mores which do not allow females to visit some government organizations, the online services will be useful and helpful to use without facing any problems.

Regarding the citizen’s challenges and duties, participants reported that there are some factors which affect individuals and should be overcome personally. Participants complained about some individual who was always being negative when talking about online services such as online banking. He stated that “the security issues are not just about the communication channels which is the government’s duty, but also about the security level on the device that is being used by the consumer, setting up internet security software and keep updating it, and increasing his/her knowledge about online security by asking for advice from experts and following the online services’ provider instructions”. In addition, “although the education system in Saudi Arabia is providing some compulsory courses in high schools to increase computer and information knowledge as basics, the courses should be given to early age students to give the chance to the people who want to increase their knowledge level and the confidence of using technology as well”, a participant said. An elder participant stated that “I found the online services is a bit hard to use due to the low level

of computer skills that I have which makes me use the traditional way to apply for the services, while my sons and grandchildren find using computers and online services are useful and easy to use". Moreover, participants reported that "although the influences from relatives are affecting the potential users' intention, negatively or positively, before using the services, they should not pass their negative experience as a fact and it definitely will happen to everyone since they had their chance to try and should give others the right to try".

The last type of the citizens' comments was about the government's duties and what the government should do based on the citizens' view in order to increase the chance for the public to use the services and adopt the e-Government. This type of comment could be classified under two categories, including challenges that the government should overcome which are reported in the following chapter, and the second type is about some individual organisations or some leaders who should cooperate more in order to activate the e-Government program which would increase the citizens' perception of the e-Government services' benefits. Some participants complained about some government organizations, that they are willing to participate in implementing the e-Government project and they do not like to change. In addition, "some government organisation's leaders do not encourage the staff to actively support the online services and give priority to people who apply online, but in fact people who attend and apply in person would be serviced immediately which makes people ignore the online services and apply using the traditional way", one participant said. The connections between the government's organizations are not activated yet, which means the online service could not be completed. For instance, if someone wants get approval to open a shop, he/she should first apply to have a commercial certificate, get a safety certificate, and pay some fees which could not all be done online on the same website. The applicant should apply to two different organizations to get a commercial registration in order to get permission to open a shop. Therefore, people prefer to do it in person rather than combining electronic and traditional ways which would take a longer time.

8.5 Concluding comments

This section concluded the data analysis and results that applies to the citizens. The questionnaire which has been given to Saudi citizens was built to have four sections including demographic data, computer and internet skills and knowledge, closed-ended questions about the proposed model, and the last part was seeking opinions and suggestions from the participants. The questionnaires were built and distributed electronically using web tools. The link to the questionnaire has been sent and shared by email and social networking sites. There were 537 completed questionnaires received and more than 750 people accessed the link. The sample size was seen to be enough to do the planned analysis approach since the minimum sample size, which was 265 fully-answered questionnaires based on the G*Power calculation, was achieved. In addition, the processes that have been used to analyse the closed-ended questions were first analysing and estimating each latent variable (factor) separately using the Structural Equation Modelling (SEM), followed by an overall analysing and estimating for all the latent variables. These processes were first to nominate any suspicious item for exclusion and then to report how well the model is fitting the data in order to answer the research question RQ5. In conclusion, it was found that all the factors were significant in explaining the users' intention to adopt e-Government services in Saudi Arabia, and the model was reported as fitting the data well. The final model with the estimation results is presented in Figure B-1 (Appendix B).

Chapter 9: Data analysis and results of Government model

In this section, the questionnaire that applies to the government's employees and experts was analysed. The results and the analysis process are presented. Additionally, the SEM approach has been undertaken in order to prove the hypothesised model. The structure of this section is first, the respondents' demographic data is presented, followed by data analysis of the knowledge and experience of the respondents. Last, the process of running the SEM approach on the Citizens model is shown.

9.1 Demographic data

In the employee's questionnaire, the first questions were seeking the participants' characteristics such as gender, age group, current level of education, and overseas experience. In Section 7.4, it is mentioned in which form the questionnaire was being delivered either electronically by sending it via email or handed out in person as paper-based. The number of employees who accessed the electronic version was about 200 and 128 were marked as completed and it was assumed that the reason for not finishing the questionnaire was either refusal to take part or a technical problem, whereas with the traditional version 200 questionnaires were handed out, and 168 were returned. The completed traditional questionnaires were 154, and 14 participants refused to take part in this study. Therefore, the response rate for the traditional version is 84%. However, only the questionnaires which were marked as completed were analysed. In addition, there were two questionnaires which had been returned incomplete and were excluded from the analysis. The total number on both versions was 280 fully completed questionnaires. However, there were about 7 responses having missing values (<5%) which falls within the accepted rate, as mentioned in Section 7.6.1. Therefore, the missing values were replaced by the mean of the same question. Furthermore, the majority of the participants were males (82%) while there were only 49 females who participated. In the age group question, there were 203 who were below 40, while the percentage of participants aged 40 and above was 28%. Regarding the education level, the minority have not finished

their high school (4%), whereas the number of participants who have an undergraduate certificate or above were 159. Moreover, more than a third of the participants (39%) did not have any overseas experience, while the number of people who travel overseas for study, work, business, or leisure was 171.

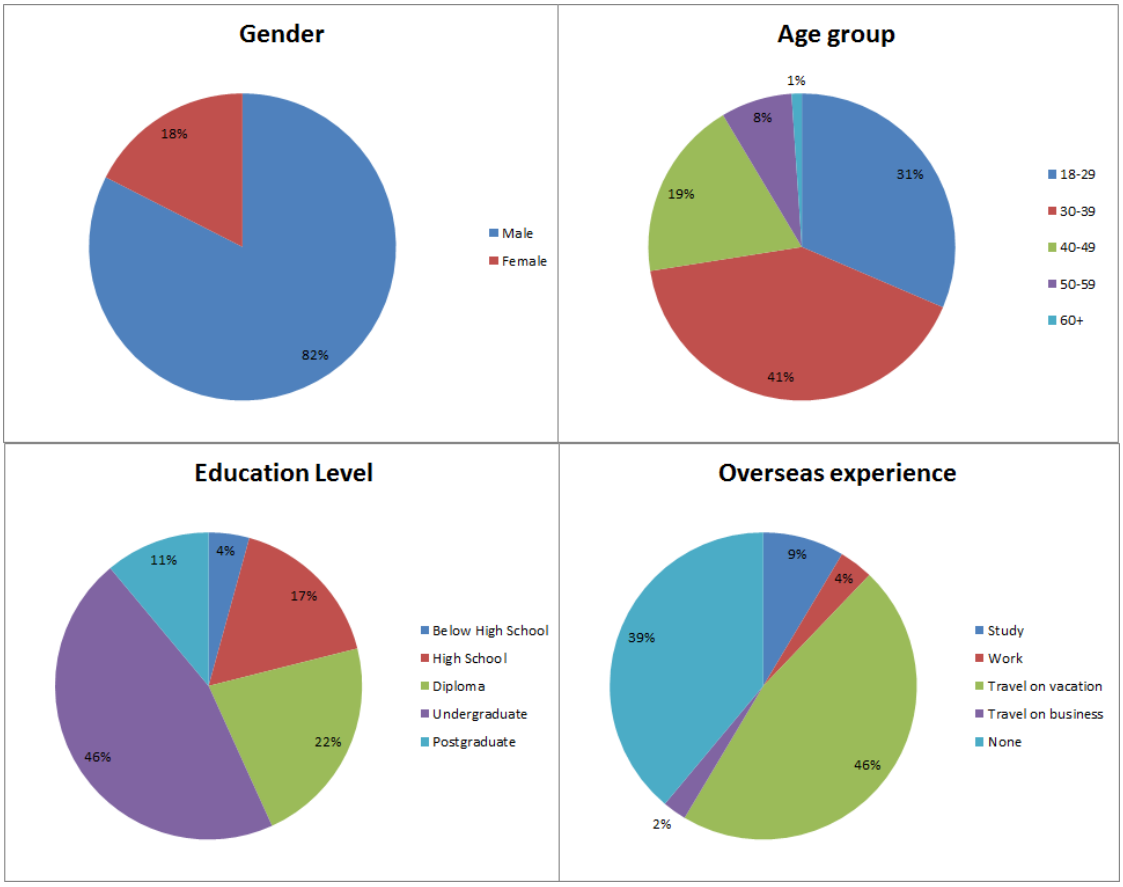


Figure 9-1: Full details of the demographic data of the government's employees

9.2 Computer and internet skills and knowledge

In the second part of the employee's questionnaire, the questions were gathering data about computer and internet skills and knowledge, as well as the participants' experience in using the internet and electronic services, internet banking for example. The daily internet usage also was gathered. There were only two participants who do not have any knowledge on how to use the computer and three without internet skills, while more than half of the participants described themselves as having very good skills and knowledge in using a computer and the internet with 55% and 56% respectively. The number of people who have poor knowledge in using a computer was 10, whereas only

2% were having poor knowledge in surfing the internet. The majority of the participants (253) stated that they have been using the internet for more than two years, while participants who have been using e-services more than one year were 241. Furthermore, the daily time that participants spent in using the internet were 42% who were spending 1-2 hours, 57% who spent three hours or more. However, from the responses only 1% stated that they never used the internet.

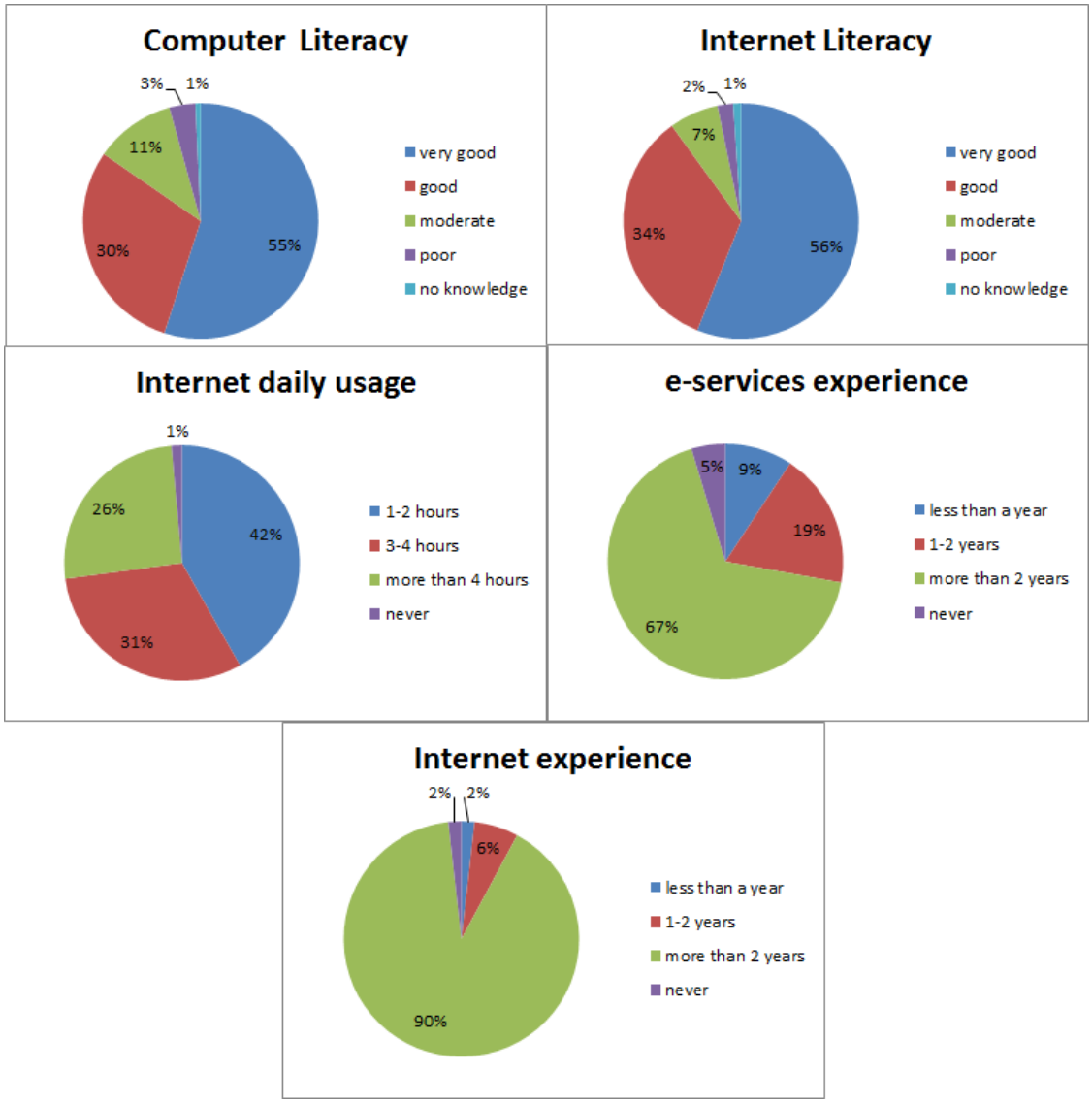


Figure 9-2: Summary of the government employees' skills and knowledge data

9.3 The process and result of applying the SEM approach on Government model

As shown in Figure 7-3 the Government model was hypothesised using the triangulation method which was based on a detailed literature review and the exploratory study which has been undertaken prior to this study. As mentioned earlier in the Citizens model, this type of model is called an indirect model (Byrne, 2010). The latent variables in the Government model are Website Design (WD), Lack of Awareness (AW), Knowledge and Skills (KS), Technical Infrastructure (IN), Quality of Service (QS), Relative Advantage (RA), Complexity (CX), Compatibility (CT) Image (IM) and E-Readiness (ER), and they are affecting the Intention to Adopt e-Government services (ADOP). However, the model has been developed based on the literature review, and then confirmed by the study in Chapter 6. Therefore, the hypotheses have been addressed based on the confirmed model. Additionally, the main hypotheses for the Government model are:

1HB1: the variable Website Design has an indirect or direct effect on the Intention to Adopt e-Government services factor.

1HB0: the variable Website Design does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

2HB1: the variable Lack of Awareness has an indirect or direct effect on the Intention to Adopt e-Government services factor.

2HB0: the variable Lack of Awareness does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

3HB1: the variable Knowledge and Skills has an indirect or direct effect on the Intention to Adopt e-Government services factor.

3HB0: the variable Knowledge and Skills does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

4HB1: the variable Technical Infrastructure has an indirect or direct effect on the Intention to Adopt e-Government services factor.

4HB0: the variable Technical Infrastructure does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

5HB1: the variable Quality of Service has an indirect or direct effect on the Intention to Adopt e-Government services factor.

5HB0: the variable Quality of Service does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

6HB1: the variable Relative Advantage has an indirect or direct effect on the Intention to Adopt e-Government services factor.

6HB0: the variable Relative Advantage does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

7HB1: the variable Complexity has an indirect or direct effect on the Intention to Adopt e-Government services factor.

7HB0: the variable Complexity does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

8HB1: the variable Compatibility has an indirect or direct effect on the Intention to Adopt e-Government services factor.

8HB0: the variable Compatibility does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

9HB1: the variable Image has an indirect or direct effect on the Intention to Adopt e-Government services factor.

9HB0: the variable Image does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

10HB1: the variable E-Readiness has an indirect or direct effect on the Intention to Adopt e-Government services factor.

10HB0: the variable E-Readiness does not have an indirect or direct effect on the Intention to Adopt e-Government services factor.

Next the process of evaluating and estimating for each latent variable in the Government model are presented, followed by the estimation of the whole model.

9.3.1 Latent variable estimation and item analysis

In this section, measurement models of each latent variable were evaluated and estimated separately. The purpose of evaluating the measurement models is to nominate any suspect item, whereas the estimation is to prove that the factor is predicted. Moreover, the processes have been done by applying a reliability analysis to get statistical results such as Cronbach's Alpha, standard deviation and squared multiple correlation, and the estimation is to estimate how well the measurement models fit the data. Prior to the estimation, at least one item should be set up as the anchor variable and assigned regression coefficient 1 as a standard for the model to converge. Therefore, only the results and any modification that has been done on the model are presented.

9.3.1.1 Website Design

The Website Design (WD) factor is predicted by the items WD1, WD2, WD3, WD4, WD5, WD6, WD7, WD8 and WD9. It was found that the reliability test result was adequate with a value of 0.860. Additionally, the items reported a high standard deviation and with no possible improvement on the Cronbach's Alpha by deleting an item. However, the squared multiple correlation results reported two items that scored under the range value, which are WD8 and WD9. Therefore, these two items were included in the suspect items list. Table 9-1 illustrates the summary of the analysis results.

Table 9-1: The summary results of the Website Design statistical analysis with a Cronbach's Alpha of 0.860 for 9 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
WD1	0.955	0.431	0.844
WD2	0.920	0.488	0.838
WD3	0.889	0.441	0.853
WD4	0.935	0.460	0.843
WD5	0.899	0.527	0.838
WD6	0.969	0.496	0.837
WD7	0.841	0.430	0.846
WD8	0.981	0.344	0.851
WD9	0.945	0.313	0.856

Regarding the estimation, WD1 was the anchor variable and was assigned regression coefficient 1. The result on the first go found that the model does not report a good fit. Therefore, the model has been modified by correlating items WD9, WD8, WD7, WD6 and WD5. The model was found after the modification presenting a good fit. The detailed results of the estimation are shown in Table 9-2.

Table 9-2: The summary results of estimating Website Design

Chi-square	p-value	CFI	GFI	RMR	RMSEA
47.175	0.001	0.972	0.966	0.026	0.067

9.3.1.2 Lack of Awareness

The latent variable Lack of Awareness (AW) is predicted by three items including AW1, AW2 and AW3. The reliability test for the factor reported 0.599 score for the Cronbach's Alpha which indicates that the result is slightly below the lower accepted value (0.6). In addition, the detailed statistical analysis showed that the reliability result could be improved up to 0.651 when AW1 is excluded. Regarding the other statistical results, all items scored high values in standard deviation, whereas the squared multiple correlation result for all items were found below the range, especially AW1 with a value of 0.108. Therefore, the item AW1 should be excluded from the whole model analysis, while AW2 and AW3 remain suspect items to be watched during the final analysis. The detailed analysis results are presented in Table 9-3.

Table 9-3: Summary of the statistical analysis results for Lack of Awareness with a Cronbach's Alpha of 0.599 for 3 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
AW1	0.777	0.108	0.651
AW2	1.063	0.297	0.277
AW3	1.183	0.236	0.476

In the estimation process, AW3 was the anchor variable. The result of the estimation found that the model well fit the data. The chi-squared= 0.064 with probability value 0.800 and the full estimation process results are shown in Table 9-4.

Table 9-4: The summary results of estimating Lack of Awareness.

Chi-square	p-value	CFI	GFI	RMR	RMSEA
0.064	0.800	>0.999	>0.999	0.007	<0.001

9.3.1.3 Knowledge and Skills

There are eleven items predicting the Knowledge and Skills (KS) factor. The items were assigned codes starting from KS1 to KS11. In the reliability test, the result was found adequate with 0.771, with a possibility to improve the score a little to 0.773 when KS9 is excluded. Furthermore, the standard deviation result presented high values for the items, while the squared multiple correlation values were classified thus: first, KS10 and KS11 scored above the expected value of 0.4, whereas the rest of the items scored lower than the range and the values were between 0.136 as the lowest and 0.373 the highest. Therefore, the items from KS1 to KS8 were being suspect and were given attention in the whole model analysis. However, KS9 reported poor results, therefore the item should be excluded from the model.

Table 9-5: Summary results of the statistical analysis of Knowledge and Skills with Cronbach's Alpha of 0.771 for 11 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
KS1	0.795	0.347	0.750
KS2	0.964	0.174	0.762
KS3	1.056	0.213	0.761
KS4	0.821	0.248	0.754
KS5	0.895	0.373	0.749
KS6	0.909	0.342	0.743
KS7	0.872	0.310	0.745
KS8	1.013	0.164	0.761
KS9	0.997	0.136	0.773
KS10	1.073	0.493	0.744
KS11	0.910	0.443	0.744

Prior to the estimation process, the anchor variable was assigned to KS1. The estimation result was reported a poor fit with a value of RMSEA= 0.123. Therefore, a modification has been done to the model. The items KS11 and KS10 were correlated with KS3 and KS7. The result was found that the model

fit the data. Additionally, all paths were found significant at 1%. The standardized regression weights varied from 0.672 for KS5 and KS9= 0.248. Table 9-6 illustrates the summary results of the analysis process of Knowledge and Skills.

Table 9-6: Summary of the statistical results of Knowledge and Skills

Chi-square	p-value	CFI	GFI	RMR	RMSEA
80.667	<0.001	0.934	0.950	0.058	0.062

9.3.1.4 Technical Infrastructure

Technical Infrastructure (IN) was predicted by three items including IN1, IN2 and IN3. In the reliability process, the Cronbach's Alpha was reported just above the lower accepted value (Cronbach's Alpha = 0.614). However, the detailed analysis results show that by deleting IN1 the Cronbach's Alpha is enhanced to 0.861. Furthermore, IN1 reported a very low score in the squared multiple correlation with only 0.026, whereas the IN2 and IN3 represented high scores in both standard deviation and squared multiple correlation. Therefore, it is highly recommended in the whole model analysis for IN1 to be excluded. Table 9-7 illustrates the detailed statistical results.

Table 9-7: Detailed results of the reliability process on Technical Infrastructure with a Cronbach's Alpha of 0.614 for 3 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
IN1	1.066	0.026	0.861
IN2	1.096	0.576	0.273
IN3	1.002	0.579	0.234

Table 9-8: The summary results of estimating Technical Infrastructure

Chi-square	p-value	CFI	GFI	RMR	RMSEA
1.324	0.250	0.999	0.997	0.041	0.034

During the estimation of Technical Infrastructure, IN1 was the anchor variable. It was found that the paths of IN2 and IN3 were significant at 0.005 and 0.016 respectively. Additionally, the statistical result reported 1.324 on chi-square

with probability at 0.250, which indicates that the measurement model is well fitting the data. Consequently, the highest standardized regression weight was reported by IN3 followed by IN2 with scores of 0.943 and 0.805 respectively. However, the suspect item IN1 scored only 0.177 in the standardized regression weight. The summary results of the estimation are presented in Table 9-8.

9.3.1.5 Quality of Service

The latent variable Quality of Service (QS) was predicted by QS1, QS2, QS3, QS4, QS5 and QS6. The reliability test indicated that the Cronbach's Alpha was acceptable at 0.811. Moreover, the detailed analysis results found that all items presented adequate scores in standard deviation as well as the squared multiple correlation, with no sign of suspect items that if deleted would improve the Cronbach's Alpha result. Table 9-9 shows the detailed analysis results.

Table 9-9: Summary results of the statistical process for Quality of Service with a Cronbach's Alpha of 0.811 for 6 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
QS1	1.049	0.417	0.773
QS2	0.884	0.464	0.797
QS3	0.965	0.476	0.783
QS4	0.920	0.452	0.777
QS5	1.043	0.571	0.760
QS6	1.116	0.473	0.797

QS1 was the anchor variable in the estimation process. It was found that all paths are significant at 1%. Consequently, the estimation result reported poor fit in the first go, therefore the model has been modified by correlating some items to enhance the goodness-of-fit scores. The results after the modification was Chi-square = 2.025 with p= 0.363. The results indicate a perfect fit and the summary of the estimation results is shown in Table 9-10.

Table 9-10: Summary results for the Quality of Service estimation

Chi-square	p-value	CFI	GFI	RMR	RMSEA
2.025	0.363	>0.999	0.998	0.13	0.007

9.3.1.6 Relative Advantage

Relative Advantage (RA) was predicted by RA1, RA2, RA3 and RA4. The result of the reliability analysis shows that the Cronbach's Alpha for the analysed items was adequate with a value of 0.873. In addition, the items reported acceptable scores on the requirements including standard deviation, squared multiple correlation and no sign of possible improvement if an item is deleted. Therefore, the items were found consistent and there was no suspect item to be nominated to be excluded. Table 9-11 represents the detailed results of the items' analysis.

Table 9-11: The summary results of the analysis process for Relative Advantage with a Cronbach's Alpha of 0.873 for 4 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
RA1	0.762	0.522	0.850
RA2	0.740	0.626	0.814
RA3	0.783	0.507	0.849
RA4	0.758	0.544	0.835

In the estimation, RA1 was the anchor variable. All paths were found significant at 1%. Moreover, the fit indices result shows that the model does not fit the data well (Chi-square= 11.780, with p-value= 0.003). Therefore, a modification has been done by correlating the errors of items RA3 and RA4. The modified model reported a good fit with p-value= 0.691 and Chi-square= 0.158. The detailed results of the estimation of Relative Advantage are shown in Table 9-12.

Table 9-12: The detailed results of estimating Relative Advantage

Chi-square	p-value	CFI	GFI	RMR	RMSEA
0.158	0.691	>0.999	>0.999	0.002	<0.001

9.3.1.7 Complexity

The factor Complexity (CX) was measured by four items CX1, CX2, CX3 and CX4. In the item analysis, the Cronbach's Alpha was found at 0.807 which indicated an acceptable level of reliability. Consequently, it was found that CX2

and CX3 scored a little lower than the range on the squared multiple correlation with values of 0.372 and 0.350 respectively, while the rest of the required values were adequate with no possibility of improving the Cronbach's Alpha. Therefore, CX2 and CX3 might be suspect items with a possibility of exclusion.

Table 9-13: Summary results of the statistical analysis of Complexity with a Cronbach's Alpha of 0.807 for 4 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
CX1	0.740	0.420	0.764
CX2	0.872	0.372	0.766
CX3	0.860	0.350	0.780
CX4	0.848	0.500	0.722

Before estimating the complexity measurement model, CX1 was the anchor variable. From the estimation result, it was found that all paths were significant at 1%. Furthermore, the fit indices reported were moderate with p-value= 0.038 and RMSEA 0.090. The model fit could be improved by correlating errors of CX1 and CX3. The results after applying the modification reported a good fit and the detailed results are shown in Table 9-14.

Table 9-14: Summary results of estimating Complexity

Chi-square	p-value	CFI	GFI	RMR	RMSEA
0.470	0.493	>0.999	0.999	0.005	<0.001

9.3.1.8 Compatibility

Four items were predicting the latent variable Compatibility (CT) including CT1, CT2, CT3 and CT4. The analysis test represents an inadequate value of Cronbach's Alpha with only 0.423. In the detailed analysis results, it was found that the Cronbach's Alpha could be improved to 0.810 if CT4 is deleted. In addition, CT4 reported a value of squared multiple correlation far lower than the required value with only 0.071. Therefore, the item CT4 was seen as suspect and would be excluded. Table 9-15 illustrates the detailed analysis results of Compatibility.

Table 9-15: Summary results of the analysis process of Compatibility with a Cronbach's Alpha of0.423 for 4 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
CT1	0.746	0.417	0.172
CT2	0.795	0.615	0.018
CT3	0.832	0.495	0.280
CT4	1.287	0.071	0.810

Prior to the estimation, the anchor variable was set to be CT1. During the estimation, all paths were significant at 1% except CT4. It was found that CT4 is not predicting the compatibility with an insignificant p-value= 0.579. However, this item was nominated for exclusion from the whole model estimation. Consequently, the measurement model has been modified to improve the model fit. Items CT3 and CT4 were correlated and the estimation result reported a perfect model fit. The summary results of the estimation process are presented in Table 9-16.

Table 9-16: The detailed results of estimating Compatibility

Chi-square	p-value	CFI	GFI	RMR	RMSEA
0.102	0.750	>0.999	>0.999	0.004	<0.001

9.3.1.9 Image

The latent variable Image (IM) was predicted by IM1, IM2, IM3 and IM4. The reliability test reports an acceptable Cronbach's Alpha value of 4 items at 0.768. The result could be improved to 0.782 by deleting IM4. Moreover, it has been noticed that the squared multiple correlation value of the items IM3 and IM4 were lower than the minimum required value, whereas all other scores were seen as adequate. Thus, IM3 was nominated as a suspect item while IM4 was seen as suspect and recommended to be excluded from the whole model. Table 9-17 illustrates the full analysis results of Image.

IM1 was the anchor variable during the estimation. It was found that all paths were significant at 1% level. Additionally, the fit indices of the model reported a poor fit with p-value= 0.003 and Chi-square= 11.404. Consequently, the modification indices indicated that there is a possibility of improving the model

fit by correlating the errors of IM3 and IM4. The estimation result for the modified model indicated a perfect fit and the complete results of the estimation are shown in Table 9-18.

Table 9-17: The detailed results of the statistical analysis of Image with a Cronbach's Alpha of 0.768 for 4 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
IM1	0.901	0.513	0.663
IM2	0.873	0.467	0.685
IM3	0.852	0.332	0.714
IM4	0.958	0.205	0.782

Table 9-18: Summary results of estimating Image

Chi-square	p-value	CFI	GFI	RMR	RMSEA
1.974	0.160	0.997	0.996	0.011	0.059

9.3.1.10 E-Readiness

E-Readiness (ER) was predicted by ER1, ER2, ER3, ER4 and ER5. In the reliability analysis, the Cronbach's Alpha has met the lower level of the accepted value (0.613). The result has a chance to be improved a little to 0.624 by deleting ER4. Furthermore, it could be noted from Table 9-19 that all the items scored lower than the required value in the squared multiple correlation. Therefore, ER4 was nominated to be excluded whereas the rest of the items were kept to be watched during the whole model analysis.

During the estimation, ER1 was the anchor variable. It was found that the ER4 path is significant at 0.004 while the rest of the paths were significant at 1%. From the estimation result, the model represented a poor fit. Therefore, the model has been modified by adding a suggested correlation between ER1 and ER4. The estimation's result after modifying the model indicated a good model fit. The summary results of estimating E-Readiness are presented in Table 9-20.

Table 9-19: The total statistical analysis results of E-Readiness with a Cronbach's Alpha of 0.613 for 5 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
ER1	0.992	0.294	0.472
ER2	0.836	0.170	0.552
ER3	0.847	0.136	0.609
ER4	1.114	0.165	0.624
ER5	0.981	0.224	0.520

Table 9-20: The detailed results of the estimation process of E-Readiness

Chi-square	p-value	CFI	GFI	RMR	RMSEA
7.594	0.108	0.978	0.990	0.033	0.057

9.3.1.11 Intention to adopt e-Government services

Intention to adopt e-Government services (ADOP) was predicted by five items, which are ADOP1, ADOP2, ADOP3, ADOP4 and ADOP5. The result that has been reported from the reliability test was 0.819. In the detailed analysis process, there is no sign of a possible improvement by deleting an item. In addition, three items, including ADOP1, ADOP2 and ADOP5, scored lower than the range on the squared multiple correlation. Thus, these items might be seen as suspect and might be excluded from the full model analysis.

Table 9-21: Summary results of the reliability analysis of Intention to adopt e-Government services with a Cronbach's Alpha of 0.819 for 5 items

Item	Std. Deviation	Squared Multiple Correlation	Revised Cronbach's Alpha value if Item Deleted
ADOP1	0.739	0.399	0.786
ADOP2	0.782	0.383	0.785
ADOP3	0.801	0.483	0.767
ADOP4	0.601	0.509	0.770
ADOP5	0.763	0.278	0.812

Before the estimation, ADOP1 was the anchor variable. It was discovered that all paths were significant at 1%. Furthermore, it was found from the alternative model fit indices that the model reported a moderate fit (CFI= 0.981, GFI= 0982, RMR= 0.015 and RMSEA 0.080). The model fit could be improved by

applying the modification that has been suggested to correlate the errors of items ADOP2 and ADOP4. The summary results after modifying the model are shown in Table 9-22.

Table 9-22: The detailed results of the estimation process of Intention to adopt e-Government services

Chi-square	p-value	CFI	GFI	RMR	RMSEA
1.237	0.872	>0.999	0.998	0.005	<0.001

9.3.2 The overall estimation and item analysis for the Government model

Earlier, the latent variables have been evaluated and analysed separately in order to predict any suspect items to be excluded from the whole model analysis. In this section, all latent variables that were used to predict the Government employee's model with their items were evaluated and analysed. This step is also to predict the suspect items for exclusion. It is also to confirm the final nominating items to be excluded. After excluding suspect items, the remaining items have been integrated in the Government model using AMOS software for estimation.

9.3.2.1 The overall reliability analysis

The reliability analysis for each factor has been done so far in Section 9.3.1. Therefore, in this section overall reliability for the items has been undertaken. The overall Cronbach's Alpha for 58 items was 0.940. However, in the squared multiple correlation some items were noticed that scored lower than the required value, with a possibility to improve the overall Cronbach's' Alpha if the item is deleted. The overall item statistics are shown in Table 9-23 and the suspect items are highlighted.

Table 9-23: Summary of the overall results of the statistical analysis of the Government model with a Cronbach's Alpha of 0.940 for 58 items

Item	Std. Deviation	Corrected Item - Total correlation	Revised Cronbach's Alpha value if Item Deleted
RA1	0.762	0.512	0.938
RA2	0.740	0.590	0.938
RA3	0.783	0.472	0.939
RA4	0.758	0.598	0.938
CT1	0.746	0.507	0.938
CT2	0.795	0.609	0.938
CT3	0.832	0.615	0.938
CT4	1.287	0.010	0.942
IM1	0.901	0.429	0.939
IM2	0.873	0.372	0.939
IM3	0.852	0.384	0.939
IM4	0.958	0.353	0.939
CX1	0.740	0.535	0.938
CX2	0.872	0.524	0.938
CX3	0.860	0.515	0.938
CX4	0.848	0.650	0.938
QS1	1.049	0.498	0.938
QS2	0.884	0.543	0.938
QS3	0.965	0.540	0.938
QS4	0.920	0.486	0.938
QS5	1.043	0.469	0.939
QS6	1.116	0.429	0.939
WD1	0.955	0.523	0.938
WD2	0.920	0.587	0.938
WD3	0.981	0.468	0.939
WD4	0.935	0.538	0.938
WD5	0.899	0.553	0.938
WD6	0.969	0.596	0.938
WD7	0.841	0.562	0.938

Item	Std. Deviation	Corrected Item - Total correlation	Revised Cronbach's Alpha value if Item Deleted
WD8	0.889	0.554	0.938
WD9	0.945	0.444	0.939
KS1	0.795	0.554	0.938
KS2	0.964	0.327	0.939
KS3	1.056	0.371	0.939
KS4	0.821	0.487	0.938
KS5	0.910	0.399	0.939
KS6	0.909	0.518	0.938
KS7	0.872	0.425	0.939
KS8	1.073	.332	0.939
KS9	0.997	.301	0.940
KS10	1.013	.411	0.939
KS11	0.895	0.599	0.938
AW1	1.183	0.263	0.940
AW2	1.114	0.426	0.939
AW3	0.777	0.558	0.938
IN1	1.066	0.389	0.939
IN2	1.096	0.433	0.939
IN3	1.002	0.512	0.938
ER1	0.992	0.476	0.938
ER2	0.836	0.290	0.939
ER3	0.847	0.284	0.940
ER4	1.063	0.294	0.939
ER5	0.981	0.343	0.939
ADOP1	0.739	0.424	0.939
ADOP2	0.782	0.463	0.939
ADOP3	0.801	0.388	0.939
ADOP4	0.601	0.415	0.939
ADOP5	0.763	0.437	0.939

It can be seen from Table 9-23 some items were being repeated as suspect in the measurement models evaluations and in the overall evaluation. The list

includes: CT4, IM4, KS2, KS3, KS5, KS8, KS9, AW1, IN1, ER2, ER3, ER4 and ER5. However, by excluding ER2, ER4 and ER5 the total Cronbach's Alpha is lowered. Therefore, the items were remaining in the model to be observed during the model estimation. The rest of the repeated suspect items were excluded from the whole model. Furthermore, the items that have been nominated during the single analysis or the overall analysis have been examined during the model estimation for possible exclusion.

Accordingly, the rest of the items, including the suspect ones, were analysed using a factor analysis to confirm the number of the proposed factors. During the factor analysis, only the repeated items which have been mentioned to be excluded were removed from the process. The results show that the number of the factors which were found in the factor analysis matched the number of the proposed factors, which are eleven factors. Additionally, the items were grouped correctly and loaded successfully (see Table 9-24). In the factor analysis the repeated suspect items have been removed. However, it was discovered during the process that some suspect items caused a negative effect to the other items as well as some items which did not load any value. These items are QS2, QS3, KS1, KS4, KS6, WD8 and WD9. Therefore, the items were removed.

Table 9-24: The confirmation results of the factor analysis for the Government model using Maximum Likelihood as the extraction method

	Factor										
Item	1	2	3	4	5	6	7	8	9	10	11
RA1	0.817										
RA2	0.795										
RA3	0.823										
RA4	0.677										
CT1		0.309									
CT2		0.915									
CT3		0.390									
IM1			0.936								
IM2			0.673								
IM3			0.509								
CX1				0.801							
CX2				0.667							
CX3				0.598							
CX4				0.801							

Item	Factor										
QS1					0.589						
QS4					0.505						
QS5					0.792						
QS6					0.701						
WD1						0.605					
WD2						0.535					
WD3						0.561					
WD4						0.779					
WD5						0.787					
WD6						0.673					
WD7						0.348					
KS7							0.465				
KS10							0.777				
KS11							0.817				
AW2								0.326			
AW3								0.998			
IN2									0.973		
IN3									0.732		
ER1										0.688	
ER2										0.379	
ER4										0.341	
ER5										0.581	
ADOP1											0.424
ADOP2											0.537
ADOP3											0.891
ADOP4											0.705
ADOP5											0.545

9.3.2.2 The overall estimation for the Government model

This section illustrates the process of estimating the Government model. In AMOS software, the Government model has been built based on the proposed model. There were 280 records which have been used as the gathered data. In the hypothesis, the citizens' intention to adopt e-Government services in Saudi Arabia is influenced by the proposed factors either directly or indirectly. From the estimation, it was found that all paths are significant (<0.05) at different levels. The paths from compatibility to relative advantage, quality of services to website design, E-Readiness to intention to adopt e-Government services, complexity to intention to adopt e-Government services, relative advantage to intention to adopt e-Government services, and website design to E-Readiness

are significant at 1% level, while the rest are significant at 5% level. Table 9-26 presents the summary of the path estimation of the Government model. Although the statistical results of Chi-square and p-value seems a poor fit, it was found that the alternative fit indices were adequate. The alternative statistical results indicate that model fits the data well. The results are RMSEA= 0.050, CFI= 0.903, GFI= 0.829 and RMR= 0.057. Table 9-25 illustrates the model fit indices.

Table 9-25: Fit indices for the Government model

Chi-square	p-value	CFI	GFI	RMR	RMSEA
1193.359	<0.001	0.903	0.829	0.057	0.050

Table 9-26: Summary results of estimating paths in the Government model, where *** indicates that p<0.001

Path			Estimation	P-value
Website Design	<---	**Quality of Service**	0.784	***
E-Readiness	<---	**Website Design**	0.487	***
E-Readiness	<---	**Technical Infrastructure**	0.117	0.040
E-Readiness	<---	**Lack of Awareness**	0.237	0.009
E-Readiness	<---	**Knowledge and Skills**	0.261	0.002
Relative Advantage	<---	**Compatibility**	0.954	***
Intention to adopt e-Government services	<---	**Image**	0.114	0.021
Intention to adopt e-Government services	<---	**Complexity**	0.461	***
Intention to adopt e-Government services	<---	**Relative Advantage**	0.221	***
Intention to adopt e-Government services	<---	**E-Readiness**	0.450	***
Intention to adopt e-Government services	<---	**Quality of Service**	0.197	0.038

9.4 Participants' suggestions

This section discusses the last part of the questionnaire that applied to the government's employees and experts. The last part was asking the participants to give their opinion about the proposed factors, and provide their opinion regarding the other possible factors that would influence the citizens' intention. First, it is important to mention that the government's employees and experts are also citizens of Saudi Arabia. Therefore, their comments are based on their opinion as employees running the system, and as citizens they might use the services. The comments that have been received were reporting key points as well as emphasising some of the proposed factors. Firstly, there is one major point, that most of the participants have mentioned, which is the technical infrastructure and specifically the internet. The participants stated that the high cost of the internet with poor connectivity is one of the key challenges that would alienate citizens from using the online services. A participant reported that during the period of applying online for a job, the network connection usually went down and it took a long time to solve the problem which might cause a loss of the chance to get that job. Additionally, "the website design is also a big challenge to the government to apply the government services when it comes to old people, people with some disabilities, and people who are illiterate" one participant stated. Therefore, the government should provide some assistance tools on their websites and do not make the online services compulsory for these people. Moreover, it has been mentioned that some of the government's websites are not updated regularly which might cause problems to users. Participants noted that the government should provide some training courses for the citizens to make using the services easy and clear as well as training their employees to increase the level of serving citizens. They stated that some employees, especially older people and those who do not have computer skills, would affect the level of services and being a barrier to apply the e-Government. In addition, a participant reported that the complexity of the system and difficulties of using the services would alienate citizens to engage with the services. Therefore, he suggested that the government should make using the services as easy as possible, especially for people who only have basic skills to use the internet and computers. The lack of awareness is also seen as a major factor that would influence the citizens' intention. Participants mentioned that the government

should increase the level of awareness of their citizens of the e-Government services by investing more in media and especially in social networking.

On the other hand, some participants suggested some solutions to help in engaging citizens with the e-Government. For instance, participants stated that providing personal computers in the government's organizations with assistance as express services would increase the users' awareness of using the services and increase the perception of the benefit of using the online services. This also would help older people and give them the opportunity to learn how to use the online services with extra care. It was suggested that installing some online access points in public sites, such as malls, would encourage people to use the services, with free cost of using these devices. Moreover, a participant suggested that by providing some benefits, such as reducing the service's fee only for people who apply online, or increasing the validity of the service, the expiry date of the driving licence for example. One key point has been noted, that of connecting all the government's organizations by sharing some information and services from their database, and allowing users to move easily from one service to another in the same website, with the possibility to download and upload the relevant documents with high level security, would increase the chance of engaging citizens with the e-Government services. However, it should consider the risks, the information security, and transaction security for the government's and its citizens' data.

9.5 Concluding comments

This section highlights the process and results of the questionnaire that applied to the government's employees and experts in the field. The questionnaire was designed to seek first the participants' demographic data, followed by the skills and knowledge in using computers and the internet that the participants obtained. The third part was gathering the data about the proposed model in a form of closed-ended questions, and the final section was seeking the participants' opinions and suggestions regarding the proposed model. Moreover, 282 questionnaires were returned which is more than the minimum sample size that was required. The returned questionnaires were analysed using some steps, including excluding the questionnaires that exceeded the maximum missing value rate of 5% which has been chosen in this

research. Consequently, as mentioned previously in Section 8.5, there were two evaluation steps. First, each factor has been analysed and estimated in order to propose suspicious items for elimination and then overall estimating and evaluation to report how well the model fit the data. The result of estimating the model reported a good fit and all the latent variables were found significant in explaining the users' intention to adopt e-Government services in Saudi Arabia. The final model with the estimation results is presented in Figure B-1 (Appendix B).

Chapter 10: **Discussion**

This chapter discusses the major points that are being researched to achieve the main research objective which is to address a model that is constructed to demonstrate the most influential factors to citizens of Saudi Arabia to adopt the e-Government services. However, there are some research questions which should be answered in order to achieve the research objective. The key question of this research is as follows:

- What are the influential factors to be integrated in a model for implementing and developing e-Government in order to be adopted by citizens?

It can be noticed that the key question is broad; therefore it has been subdivided to the following questions in order to address the answer clearly and efficiently:

a) Which of the identified factors in Table 3-1 have an impact on the citizen's intention?
b) How well does the proposed theoretical model of intention to adopt e-Government services fit the Saudi context?
c) According to the proposed theoretical model, which relations are significant in explaining the user's intention to adopt e-Government services in Saudi Arabia?
d) Are there any other relationships between the proposed factors that might affect the intentions of citizens?

10.1 The implementation and development of Saudi e-Government

The government of Saudi Arabia has done a massive amount of work to implement and develop a strong e-Government (United Nations, 2012). The Saudi Arabian government has invested millions of Saudi Riyals to implement a reliable e-Government. The idea of creating an e-Government came up in 2003, while the main project was launched in 2005. In the first year when the government decided to build an e-Government (2003), the rank of the development of e-Government for Saudi Arabia was 105, whereas in 2014 the

Saudi e-Government achieved the place 36 in the worldwide ranking (see Table 1-1). From these results in Table 1-1, there is a good sign from the work that the Saudi government is doing. However, in real life there are only a few services the Saudi citizens could use. The fact is that the leaders on the e-Government project have spent the time in building the infrastructure of the e-Government, and ignoring one of the important stakeholders: citizens. The relationship between Government and citizens is one of the major e-Government drivers which have been presented in Section 2.2. The key stakeholders in e-Government have been identified (see Section 2.2), including Government to Government, Government to Business, and Government to Citizen. In addition, the citizens have stated that there are a few services online which make them still need to visit a government's organization (Chapters 6 & 8). For instance, fathers could apply to give their underage (<21 years) dependents travel permission online, but still they need to attend the Passport Department to apply for other services, such as a new passport or to renew a passport for either themselves or their dependents. However, in August 2014, the Saudi Arabian government announced new services which allow citizens to apply for a new passport or renew their existing passport online. In fact, this service is only for citizens who have national identification card (ID). The national ID card could be obtained from the age of 15. In addition, most of the women have not obtained a separate ID card, because a woman's ID is usually on her father's or her husband's ID card and that extracting the woman's ID from their father's or husband's ID card has only recently been launched and also faced strong criticism as it is against the culture and mores. Therefore, people who have children have to use the traditional way to get or renew their dependents' passports.

Another issue is that the government does not emphasise making citizens aware of the new e-services, how they could use it, how easy it is to use it, or what the benefits are that they would get (Chapter 6). As a comparison between the Saudi e-Government and the Dubai e-Government in the United Arab Emirates: the number of channels that are used by the Dubai government to announce new services and make their citizens aware of them outnumber the Saudi's channels. On Twitter, for instance, there are many government accounts belonging to the Dubai government including His Highness Sheikh Mohammed bin Rashid Al Maktoum, the Dubai ruler, who announced every new service, new achievement, or new plan. Moreover, based on the work and

achievements of the Saudi Arabian government which improved the Saudi e-Government ranking, there is still the gap between the improvements of the e-Government and using the services by the Saudi citizens. As the author is a Saudi citizen and is interested in e-Government, the government has announced that the public could book an appointment online to visit the Passport Department which reduces the waiting time for people who have booked an appointment. In fact, there are many people still unaware about the online appointment and do not even know how to book it online. The government should increase the investment in media, social networking websites, and texting citizens' mobiles (Chapter 6). On the other hand, the government recently announced new services, such as applying for a passport or renewing it online. A new service such as this reduces the number of people visiting the Passport Department and saves the citizens time, money, and is safer. However, in order for the government to provide such services, the government should improve the postal services, by assigning a unique and clear address for each property which makes the delivery service become easy and accurate. From the study in Chapters 6, 8, and 9, it was found that, due to the lack of professional postal services and unclear addresses, people are afraid of losing their personal documents or of something being mis-delivered. Therefore, improving the current postal services and labelling every single property would influence people to use and adopt the new services. To sum up, government should clearly identify all possible challenges and barriers that might face the implementation and development of the e-Government project in order to overcome these challenges to make better e-Government. In the next section, there is a further discussion on the government's challenges and how it would overcome these challenges.

10.2 Challenges facing e-Government

e-Government has been introduced and developed for quite a long time in developed countries, while is it still new in the developing countries. As it is widely defined (see Section 2.1) that e-Government is using ICT to communicate, provide services, and/or consume services among three main parties including government, business and citizens (see Section 2.2) to benefit from saving money and effort with respect to security and privacy. In the developed countries, the development of the ICT has helped to implement and

develop such a strong e-Government. However, in the developing countries, such as Saudi Arabia, the technical infrastructure (ICT specifically) is one of the major challenges facing government to establish the e-Government project. In addition, some of the other major challenges, such as trust, privacy, security, computer literacy, culture, and accessibility (Chapter 2) were overcome in developed countries, while it remains a big challenge facing the governments of the developing countries. However, some of these challenges were common (see Section 2.3), whereas some were only facing a specific country (see Sections 3.2 and 3.3). For instance, in the UK, the government provides on their websites some assistance tools for people with disabilities such as problems with hearing or sight to easily access the government's websites, while such as these tools are hardly found on the Saudi government websites. Therefore, the major challenges that are facing the e-Government implementation and development in Saudi Arabia have been discussed in Chapter 3 and the factors that would influence a citizen's intention to adopt e-Government services were identified in Table 3-1. Moreover, in this research the major concern is how to encourage people to adopt e-Government in Saudi Arabia. However, there is no research (to this author's knowledge) which introduces the possible factors that would influence the citizen to adopt e-Government in the Saudi Arabian context. Therefore, the identified factors in Table 3-1 have been evaluated and integrated in a model to help the government of Saudi Arabia to overcome their challenges in order to improve and develop a better e-Government for their citizens. In the next section is a discussion on how the factors were assessed, and how they were integrated in the research model.

10.3 The model construction

As this research discusses the way of how to influence Saudi citizens to adopt e-Government services, therefore a close investigation was carried out to identify the major factors that would influence the citizens' intention to adopt e-Government services (Chapters 3 and 4). The research has identified the possible factors that might encourage citizens to adopt e-Government services (Table 3-1), as most governments around the world have done to implement and develop a reliable e-Government with due consideration to increase the chance to influence citizens to adopt the proposed online services. Moreover,

the proposed factors have been confirmed as the most important factors that would influence the citizens' intention to adopt e-Government services by using a triangulation approach including a detailed literature review, a questionnaire applied to citizens, and interviews and a questionnaire applied to government employees and experts in the field, to be integrated in a model (see Chapter 6). The confirmation from the exploratory study (Chapter 6) was confirming that each government has its own requirements to build their own e-Government, as mentioned in Section 2.1. For instance, the cultural influences is one of the key factors that would influence a citizen's intention either positively or negatively to use and then adopt the e-Government services in the eastern regions, whereas in the western countries, culture used to be a major challenge that faced e-Government. Additionally, although there are common challenges that would influence a citizen's intention, postal services is only being a barrier to the Saudi Arabian government (to this author's knowledge) to influence their citizens to adopt the online services. Thus, the proposed factors in Table 3-1 were seen as the most influential factors that would encourage the citizens of Saudi Arabia to use the online services, and then adopt them. However, to evaluate these proposed factors, the research model has been constructed to help in understanding how to influence the citizen's intention to adopt e-Government and what are the greatest concerns from these factors based on the citizen's and the government's perspective. In order to make the evaluation of the model easy and accurate, the factors have been classified under two main constructs, including intention to use e-Government services and government readiness (Figure 4-1 and Figure 4-2). The classification has been done using major steps including previous studies (literature review), participants' overview (exploratory study Chapter 6), and author's view (hypothesis). The final model for this research has been addressed with some modifications (based on the study in Chapter 6) and is illustrated in Figure 7-1. The model has been broken down to two detailed models in order to be evaluated efficiently and effectively (Figure 7-2 and Figure 7-3). The first part is the Citizens model which mainly presents the factors that are seen as the citizen's concerns, whereas the other factors that are seen as barriers facing citizens to be overcome by government in order to influence the public to adopt e-Government services.

10.4 Discussion on the Citizens model

In this research, the Citizens model has been validated using the Structural Equation Modeling (SEM) approach (Chapter 8). The model has been addressed with the best practice with respect to the theories that have been presented and used from the beginning of this research. The best practice model has been delivered to answer the subdivided research questions, which are:

b) How well the proposed theoretical model of intention to adopt e-Government services fit the Saudi context?
c) According to the proposed theoretical model, which relations are significant in explaining the user's intention to adopt e-Government services in Saudi Arabia?

The proposed model is fitting the gathered data and reported a well fit result; this is shown in Table 8-25. In the following, discussion on the relations between the factors within the model.

Culture influences: Culture influences factor was reported as influential factor that would encourage people to use online services in many countries, including developed and developing countries. For example, a comparison study between the UK and Sri Lanka concluded that culture was found as an influential factor in both countries (Ali *et al.*, 2009). The researcher concluded that based on different dimensions culture was more likely to increase the chance of adopting the online government services. In this research, the results were found that people are more likely to be influenced by their culture; this effect is also supported by other researchers (Venkatesh *et al.*, 2003; AlAwadhi and Morris, 2008; Ali *et al.*, 2009).

Postal address: Postal address was reported in this research as an influential factor. The factor was found during the data analysis fitting the data (Section 8.3.1.7). Additionally, during the model development in Chapter3, the postal address was identified as a critical issue which might affect the citizen's intention to adopt e-Government. This issue was agreed by participant comments during the exploratory study in Chapter 6.

Privacy and security: Researches were reported that people are more concerned about their personal and financial data. According to Bélanger and Carter (2008), in the USA losing privacy would affect the citizens' intention to

use e-Government. In addition, a comparison study between the USA and Japan found that people are less likely to adopt e-Government due to risks and threats to their privacy (Akkaya *et al*., 2012). In this research, the result was found that privacy is an influential factor which highly concerned the Saudi Arabian citizens, which is also confirmed by research in Germany when the German government decided to stop an e-Government project in 2010 and erase all the data which had been collected from their citizens because of the violation of privacy rights (Akkaya *et al*., 2012). On the other hand, the level of the online services' security was reported as a critical factor that would affect the citizens' intention. The result of the data analysis in this research concluded that the high level of security on the online services would encourage Saudi Arabian citizens to use and then adopt the e-Government services. The result was confirmed by other researches which were undertaken in developed and developing countries. For instance, researches in Kuwait and in the USA concluded that people are more likely to use online services when they are assured about the online security including information and transaction security (Bélanger and Carter, 2008; AlAwadhi and Morris, 2009).

Perceived ease of use and perceived usefulness: Previous studies which have been carried out by researchers and have been undertaken in different countries, concluded that some of the proposed factors do not affect the public's intention (see literature review). For instance, the citizen's perception of ease of use is a significant factor in Pakistan, while in the USA the citizen's intention is not affected by the same factor (Carter and Bélanger, 2004a; Rehman *et al*., 2012). On the other hand, people in the USA are influenced by the level of trust in the internet and in the government, whereas these factors are not significant in the Pakistan context. In the Saudi context, however, both factors were found to be significantly important based on the citizens' views (Chapter 6) and seen as major requirement for the Saudi e-Government project. The reason for reporting both factors that are required to influence the citizen's intention to adopt e-Government is the high level of computer and internet literacy in Saudi Arabia (see Section 8.2) which makes the online services easy to use and useful. In a similar case in Kuwait, it is also reported that people with enough computer and internet skills found that using online services is easy and useful (AlAwadhi and Morris, 2009).

However, as mentioned in Section 2.1, it is difficult to define e-Government from one perspective and apply it to the world. In this research, the most common factors which have been defined were used and assessed to be applied only to the Saudi context. Therefore, some of the proposed factors that were found during the analysis have contributed in the model by more than one relationship which answers the subdivided research question, *"(d) Are there any other relationships between the proposed factors that might affect the intentions of citizens?"*. To answer this question, all possible relations were applied in the model and have been estimated. First, it is a fact that when the citizen's perception of ease of use of a new system was obtained, the system is found useful by users (Davis, 1989; Carter and Bélanger, 2005). Additionally, it is stated that perceived usefulness and perceived ease of use are influencing the citizen's intention (Figure 2-1), and as mentioned earlier in this section, the significance of the factor depends on where the data has been gathered. Although in this research both factors (perceived usefulness and perceived ease of use) were found to be significantly influencing the Saudi citizen's intention (Table 8-26), it is discovered that the Saudi citizen's perception of ease of use of the online services is also affecting their perception of finding the e-Government services useful (Figure 10-1). The reason for reporting that, in the Saudi context, people found the online services useful when they found it easy to use first is also due to their level of computer and internet skills and experience of using similar services, such as online banking. In other words, people with insufficient computer and internet skills and experience found the online services not useful when they faced difficulties in using the services, see Section 8.2 (AlAwadhi and Morris, 2009).

Trust in Internet and trust in government: Another issue, both trust in the internet and in the government are putting the security of the system at risk (Bélanger and Carter, 2008). In other words, increasing the public's trust in the internet and the government reduces the feeling of being insecure with high concerns about the risk of losing personal information (Colesca, 2009) (Table 8-26). In this research, it is confirmed that trust in the internet and in the government affects the citizen's intention indirectly through the security. However, it is discovered that the citizen's intention could be affected by trust in the government indirectly through the citizen's intention to use e-

Government services (USE) (Figure 10-1). The reason is that in Saudi Arabia people consider the trust in the internet as part of the security, whereas trust in the government could have two sides; as part of the security by misusing their information (based on participants' comments in the exploratory study, Chapter 6), and as part of their relationship by not serving them well and being afraid of being served unfairly ("Wasta", see Section 2.6.4) when behind screens (AlAwadhi and Morris, 2009).

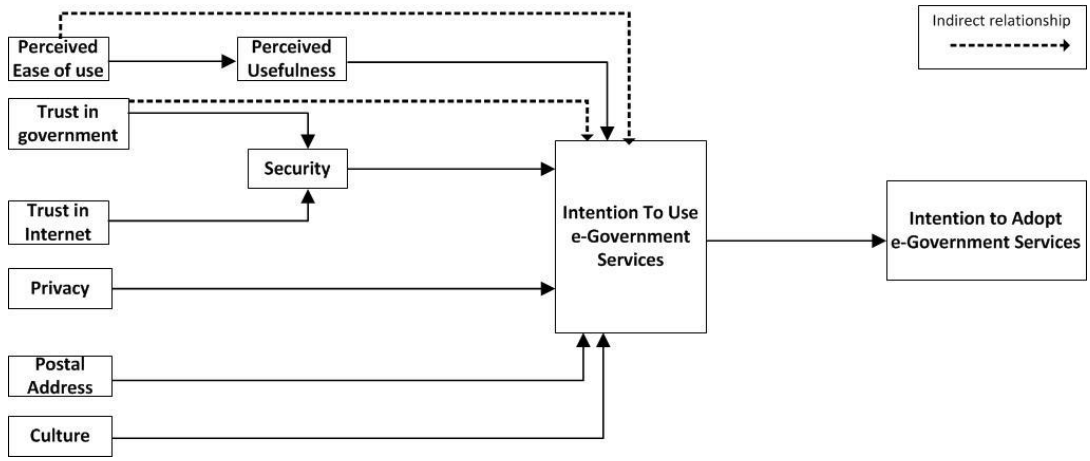


Figure 10-1: The other possible effects of perceived ease of use and trust in the government in the intention to use e-Government services

10.5 Discussion on the Government model

The Government model has been evaluated using the SEM approach (Chapter 9). The result of the evaluation process presented the model with the best practice and confirmed that most relations were illustrated in the model (Figure 7-3). In the following, there is discussion on the relations between the factors within the model.

Image: When a user sees how the new system would enhance the individual's image or their social status, that would encourage the user to adopt the new system. Based on the data analysis, the result showed that image would influence the citizen's intention to adopt e-Government services in Saudi Arabia. This result was also agreed by other researchers including Carter and Bélanger (2004b); Slyke *et al.* (2004).

Compatibility and Relative advantage: Although compatibility, as stated by Rogers (1995), is highly affected by the adopter's intention to adopt a new

innovation, in the Saudi context compatibility is seen as an influential factor that would become active only when through the relative advantage. In the assessment's results, it was reported that the people's perception in Saudi Arabia of seeing the new innovation as compatible with their needs, experience and existing values, would increase their perception of the relative advantage of the new system in order to be adopted. It is often that when a person finds that the new system meets his/her needs without affecting the person's beliefs, he/she would acknowledge the relative advantage of the new innovation (Rogers, 1995). In addition, Saudi Arabian society is highly influenced by religion and culture, which would reduce the possibility of the compatibility factor influencing the citizen's intention directly (Rogers, 1995).

Complexity: The level of difficulty of understanding and using a new system by a potential adaptor, which refers to complexity, would affect the intention of a user to adopt the new system. This has been approved by the result of the data analysis (see Chapter 9) which was confirmed by previous researches (Rogers, 1995; Carter and Bélanger, 2004a; Akkaya *et al.*, 2012). Based on a comparison study in Germany by Akkaya *et al.* (2012), the intention of a user to adopt e-Government would be affected by the difficulty of using the services. However, this is also remaining as an influential factor in Saudi Arabia.

Lack of Awareness: One of the factors that would prevent the citizens from adopting the new e-Government services is the awareness of the services and how to use them. In this research which was being undertaken in Saudi Arabia, the lack of awareness of the new e-Government services and how they could be used was reported as an influential factor that would encourage Saudi Arabian citizens to adopt e-Government. The result was also confirmed by previous research (AlAwadhi and Morris, 2009; AlNuaimi *et al.*, 2011; Pi *et al.*, 2012; Rehman *et al.*, 2012).

Technical Infrastructure: Technical infrastructure was reported as one of the major factors that would have a negative effect on the adoption of e-Government. The result from the data analysis in this research showed that technical infrastructure has an impact on the citizen's intention to adopt e-Government which is supported by some similar research. According to Al-Sobhi *et al.* (2010) lack of a reliable technical infrastructure would negatively affect the process of influencing the citizens to adopt e-Government. In

addition, improvement of the technical infrastructure would increase the chance of serving more users, especially people with disabilities by providing different communication channels which consequently would affect the users' intention to adopt e-Government (Baker and Bellordre, 2004; Al-Sobhi *et al.*, 2010).

Knowledge and Skills: the Knowledge and Skills factor includes information and communication literacy, level of education, gender, and age. The data analysis showed that the Saudi Arabian citizens would be influenced by the knowledge and skills. The result was reported that knowing how to use electronic devices (e.g. Personal Computer), the experience of using the internet, the level of education, the user's gender, and the user's age all play roles in influencing the user's intention to adopt e-Government. Similar studies, including studies in Kuwait, Taiwan, Pakistan, Romania, and the USA, confirmed that knowledge and skills is a factor that would encourage users to adopt the new services (Baker and Bellordre, 2004; AlAwadhi and Morris, 2009; Colesca, 2009; Pi *et al.*, 2012; Rehman *et al.*, 2012).

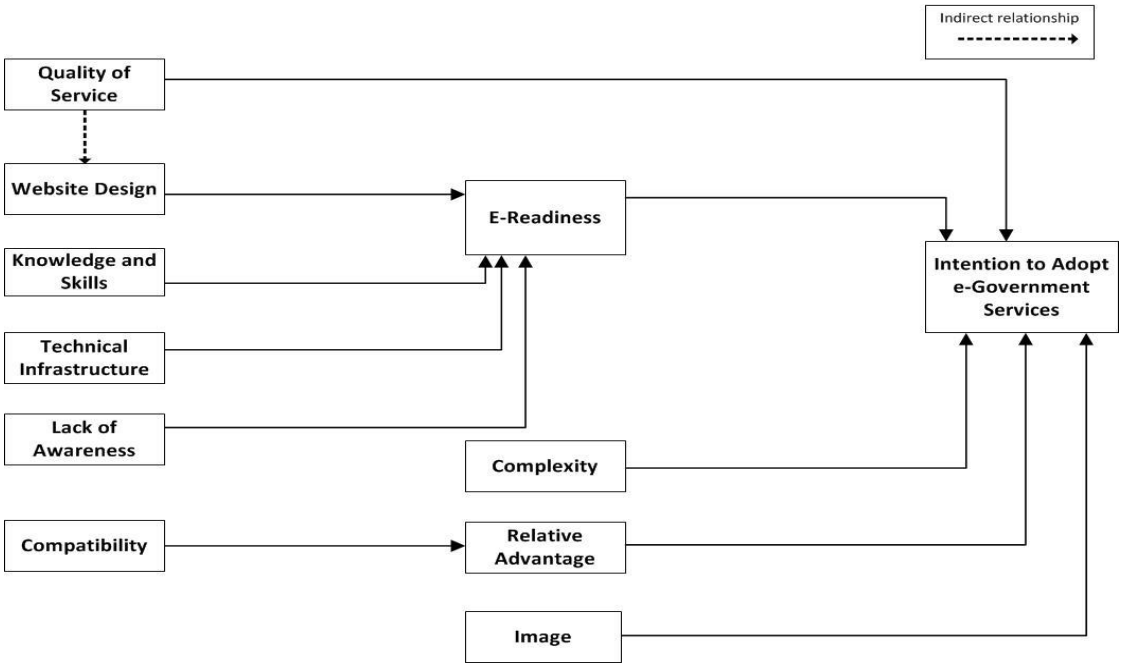


Figure 10-2: The relationship between factors within the Government model

Quality of Service and Website Design: when the level of the quality of service that is provided to consumers is high, that would increase the chance of adopting the service by users (Rehman *et al.*, 2012). In Saudi Arabia, it is found that the high quality of services could influence the citizen's intention to adopt

e-Government services (Table 9-26). On the other hand, the quality of services which is delivered by the government online could also influence the citizen's intention to adopt e-Government services indirectly through website design, then E-Readiness. In other words, the citizen's perception of E-Readiness in Saudi Arabia and the professionalism in designing the e-Government websites are affected by the level of the public's perception of the quality of services (see Figure 10-2).

10.6 Intention to adopt e-Government services

The main objective of this research is to propose the potential factors that would be integrated in a model to influence the citizen's intention to adopt e-Government services in Saudi Arabia which are represented by the research question. The research was driven from three main approaches, including a detailed literature review which explored previous adoption models (Chapter 2), an exploratory study to confirm the proposed factors (Chapter 6), and finally the evaluation study which has been done to confirm the model (Chapters 7, 8, and 9). These three approaches were the answer to the research question. In addition, as mentioned earlier in this research (literature review) there are three main stakeholders and the government should balance their efforts in serving these three stakeholders. Implementing and developing an e-Government project needs some requirements to overcome any possible challenges in order to build a reliable e-Government. However, these requirements vary from one country to another. Trust in the internet, for instance; the citizen's intention is not affected by trust in the internet in Pakistan (Rehman *et al.*, 2012), Abu Dhabi - United Arab Emirates (AlNuaimi *et al.*, 2011), or Jordan (Alomari *et al.*, 2012), whereas in the USA trust in the internet is seen as an influential factor (Carter, 2008). In contrast, trust in the government is reported as having an impact on the citizen's intention in Romania (Colesca, 2009) and the USA (Carter, 2008), while in Pakistan (Rehman *et al.*, 2012), Kuwait (AlAwadhi and Morris, 2009), Abu Dhabi (AlNuaimi *et al.*, 2011), and Jordan (Alomari *et al.*, 2012) it is found to be affecting the public's intention to adopt e-Government services. Therefore, it was necessary to take a high level overview of different models (literature review) to find out the major challenges (see Sections 2.3and 2.4) that are facing the implementation and development of an e-Government to be

overcome; to assess and find out how important they are based on the different views of citizens, government employees, and experts (exploratory study) in order to be integrated in a model to help government face these challenges and overcome them; and then confirming how well these factors in the model are fitting the data (evaluation study) to introduce the final model. Moreover, the Saudi citizens' confirmed that the proposed factors in the Citizens model were the major concerns that would prevent them from using and adopting the new services (see Section 8.3), while if the government reduce their citizens' concerns by increasing the security level, clearly introduce the privacy policies with strong punishments for hacking or misusing the citizens' and government data, provide simple instructions in how to use the services which increase the citizens' perception of ease of use of the system and their perception of usefulness of the services (see Section 8.4). Finally, the government should improve the postal services, especially in rural areas, and introduce a clear and permanent address for each property (see Section 8.4). On the other hand, the government employees and experts reported that when the Government model with its proposed factors was being applied, the perception of the benefits of adopting the government services by the public would be clear and therefore would influence more users to adopt the services (see Sections 9.3 and 9.4).

In conclusion, in order for the Saudi Arabian government to influence their citizen's intention, there are some factors, in both sub-models Citizens model and Government model, which have more priority to be undertaken in order. These factors would be classified under three categories, including high priority, mid priority, and low priority. However, all three categories are important based on the results from the estimation (Figure B-1, Table 8-26, and Table 9-26) but they have been categorized to show which factors would be better to start with. From the Citizens model, Trust in Internet, Trust in Government, Security, and Perceived Ease of Use have the most priority, followed by Privacy as mid priority. Perceived Usefulness, Culture, and Postal Address were seen as low priority. On the other hand, Compatibility, Complexity, Website Design are the highest priority factors in the Government model, while Quality of Service, Technical infrastructure, and Image fall in the low priority category. The mid priority category in the Government model has Knowledge and Skills, Lack of Awareness, and Relative Advantage. Finally, the contributions from both sub-models to the Intention to Adopt e-Government

Services are the Intention to Use e-Government Services, followed by Complexity, and then E-Readiness.

Chapter 11: **Conclusions and Future work**

In this chapter, the conclusions about what has been done and how the research questions have been answered are presented. The main contributions of this research are identified, followed by suggestions about future work.

11.1 **Conclusions**

The relationship between the Internet and people has been presented to show the importance of using information and communication technology (ICT) in order to access online services and achieve their daily tasks. ICT is a key enabler for implementing and developing an e-Government project. Therefore, proposing and developing electronic services has become a high priority in most countries. Many governments have transferred their traditional systems to e-services in order to improve their internal and external relationships. Moreover, building an e-Government system would help governments to serve their citizens better and at any convenient time anywhere the user has access to the services. Therefore, one of the major challenges that face government is building a reliable technical infrastructure. However, alongside the rapid development of information and communication technologies (ICT) and the significant improvements in digital connectivity, adoption of e-Government services by citizens is also a concern of many governments.

General information about Saudi Arabia has been provided to give the reader a clear idea about where this research has taken place. The physical geography of Saudi Arabia, being one of the biggest countries in the Middle East, also makes the case for implementing e-Government essential which is one of the problems facing the Saudi Arabian government.

The Saudi Arabian government launched the Saudi e-Government program (Yesser) in 2005. The plan of the project has two phases starting in 2006 until 2016. The Saudi Arabian government has done massive work and is investing large amounts of money to implement and develop the first e-Government project in Saudi Arabia. In addition, the current e-Government development index (EGDI) ranking of the Saudi Arabian e-Government is 36 among 192 countries compared to the position of 105 in 2003. However, the Saudi Arabian government has been criticized because of its services not being sufficient to

the citizens with limited services, whereas businesses have more services (Al-Sheha, 2007). One of the major problems that government faces is how to encourage their citizens to adopt the provided services. Therefore, this research identifies and discusses the gap, then introduces the solution. Additionally, the research questions of this research are:

- What are the influential factors to be integrated in a model for implementing and developing e-Government in order to be adopted by citizens?

Electronic Government (e-Government) has been widely identified by researchers based on an existing set of requirements, since there is no unique definition. In this research e-Government has been defined as a matrix of stakeholders: Government to Government, Government to Business and Government to Citizens, using Information and Communications Technology (ICT) to deliver and/or consume services. Saving money, time and effort with increased efficiency, with due consideration for information security and privacy to all parties is an object of e-Government. Government to Government (G2G), Government to Business (G2B) and Government to Citizen (G2C) are the common drivers for e-Government. In addition, 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, including Saudi Arabia. Therefore, developing a reliable e-Government results in many benefits that e-Government services have delivered to governments, businesses and citizens. Moreover, privacy, security, trust, culture, computer and information literacy, and IT infrastructure have been presented as common challenges that face the implementation and adoption of e-Government. There are also many other more specific challenges facing some countries, including authentication, digital divide and funding shortage. Therefore, it was essential to explore the challenges and barriers that influence the implementation and adoption of successful e-Government services. Additionally, the first step for the Saudi Arabian government to overcome the challenges is by identifying clearly its requirements in order to propose solutions. Therefore, following the exploring of the common challenges, an exploring of the challenges facing Arab states alongside with the challenges facing the Saudi Arabian government have been undertaken. The challenges includes accessibility, availability, citizen expectations,

computer and information literacy, cost of Internet usage, culture, political challenges, privacy, security, trust, technical infrastructure and adoption. However, citizens' adoption has been identified as the gap in this research to be investigated.

Adoption is a critical issue to governments that want to implement and develop a successful e-Government. Nevertheless, there has been little research exploring the factors that determine the adoption of e-Government services by citizens in developing countries, especially in the Arab world. Additionally, common models, that have been used to measure the adoption of new technology such as the Technology Adoption Model (TAM), the Diffusion of Innovations Model (DOI), and the Unified Theory of Acceptance and Use of Technology (UTAUT), were presented and discussed along with other adoption models to identify the influential factors that affect the citizen's intention to adopt e-Government in Saudi Arabia. The factors have been grouped and presented in Table 3-1.

Two different scenarios, UK passport application and school communications, have been used to show the difference between electronic and paper-based systems.

Consequently, the identified factors have been defined and integrated in an initial model. The triangulation technique was used to validate the introduced factors in the proposed model. The validation used the detailed literature review, questionnaires for Saudi citizens and Saudi government employees, and an interview with experts in the e-Government field. The presented results concluded that the identified factors were found important in influencing the citizens' intentions. Additionally, it was found that 'postal address' is an important factor that would encourage citizen's intention to adopt e-Government services.

Following the exploratory study, a detailed study was carried out in order to validate the developed model and answer the research question. Since the research question is a broad question, it has been subdivided into:

a) Which of the identified factors in Table 3-1 have an impact on the citizens' intention?
b) How well does the proposed theoretical model of intention to adopt e-Government services fit the Saudi context?

c) According to the proposed theoretical model, which relations are significant in explaining the users' intention to adopt e-Government services in Saudi Arabia?

d) Are there any other relationships between the proposed factors that might affect the intentions of citizens?

Hence, to answer these sub-questions, first the initial model was reconstructed based on the literature review and the exploratory study. The main study was used to evaluate the developed model using the triangulation method. It included the detailed literature review, questionnaires applying to the Saudi citizens, and questionnaires applying to the government's employees and experts. The study, which gathered information from people who might use the e-Government services, was undertaken to build a clear picture about the relationship between the proposed factors. Consequently, two sets of questionnaires and in-person interviews were set up in an appropriate way to ensure that the results would represent the real situation. However, both sets of the questionnaires were built using mixed-methods, including closed-ended questions and open-ended questions. The first set of the questionnaires and the interviews were done with some government employees and experts who work in the Saudi e-Government program and people running the e-Government system. In addition, the citizens' questionnaires were distributed online among Saudi citizens in rural, urban and overseas areas to collect different views of the factors that influence citizens to adopt e-Government services in Saudi Arabia. The questionnaires had a section in which the participants would give their demographic data such as age, education level, and gender, to help in grouping them in the analysis stage, as well as open-ended questions to get the participants' views and suggestions that might not have been covered. The data were analysed using Structural Equation Modelling (SEM) to measure the strength of the relationship between the factors. Additionally, the reason for choosing Structural Equation Modelling is because of the features of estimating the factors' impact, and how well does the data fit the model. Moreover, a factor analysis was used to confirm the number of the factors that were extracted from the gathered data. Likewise, the analysis' data also illustrated other possible indirect relationships between the factors. Consequently, the results from the main study indicated that the identified factors had an impact on the citizens' intentions as well as the model was fitting the data well. However, from the data analysis which has been done

in Chapter 8 and Chapter 9, some of the instruments have been excluded based on the detailed analysis. Therefore, it is recommended for future research that these instruments be enhanced by rewording in order to give better results.

11.2 Contributions

In this research, there are three main contributions that the researcher has addressed. The researcher was the first who has introduced these contributions, to the best of the researcher's knowledge. First, the factors that are having an impact on the intentions of the Saudi citizens have been identified and assessed. Although there were some researches which identified some influential factors, they were only applied to specific organizations. However, the identified factors in this research were applied to the Saudi context, and had been confirmed using the triangulation methods. To the best of the researcher's knowledge, the factor 'postal address' is being introduced for the first time.

The second main contribution is developing a new adoption model. From the identified factors, a new model has been developed in order to help in encouraging the Saudi citizens to adopt e-Government services. The model has been evaluated using the triangulation approach including detailed literature review, citizens' surveys, and surveys of government employees and experts. The gathered data has been analysed using Structural Equation Modelling. The results showed that the model is fitting the data well. Therefore, it could be stated that the developed model is valid and it is highly recommended to be used by the Saudi government to influence their citizens to adopt the Saudi e-Government.

The final main contribution is that the researcher has introduced new instruments. Although most of the questions that were used in building the questionnaires were adapted from other research, the questions were modified to suit this research requirement. Some of the questions, including the postal address questions, part of the website design questions, and part of the knowledge and skills questions, were added to this research. Consequently, the modified questions were translated into the Arabic language by experts, examined by academic and non-academic experts in the Arabic language, and

have been evaluated by applying a reliability test. The results of the reliability (α) test for the citizens' questionnaires and the government questionnaires were 0.748 and 0.940 respectively. Therefore, the new translated questions could be used by other researchers who want to run new research in an Arabic context.

11.3 Future work

From the limitations of this research, there were some points mentioned that could be carried out in future. These points could be used as a continuation of this research and other points that the researcher has discovered during this research which could not be done due to the time limitation and the research scope.

First, as a result of this research, the model has been developed and validated; it would be useful to enable the developed model to be used by the Saudi government in order to help in influencing their citizens to use and then adopt the Saudi e-Government. The Saudi government could use the model in improving the current e-Government program. In addition, the Saudi government also might ask the researcher to cooperate as the researcher is a Saudi citizen.

Second, as the results of this research contribute to knowledge, the developed model could be enabled to be used in other similar contexts such as Arabic regions and developing countries. In the Middle East countries, most of the countries are similar and sharing many things such as language, religion, and culture.

The third point is that in the last few years many governments and businesses have suffered from hacker associations such as *Anonymous*. It has been stated that a high level of security is needed because of the massive attacks from hackers to destroy the victims' IT infrastructures, snatching some data, and other potential threats (Whitman, 2004). According to Mookerjee *et al.* (2011) there is a major concern over the last decade from the incidence of cyber-attacks and breaches in the information security. A study concluded that in the new e-services project the requirements of information security are not being adequately addressed (Gordon and Loeb, 2002). Therefore, it is recommended to undertake an investigation of the effects of the threats of hacker

associations on the citizens' perceptions of security. The security is not only the citizens' concern, governments are also concerned about losing vital data as well as putting the government's and the citizen's information at risk. Thus, new research should be undertaken to find out how much the citizens and government are affected by these threats when using online services and/or providing information online. In addition, the research could also conclude how it could be prevented in order to use the services safely.

Appendices

Appendix A

Table A-1: Summary of the proposed factors and its definitions

Attributes	Author's Definition	Adapted from
Trust in Government	The belief that governments will adopt and implement an e-government with full functionality of privacy and security.	(Bélanger and Carter, 2008; Alomari *et al.*, 2009)
Trust in internet	This is often identified as institution-based trust, which is 'the belief that needed structural conditions are present (e.g., in the Internet) to enhance the probability of achieving a successful outcome in an endeavour like e-commerce'.	(Bélanger *et al.*, 2002; Alomari *et al.*, 2012)
Perception of Usefulness	The degree to which a person believes that using a particular system would enhance his or her job performance.	(Davis, 1989; Carter and Bélanger, 2004a)
Perception of Ease of Use	The degree to which a person believes that using a particular system would be free of effort.	(Davis, 1989; Carter and Bélanger, 2004a)
Compatibility	The degree to which an innovation is seen to be compatible with existing values, beliefs, experiences and needs of adopters.	(Rogers, 1995; Carter and Bélanger, 2004a)
Complexity	The degree to which an innovation is seen by the potential adopter as being relatively difficult to use and understand.	(Rogers, 1995; Carter and Bélanger, 2004a)
Image	The degree to which the use of the innovation is seen as enhancing to an individual's image or social status.	(Carter and Bélanger, 2004b; Slyke *et al.*, 2004)
Relative Advantage	The degree to which an innovation is seen as being superior to its predecessor.	(Rogers, 1995; Carter and Bélanger, 2004a)
Privacy	It is the willingness of consumers to share information over the Internet that allows purchases to be concluded.	(Bélanger *et al.*, 2002)
Culture	Is the 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 culture, etc.	(Leung *et al.*, 2005; Ali *et al.*, 2009)

Appendix A

Attributes	Author's Definition	Adapted from
Information Quality	This is defined as the extent to which the information on the website possesses the attributes of content, accuracy, timeliness, and usefulness.	(Bock *et al.*, 2012)
Speed of Delivery	This is defined as the elapsed time between customers requesting products or services and their receiving them.	(Trentin *et al.*, 2011)
Availability	This is defined as the probability that the system is ready (provides responses) at a specific time.	(Walkowiak, 2011)
Reliability	The ability of a system to perform its intended function.	(Lin and Chang, 2012)
Service Quality	This is defined as the customer's assessment of the overall excellence or superiority of the service.	(Zeithaml, 1988; Bolton and Drew, 1991)
Technical Infrastructure	This is 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.	(Kaminski, 2010)
Transaction Security	This is one of the most minding things for users when making online financial activities.	(Pi *et al.*, 2012)
Perceived Risk	This is a subjective evaluation by consumers associated with possible consequences of wrong decisions	(Peter and Ryan, 1976; Yu-Shan and Ching-Hsun, 2012)
Lack of Awareness	This is an understanding of the activities of others, which provides a context for your own activity.	(Dourish and Bellotti, 1992)
Information Security	This 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.	(Ramnath and Paul, 2002)
Security	A security threat is a circumstance, condition, or event with the potential to cause economic hardship to data or network resources in the form of destruction, disclosure, modification of data, denial of	(Bélanger *et al.*, 2002)

Attributes	Author's Definition	Adapted from
	service, and/or fraud, waste, and abuse, while the security is the protection against these threats.	
Education	The level of education that the person held.	The author
Multi-Lingual Website	A website that has at least two displayed languages.	The author.
Computer literacy	Whatever a person needs to be able to use (and know about) computers	(Hunter, 1983; Cole and Kelsey, 2004)
Information literacy	The ability to use information, or possibly the possession of knowledge of information	(Behrens, 1994; Cole and Kelsey, 2004)

Appendix B

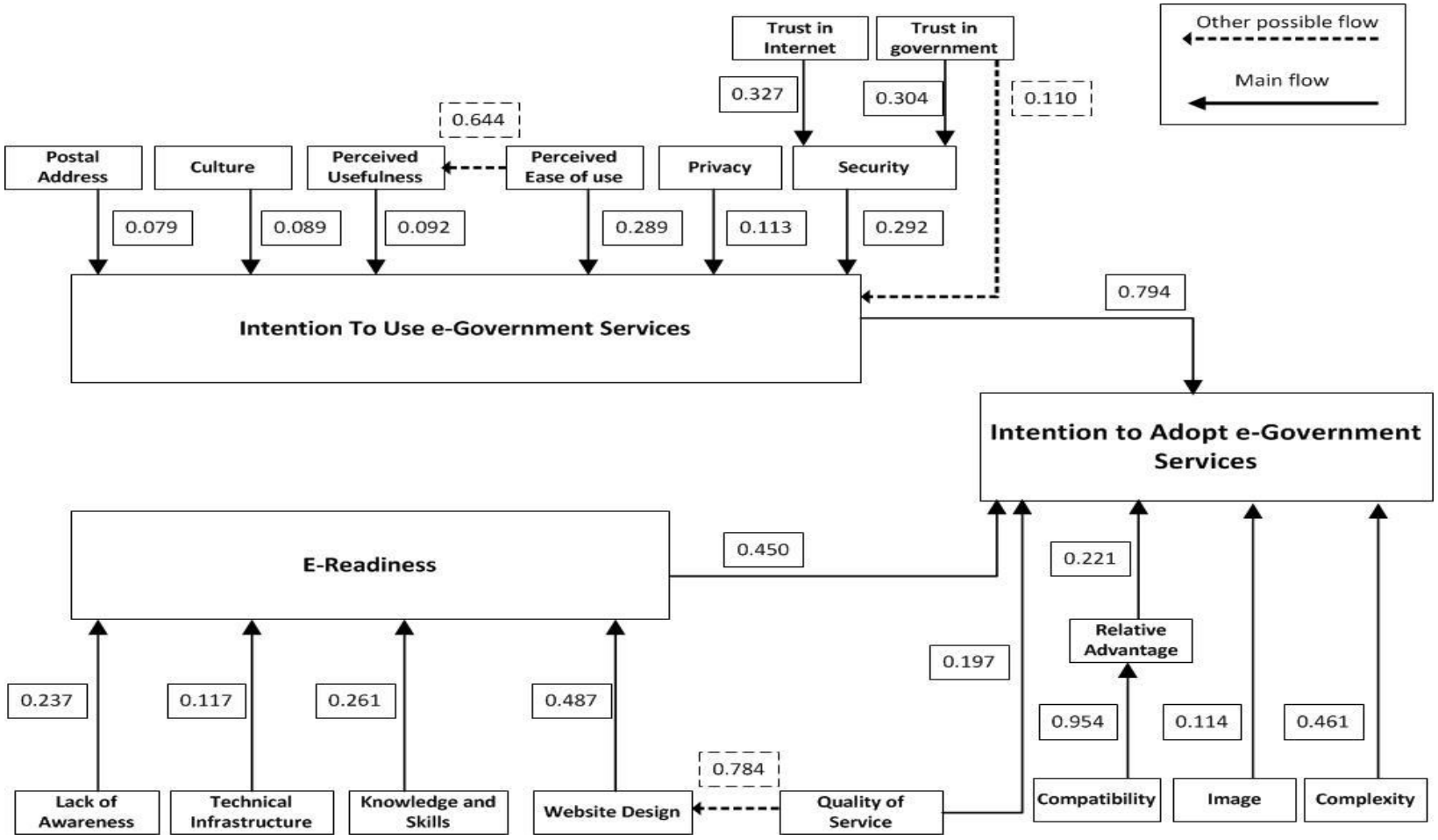


Figure B-1: The developed model and the estimation results

Appendix C **Exploratory Study**

C.1 Questionnaire applying to citizens

No	Statements	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
	Part I: Cultural influences					
1	Culture in general does influence citizens to use e-Government services.	5	4	3	2	1
2	Culture can affect the trust of citizens who intend to use e-Government services.	5	4	3	2	1
	Part II: Security					
3	Sending information via network medium (e.g. Internet) is safe, which encourages me to use e-Government services.	5	4	3	2	1
4	Providing critical information to e-Government websites can be risky, which prevents me from using the e-services.	5	4	3	2	1
5	The transaction between e-Government services and me is secure and influences my intention to use the online services.	5	4	3	2	1
6	The low level of the transaction security which might cause Losing information, encouraging me to use the paper-based system.	5	4	3	2	1
7	General security about my information, which I am concerned about, affects my intention to use e-Government services.	5	4	3	2	1
	Part III: Privacy					
8	Privacy is a critical issue that citizens are afraid of when they intend to use e-Government services.	5	4	3	2	1

Appendix C

No	Statements	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
9	Privacy has an indirect impact on the citizens' trust.	5	4	3	2	1
Part IV: Trust						
10	Trust in general is an important factor that influences citizens to adopt e-Government services.	5	4	3	2	1
11	Trust in Internet does not affect the intention of citizens to use e-Government services.	5	4	3	2	1
12	Trust in government has an impact on the intention of citizens to use e-Government services.	5	4	3	2	1
Part V: Website Design						
13	The design of a government's website increases my intention to use the e-Government services.	5	4	3	2	1
14	Whenever the usefulness of a website is clear and easily perceived by me, I use the e-Government services.	5	4	3	2	1
15	A website's perceived ease of use influences me to use the e-Government services.	5	4	3	2	1

C.2 Questionnaire applying to government employees

No	Statements	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
Part I: Quality of Service						
1	High Service Quality encourages consumers to use the e-Government.	5	4	3	2	1
2	System's reliability increases the quality of service, which has an impact on E-Readiness, which encourages citizen adoption.	5	4	3	2	1
3	e-Government services should be available most of the time in order to influence citizens to adopt e-Government services.	5	4	3	2	1
4	When e-Government services are delivered in a reasonable time, E-Readiness will increase, which will help citizens adopt e-Government services.	5	4	3	2	1
5	The quality of information used in e-Government services has a strong impact on E-Readiness, which may affect the adoption of e-Government.	5	4	3	2	1
Part II: Cultural influences						
6	Culture in general does influence citizens to use e-Government services.	5	4	3	2	1
7	Cultural influences can affect the trust of citizens who intend to use e-Government services.	5	4	3	2	1

Appendix C

No	Statements	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
	Part III: Security					
8	General security is what people are concerned about when they intend to use e-Government services.	5	4	3	2	1
9	Sending information via online medium has a negative impact on the adoption of e-Government services.	5	4	3	2	1
	Part IV: Computer and information Literacy					
10	People who have basic computer and Internet skills tend to adopt e-Government services easily.	5	4	3	2	1
11	Gender differentiation issues have an impact on the level of computer and information literacy, which may affect the adoption of e-Government services.	5	4	3	2	1
12	The level of education increases the computer literacy rate, which leads to citizens adopting e-Government services.	5	4	3	2	1
13	Consumers' age has a strong impact citizen to be literate which increase the chance to adopt e-Government services.	5	4	3	2	1
	Part V: Website Design					
14	The design of a government's website increases citizens' intentions to use the e-Government Services.	5	4	3	2	1

No	Statements	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
15	Making the services on the government's website usable would help the government encourage citizens to use e-Government services.	5	4	3	2	1
16	Giving people access to general government information and services may help the government to influence citizens to adopt e-Government services.	5	4	3	2	1
17	Creating websites that have multiple languages would help the government to serve more people in order to encourage citizens to adopt e-Government services.	5	4	3	2	1
Part VI: Lack of Awareness						
18	The government should introduce the new e-services through many channels (e.g. TV, launch campaign) to increase citizens' awareness in order to adopt e-Government services.	5	4	3	2	1
Part VII: Technical Infrastructure						
19	Strong technical infrastructure may be useful for the government to increase the adoption of e-Government services.	5	4	3	2	1
Part VIII: DOI						
20	e-Government services should be seen as compatible with citizens' beliefs and needs.	5	4	3	2	1

Appendix C

No	Statements	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
21	The introduced services are seen as difficult to use and understand.	5	4	3	2	1
22	Using the e-Government services to enhance an individual's image or social status might increase the adoption of e-Government services.	5	4	3	2	1
23	Showing the advantages of using e-services to the citizens increases the adoption of e-Government services.	5	4	3	2	1

Appendix D **The Evaluation study**

D.1 The layout of the Citizens' questionnaires

D.1.1 Information and Written Consent

Towards an e-Government model: Investigating citizen's intention to adopt e-Government services in Saudi Arabia

I am a PhD research student at University of Southampton, Southampton, UK. As part of my thesis, I am conducting a survey to investigate the factors that might affect citizen's intention to adopt e-Government services in Saudi Arabia.

The questionnaire designed for this study consists of three parts. The first part asks about the respondent's demographics. The second part asks about Internet and computer experience. The third part measures different perceptions about the adoption of the e-Government services.

If you are a Saudi citizen, and over 18, I would be very grateful if you fill out this questionnaire.

Your participation is voluntary and all responses will be anonymous and treated as completely confidential and it will not be possible for anyone to identify the information you supply.

The questionnaire will only take 12-15 minutes of your time and it is recommended not to spend too long on any question. Your first thoughts are usually your best.

It is not compulsory for you to take part and you can withdraw at any time without consequence.

You can choose to supply your email address at the end of the survey if you would like to participate in further discussions about the results.

If you have any concerns or complaints regarding this project please contact (University of Southampton)

If you have any queries or would like further information about this research, please feel free to contact me.

Appendix D

please select the appropriate

please select the appropriate	
I have read and understood the above and agree to take part in the survey	○
I have read and understood the above and do not wish to participate	○

Thank you

Sulaiman Alateyah

Electronics and Computer Science

University of Southampton,

Southampton, SO17 1BJ, UK.

Email: saa1y10@ecs.soton.ac.uk

D.1.2 Part One: Demographic Data

1	Gender	Male				Female	
2	Age	18- 29	30- 39	40- 49	50- 59	60 and above	
3	Highest Level of Education	Below High School	High School	Diploma	Bachelor	Higher degree	Other: please specify
4	Current Employment	Student	Public sector	Private Sector	Self Employed	Retired	Unemployed
5	Overseas Experience	Studied Abroad	Worked Abroad	Travelled widely on business	Travel widely on vacation	None	

D.1.3 Part Two: Computer Knowledge and Internet Experience

1	How do you describe your general computer knowledge?	Very good	Good	Moderate	Poor	No knowledge at all
2	How would you describe your Internet knowledge?	Very good	Good	Moderate	Poor	No knowledge at all
3	How long have you been using the Internet?	Never	Less than a year	1-2 years	More than 2 years	
4	How long have you been using an Internet services (e.g. Internet banking)?	Never	Less than a year	1-2 years	More than 2 years	
5	How long do you use the Internet per day?	Never	1-2 hours	3-4 hours	More than 4 hours	

Appendix D

D.1.4 The questions

Part Three						
No	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	Intention to Adopt					
1	It is likely that I would keep Interacting with the government website in the near future.	5	4	3	2	1
2	In future, I would not hesitate to provide my information to e-Government websites.	5	4	3	2	1
3	To retrieve a government's information I would use the online services.	5	4	3	2	1
4	In the near future I would inquire about the government's services online.	5	4	3	2	1
5	It is likely that I would use the online payment when using e-Government services in the near future.	5	4	3	2	1
	TAM: Intention to Use					
6	For gathering information about the Saudi government, I would use the web.	5	4	3	2	1
7	I would use the online government's services provided over the web.	5	4	3	2	1
8	Using the web for interacting with the government is something that I would do.	5	4	3	2	1
9	When using a government's website, I would not hesitate to provide the required information.	5	4	3	2	1

Part Three						
No	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
10	I would use the web for inquiring about the government's services.	5	4	3	2	1
	TAM: Perceived Ease of Use					
11	It would be easy for me to learn to interact with a government website.	5	4	3	2	1
12	I believe that the process for interacting with a government website would be a clear and understandable.	5	4	3	2	1
13	Interacting with most government websites would be flexible for me.	5	4	3	2	1
14	I found that becoming skilful at using a government website would be easy for me.	5	4	3	2	1
15	I would find that it is difficult to use the online services.	5	4	3	2	1
	TAM: Perceived Usefulness					
16	I would be able to complete transactions with the government more quickly by using e-Government website.	5	4	3	2	1
17	The e-Government website would provide me a valuable service.	5	4	3	2	1
18	I found that the content of the government website was useless.	5	4	3	2	1

Appendix D

Part Three						
No	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
19	My effectiveness in searching for and using e-Government services would be enhanced with the government website.	5	4	3	2	1
20	I think the government web site is useful.	5	4	3	2	1
	Trust in Internet					
21	There are enough safeguards in the Internet which makes me feel comfortable when using services online by transacting personal business with the government or its agencies.	5	4	3	2	1
22	I feel assured that I am protected from problems on the Internet due to the adequate legal and technological structures.	5	4	3	2	1
23	In general, todays Internet is becoming a robust and safe environment in order to transact with government or its agencies.	5	4	3	2	1
24	I feel confident that my data which I submit through an e-Government websites would not be misused and would be treated confidentially.	5	4	3	2	1
	Trust in the government					
25	It is likely that I would trust government or its agencies.	5	4	3	2	1
26	My government or its agencies could be trusted to deal with online transactions faithfully.	5	4	3	2	1

Part Three						
No	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
27	I trust my government or its agencies in keeping my best benefits in mind.	5	4	3	2	1
28	I would find my government or its agencies trustworthy.	5	4	3	2	1
	Privacy					
29	The government may share my personal information which I have given to them with other government agents whom I do not want to provide the information.	5	4	3	2	1
30	A third party may be allowed by the government to access my personal information without my consent.	5	4	3	2	1
31	My personal information may be used by the government without my consent.	5	4	3	2	1
32	My personal information could be snatched by someone while I am sending the information to a government website.	5	4	3	2	1
33	Hackers may be able to steal my personal information stored on the government's website by intruding on their websites.	5	4	3	2	1
	Security:					
34	The government agency may use my personal information in an unintended way.	5	4	3	2	1
35	My personal information could be hacked while I am sending the information to a government website.	5	4	3	2	1

Appendix D

Part Three						
No	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
36	I feel a transaction with an e-Government service is unsafe	5	4	3	2	1
37	Usually government ensure that the online information transactions are secured from being destroyed or altered by accident during transmission on the internet.	5	4	3	2	1
38	In general, I believe it is risky to use e-Government services over the Internet.	5	4	3	2	1
39	I feel that the benefits of using an e-Government service are outweighed by the risks.	5	4	3	2	1
	Cultural influences					
40	It is thought by people who influence my behaviour that I should use the e-Government services.	5	4	3	2	1
41	It is thought by people who are important to me that I should use the e-Government services.	5	4	3	2	1
42	I use the e-Government services because of the number of colleagues who use them.	5	4	3	2	1
43	I would use the online services only when I needed to.	5	4	3	2	1
44	Only if my friends used the e-Government services would I use them.	5	4	3	2	1
	Postal Services					
45	I would use the e-Government services if I have a permanent address.	5	4	3	2	1

Part Three						
No	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
46	I would use the e-Government services if I have a clear and certified address.	5	4	3	2	1
47	There is no secure communication channel between me and the government.	5	4	3	2	1
48	The mail services in my country are not performing well.	5	4	3	2	1
49	I would not use the e-Government services because I am afraid of losing personal document, since the current mail services do not perform well.	5	4	3	2	1

D.2 The layout of the Government Employees' and Experts' questionnaire

D.2.1 Information and Written Consent

Towards an e-Government model: Investigating citizen's intention to adopt e-Government services in Saudi Arabia

I am a PhD research student at University of Southampton, Southampton, UK. As part of my thesis, I am conducting a survey to investigate the factors that might affect citizen's intention to adopt e-Government services in Saudi Arabia.

The questionnaire designed for this study consists of three parts. The first part asks about the respondent's demographics. The second part asks about Internet and computer experience. The third part measures different perceptions about the adoption of the e-Government services.

If you are a government's employee, and/or you have experienced and e-Government services, and over 18, I would be very grateful if you fill out this questionnaire.

Your participation is voluntary and all responses will be anonymous and treated as completely confidential and it will not be possible for anyone to identify the information you supply.

The questionnaire will only take 15-20 minutes of your time and it is recommended not to spend too long on any question. Your first thoughts are usually your best.

It is not compulsory for you to take part and you can withdraw at any time without consequence.

You can choose to supply your email address at the end of the survey if you would like to participate in further discussions about the results.

If you have any concerns or complaints regarding this project please contact (University of Southampton)

If you have any queries or would like further information about this research, please feel free to contact me.

please select the appropriate	
I have read and understood the above and agree to take part in the survey	O
I have read and understood the above and do not wish to participate	O

Thank you

Sulaiman Alateyah

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Appendix D

D.2.2 Part One: Demographic Data

1	Gender	Male			Female		
2	Age	18- 29	30- 39	40- 49	50- 59	60 and above	
3	Highest Level of Education	Below High School	High School	Diploma	Bachelor	Higher degree	Other: please specify
4	Job experience	0-2 years	3-5 years	6-9 years	10 and more		
5	Overseas Experience	Study Abroad	Work Abroad	Travelled widely on business	Travel widely on vacation	None	

D.2.3 Part Two: Computer Knowledge and Internet Experience

1	How do you describe your general computer knowledge?	Very good	Good	Moderate	Poor	No knowledge at all
2	How would you describe your Internet knowledge?	Very good	Good	Moderate	Poor	No knowledge at all
3	How long have you been using the Internet?	Never	Less than a year	1-2 years	More than 2 years	
4	How long have you been using an Internet services (e.g. Internet banking)?	Never	Less than a year	1-2 years	More than 2 years	
5	How long do you use the Internet per day?	Never	1-2 hours	3-4 hours	More than 4 hours	

D.2.4 The questions

Part Three						
No	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	Intention to Adopt					
1	It is likely that I would keep Interacting with the government website in the near future.	5	4	3	2	1
2	In future, I would not hesitate to provide my information to e-Government websites.	5	4	3	2	1
3	To retrieve a government's information I would use the online services.	5	4	3	2	1
4	In the near future I would inquire about the government's services online.	5	4	3	2	1
5	It is likely that I would use the online payment when using e-Government services in the near future.	5	4	3	2	1
	E-Readiness					
6	The physical infrastructure in Saudi Arabia is sufficient to influence citizen's intention to adopt e-Government.	5	4	3	2	1
7	Human capacity including, literacy, ICT skill level and vocational training would influence citizen's intention to adopt e-Government.	5	4	3	2	1
8	Because the legal and regulatory environment affecting the ICT sector and ICT use, including telecommunications policy, consumer protection, and privacy, citizen's intention is affected negatively.	5	4	3	2	1

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Part Three						
No	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
9	The ICT infrastructure in Saudi Arabia is on high standard which helps citizens to adopt e-Government services.	5	4	3	2	1
10	The speed of online communication would affect the citizen's intention to adopt e-Government services.	5	4	3	2	1
	DOI: Relative advantage					
11	My efficiency would be enhanced by using the web in gathering information from government or its agencies.	5	4	3	2	1
12	It is likely that my efficiency would be enhanced when using the web in interacting with government or its agencies.	5	4	3	2	1
13	It would be easy to interact with government or its agencies when using the web.	5	4	3	2	1
14	I would feel when using the web that I have greater control over my interaction with government or its agencies.	5	4	3	2	1
	DOI: Compatibility					
15	I think using the Internet would fit well with the way that I like to gather information from the government.	5	4	3	2	1
16	I think using the Internet would fit well with the way that I like to interact with the government.	5	4	3	2	1
17	Interacting with the government using the Internet would fit into my lifestyle.	5	4	3	2	1

Part Three						
No	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
18	Interacting with the government using the Internet would be incompatible with how I like to do things.	5	4	3	2	1
	DOI: Image					
19	People who gather information about the government by using the Internet have a high profile.	5	4	3	2	1
20	People who use e-Government services on the web have a high profile.	5	4	3	2	1
21	People who gather information about the government by using the Internet have more prestige than those who do not.	5	4	3	2	1
22	Interacting over the web with the government enhances the social status of the person.	5	4	3	2	1
	DOI: Complexity					
23	Learning to use the web for using e-Government services is easy for me.	5	4	3	2	1
24	I believe that getting the web to do what I want it to do is easy to me.	5	4	3	2	1
25	It is clear and understandable when interacting with the web to use e-Government services.	5	4	3	2	1
26	Overall, I believe that using the web to use the e-Government services is easy.	5	4	3	2	1
	Technical Infrastructure					

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Part Three						
No	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
27	There are adequate facilities (e.g. ICT hubs, service centres or internet cafes) provided by government to access e-Government services.	5	4	3	2	1
28	I have the required resources at home to use e-Government services such as a computer and internet access.	5	4	3	2	1
29	At work, I have the required resources to use e-Government services such as a computer and internet access.	5	4	3	2	1
	Awareness					
30	I have enough knowledge to use e-Government services such as skills for using e-Government services	5	4	3	2	1
31	The responsibility for making people aware and educated about the existence of e-Government services is fulfilled by the government	5	4	3	2	1
32	The citizens are receiving training from their government to make best use of online services.	5	4	3	2	1
	Quality of Service					
33	At any time that I need to access government information, i.e. 24/7, e-Government services enable me.	5	4	3	2	1
34	Dealing with government through e-Government services are more reliable compared to the traditional way.	5	4	3	2	1

Part Three						
No	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
35	It is able to respond to citizens' needs quickly when applying e-Government services.	5	4	3	2	1
36	The precise information you need is provided by e-Government services.	5	4	3	2	1
37	The information provided by e-Government services is up-to-date.	5	4	3	2	1
38	It is easy to access e-Government services contents through the government's website.	5	4	3	2	1
	Website Design					
39	The support of local languages on the government's website would be helpful to understand the contents of the service.	5	4	3	2	1
40	Providing language support on the government website would encourage more users to use the e-Government services.	5	4	3	2	1
41	Supporting the government website with different languages (e.g. local languages, English, French, and Chinese) would affect the users' intention positively to use e-Government services.	5	4	3	2	1
42	I would be confident to use government's websites which are adequately designed to serve my needs.	5	4	3	2	1
43	The information in e-Government websites should be presented in a simple and understandable manner.	5	4	3	2	1
44	The access to the e-Government website is provided for full time, at anytime and anywhere.	5	4	3	2	1

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Part Three						
No	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
45	Providing support to users who have a disability would encourage more people to use the online services.	5	4	3	2	1
46	It is easy for me to use the e-Government services at anytime and anywhere.	5	4	3	2	1
47	Making e-Government websites usable would affect the citizen's intention positively.	5	4	3	2	1
	Knowledge and Skills					
48	I have enough skills and experience to use the internet.	5	4	3	2	1
49	I would find that navigating within the government's websites easy for me without having internet or computer skills.	5	4	3	2	1
50	Without having the required skills to use the internet, it is not easy for me to understand and be aware of internet benefits.	5	4	3	2	1
51	Having enough internet and computer skills would enable me to navigate within the government's websites to use different online services.	5	4	3	2	1
52	Having the required internet and computer skills would improve my interaction online with government through using different government's websites.	5	4	3	2	1
53	Age group (18-40) are more likely to use e-Government services.	5	4	3	2	1
54	Age group (18-40) have enough knowledge and skills to use e-Government services.	5	4	3	2	1

Part Three						
No	Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
55	Users with high-level education are more likely to use e-Government services.	5	4	3	2	1
56	Age group (18-30) have been educated and provided with information and computer skills.	5	4	3	2	1
57	Users' gender restricts their intention to use e-Government services.	5	4	3	2	1
58	Users' gender would increase more users to use the online services.	5	4	3	2	1

Appendix E **The full list of questions for the evaluated study and the translated copy**

E.1 The full list of questions with the code book- English version

No	Factor	Statements	Reference	Targets
	Intention to Adopt			
1	ADOP1	It is likely that I would keep Interacting with the government website in the near future.	(Alomari *et al.*, 2012)	Government's employees and experts (G). Citizens (C).
2	ADOP2	In future, I would not hesitate to provide my information to an e-Government websites.		
3	ADOP3	To retrieve a government's information I would use the online services.		
4	ADOP4	In the near future I would inquire about the government's services online.		
5	ADOP5	It is likely that I would use the online payment when using en e-Government services in the near future.		
	E-Readiness			
6	ER1	The physical infrastructure in Saudi Arabia is sufficient to influence citizen's intention to adopt e-Government.	(Ebrahim and Irani, 2005; Molla and Licker, 2005; Altameem, 2007; Rehman *et al.*, 2012)	G
7	ER2	Human capacity including, literacy, ICT skill level and vocational training would influence citizen's intention to adopt e-Government.		
8	ER3	Because the legal and regulatory environment affecting ICT sector and ICT use: including telecommunications policy, consumer protection, and privacy,		

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No	Factor	Statements	Reference	Targets
		citizen's intention is affected negatively.		
9	ER4	The ICT infrastructure in Saudi Arabia is on high stander which helps citizen to adopt e-Government services.		
10	ER5	The speed of online communication would affect the citizen's intention to adopt e-Government services.		
	TAM: Intention to Use			
11	USE1	For gathering information about Saudi government, I would use the Web.	(Carter and Bélanger, 2004b; Carter and Bélanger, 2005)	C
12	USE2	I would use the online government's services provided over the Web.		
13	USE3	Using the web for Interacting with the government is something that I would do.		
14	USE4	When using a government's website, I would not hesitate to provide the required information.		
15	USE5	I would use the web for inquiring about the government's services.		
	TAM: Perceived Ease of Use			
16	EOU1	It would be easy for me to Learn to interact with a government Website.	(Carter, 2008)	C
17	EOU2	I believe that the process for interacting with a government website would be a clear and understandable.		
18	EOU3	Interacting with most government websites would be flexible for me.		
19	EOU4	I found that becoming skilful at using a government website would be easy for		

No	Factor	Statements	Reference	Targets
		me.		
20	EOU5	I would find that it is difficult to use the online services.	(Carter and Bélanger, 2005)	
	TAM: Perceived Usefulness			
21	PU1	I would be able to complete transactions with the government more quickly by using e-Government website.	(Carter and Bélanger, 2005; Carter, 2008)	C
22	PU2	The e-Government website would provide me a valuable service.		
23	PU3	I would found that the content of the government website useless.		
24	PU4	My effectiveness in searching for and using e-Government services would be enhanced with the government website.		
25	PU5	I think the government web site is useful.		
	Trustworthiness: Trust in Internet			
26	TRUSTI1	There are enough safeguards in the Internet which makes me feel comfortable when using services online by transacting personal business with the government or its agencies.	(Carter and Bélanger, 2005; Bélanger and Carter, 2008; Carter, 2008; Rehman *et al.*, 2012) (Alomari *et al.*, 2012)	C
27	TRUSTI2	I feel assured that I am protected from problems on the Internet due to the adequate legal and technological structures		
28	TRUSTI3	In general, todays the Internet is becoming a robust and safe environment in order to transact with government or its agencies.		
29	TRUSTI4	I feel confident that my data which I		

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No	Factor	Statements	Reference	Targets
		submit through an e-Government websites would not be misused and would be treated confidentially.		
	Trustworthiness: Trust in the government			
30	TRUSTG1	It is likely that I would trust government or its agencies.	(Carter and Bélanger, 2005; Bélanger and Carter, 2008; Carter, 2008; Rehman *et al.*, 2012)	C
31	TRUSTG2	My government or its agencies could be trusted to deal with online transactions faithfully.		
32	TRUSTG3	I trust my government or its agencies in keeping my best benefits in mind.		
33	TRUSTG4	I would find my government or its agencies trustworthy.		
	DOI: Relative advantage			
34	RA1	My efficiency would be enhanced by using the Web in gathering information from government or its agencies.	(Carter and Bélanger, 2004b; Van Slyke *et al.*, 2004; Carter and Bélanger, 2005)	G
35	RA2	It is likely that my efficiency would be enhanced when using the Web in interacting with government or its agencies.		
36	RA3	It would be easy to interact with government or its agencies when using the Web.		
37	RA4	I would feel when using the web that I have greater control over my interaction with government or its agencies.		
	DOI: Compatibility			
38	CT1	I think using the Internet would fit well with the way that I like to gather information	(Carter and Bélanger, 2004b;	G

No	Factor	Statements	Reference	Targets
		from the government.	Van Slyke *et al.*, 2004; Carter and Bélanger, 2005)	
39	CT2	I think using the Internet would fit well with the way that I like to interact with the government.		
40	CT3	Interacting with the government using the Internet would fit into my lifestyle.		
41	CT4	Interacting with the government using the Internet would be incompatible with how I like to do things.		
	DOI: Image			
42	IM1	People who gather information about the government by using the Internet have a high profile.	(Carter and Bélanger, 2004b; Van Slyke *et al.*, 2004; Carter and Bélanger, 2005)	G
43	IM2	People who use e-Government services on the Web have a high profile.		
44	IM3	People who gather information about the government by using the Internet have more prestige than those who do not.		
45	IM4	Interacting over the Web with the government enhances the social status of the person.		
	DOI: Complexity			
46	CX1	Learning to use the Web for using e-Government services is easy for me.	(Van Slyke *et al.*, 2004)	G
47	CX2	I believe that getting the Web to do what I want it to do is easy to me.		
48	CX3	It is clear and understandable when interacting with the Web to use e-Government services.		

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No	Factor	Statements	Reference	Targets
49	CX4	Overall, I believe that using the Web to use the e-Government services is easy.		
	Infrastructure			
50	IN1	There are adequate facilities (e.g. ICT hubs, service centres or internet cafes) provided by government to access e-Government services.	(Rehman *et al.*, 2012)	G
51	IN2	I have the required resources at home to use e-Government services such as computer and internet access	(Venkatesh *et al.*, 2003; AlAwadhi and Morris, 2008; Rehman *et al.*, 2012)	
52	IN3	At work, I have the required resources to use e-Government services such as computer and internet access		
	Awareness			
53	AW1	I have enough knowledge to use e-Government services such as skills for using e-Government services	(Venkatesh *et al.*, 2003; AlAwadhi and Morris, 2008; Rehman *et al.*, 2012)	G
54	AW2	The responsibility for making people aware and educate about the existence of e-Government services is fulfilling by the government	(Rehman *et al.*, 2012)	
55	AW3	The citizens are receiving training from their government to make best use of online services.		
	Cultural influences			
56	CL1	It is thought by people who influence my behaviour that I should use the e-Government services.	(Venkatesh *et al.*, 2003; AlAwadhi and Morris, 2008)	C
57	CL2	It is thought by people who are important		

No	Factor	Statements	Reference	Targets
		to me that I should use the e-Government services.		
58	CL3	I use the e-Government services because of the number of colleagues who use them.		
59	CL4	I would use the online services only when I needed to.	(AlAwadhi and Morris, 2008)	
60	CL5	Only if my friends used the e-Government services I would use them.		
	Privacy			
61	PC1	The government may share my personal information which I have given to them with other government agents whom I do not want to provide the information.	(Colesca, 2009)	C
62	PC2	A third party may be allowed by the government to access my personal information without my consent.		
63	PC3	My personal information may be used by the government without my consent.		
64	PC4	My personal information could be snatch by someone while I am sending the information to a governmental website.		
65	PC5	Hackers may be able to steal my personal information stored on the government's website by intruding their websites.		
	Quality of Service			
66	QS1	At any time that I need to access government information, i.e. 24/7, e-Government services enable me.	(Rehman *et al.*, 2012)	G
67	QS2	Dealing with government through e-		

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No	Factor	Statements	Reference	Targets
		Government services are more reliable compared to the traditional way.		
68	QS3	It is able to respond to citizens' needs quickly when applying e-Government services.		
69	QS4	The precise information you need is provided by e-Government services.		
70	QS5	The information provided by e-Government services is up-to-date.		
71	QS6	It is easy to access e-Government services contents through government's website.		
	Website Design			
72	WD1	The support of local language on government's website would be helpful to understand the contents of the service.	(Rehman *et al.*, 2012)	G
73	WD2	Providing language support on the government website would encourage more users to use the e-Government services.	Added to the study	
74	WD3	Supporting the government website with different languages (e.g. Local language, English, French, and Chinese) would affect the users' intention positively to use e-Government services.	Added to the study	
75	WD4	I would be confident to use government's website which are adequately designed to serve my needs.	(Alomari *et al.*, 2012)	
76	WD5	The information in e-Government websites should be presented in a simple and understandable manner.		

No	Factor	Statements	Reference	Targets
77	WD6	The access to the e-Government website is provided for full time, at anytime and anywhere.	(AlNuaimi *et al.*, 2011)	
78	WD7	Providing support to users who have disability would encourage more people to use the online services.	Added to the study	
79	WD8	It is easy for me to use the e-Government services at anytime and anywhere.	(AlNuaimi *et al.*, 2011)	
80	WD9	Making e-Government website usable would affect the citizen intention positively.	Added to the study	
	Security:			
81	SEC1	The government agency may use my personal information in an unintended way.	(Colesca, 2009; Rehman *et al.*, 2012)	C
82	SEC2	My personal information could be hacked while I am sending the information to a governmental website.		
83	SEC3	I feel transact with an e-Government service is unsafe	(Colesca, 2009; Rehman *et al.*, 2012)	
84	SEC4	Usually government ensure that the online information transactions are secured from destroyed or altered by accident during transmission on the internet.	(Connolly and Bannister, 2008)	
85	SEC5	In general, I believe it is risky to use e-Government services over the Internet.	(Bélanger and Carter, 2008; Rehman *et al.*, 2012)	
86	SEC6	I feel that the benefits of using an e-Government service are outweighed by the risks.	(Colesca, 2009; Rehman *et al.*, 2012)	

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No	Factor	Statements	Reference	Targets
	Knowledge and Skills		.	
87	KS1	I have enough skills and experiences to use the internet.	(Connolly and Bannister, 2008)	G
88	KS2	I would find that navigate within government's website easy for me without having internet or computer skills.	(Alomari *et al.*, 2012)	
89	KS3	Without having the required skills to use the internet, it is not easy for me to understand and be aware of internet benefits.		
90	KS4	Having enough internet and computer skills would enable me to navigate within government's websites to use different online services.		
91	KS5	Having the required internet and computer skills would improve my interaction online with government through using different government's websites.		
92	KS6	Age group (18-40) are more likely to use e-Government services.	Added to the study	
93	KS7	Age group (18-40) have the enough knowledge and skills to use e-Government services.		
94	KS8	Users with high level Education are more likely to use e-Government services.		
95	KS9	Age group (18-30) have been educated and provided with information and computer skills.		
96	KS10	Users' Gender restricts their intention to use e-Government services.		
97	KS11	Users' gender would increase more users		

No	Factor	Statements	Reference	Targets
		to use the online services.		
	Postal Address			
98	ADD1	I would use the e-Government services if I have permanent address.	Added to the study	C
99	ADD2	I would use the e-Government services if I have a clear and certified address.		
100	ADD3	There is no secure communication channel between me and the government.		
101	ADD4	The mail services in my country are not performing will.		
102	ADD5	I would not use the e-Government services because I am afraid of losing personal document, since the current mail services do not perform well.		

E.2 Arabic version of the questions

	نية الاستخدام
1	التفاعل مع الحكومة عبر الإنترنت هو الشيء الذي أود فعله.
2	لن أتردد في تقديم معلوماتي الشخصية إلى المواقع الإلكترونية الحكومية للحصول على الخدمات.
3	أود استخدام شبكة الإنترنت لاسترجاع معلومات من الحكومة.
4	أود استخدام شبكة الإنترنت للاستفسار عن الخدمات الحكومية.
5	من المحتمل أن استخدم شبكة الإنترنت في المعاملات المالية مع الحكومة في المستقبل القريب.
	الجاهزية الالكترونية
6	البنية التحتية المادية في المملكة العربية السعودية تكفي للتأثير في نية المواطن في اعتماد الحكومة الإلكترونية.
7	القدرات البشرية , بما فيها محو الأمية ، ومستوى مهارة تكنولوجيا المعلومات والاتصالات والتدريب المهني , تؤثر في نية المواطن في اعتماد الحكومة الإلكترونية
8	تتأثرُ نية المواطن سلبا ؛ لأن البيئة القانونية والتنظيمية المؤثرة في قطاع تكنولوجيا المعلومات والاتصالات واستخدام تكنولوجيا المعلومات والاتصالات ، بما في ذلك سياسة الاتصالات السلكية واللاسلكية، وحماية وخصوصية المستهلك غير مستقرة.
9	البنية التحتية لتكنولوجيا المعلومات والاتصالات في المملكة العربية السعودية عالية المستوى مما يساعد المواطن على اعتماد خدمات الحكومة الإلكترونية.
10	سرعة الاتصالات عبر الإنترنت تؤثر على نية المواطن في اعتماد خدمات الحكومة الإلكترونية.
	هدف الاستخدام
11	من المحتمل أن أستخدم الإنترنت لجمع المعلومات الحكومية.
12	من المحتمل أن أستخدم الخدمات الحكومية المقدمة عبر الإنترنت.
13	التفاعل مع الحكومة عبر الإنترنت شيء أود فعله.
14	لا أتردد في تقديم معلومات إلى موقع الحكومة للحصول على الخدمة.
15	من المحتمل أن أستخدم الإنترنت للاستفسار عن الخدمات الحكومية.
	استشفاف سهولة الاستخدام
16	تعلم التفاعل مع موقع الحكومة سهل بالنسبة لي.
17	أعتقد أن التفاعل مع الموقع الحكومي هو عملية واضحة ومفهومة.
18	أرى أن معظم المواقع الحكومية مرنة أثناء التعامل معها.
19	من السهل بالنسبة لي أن أصبح ماهرا في استخدام المواقع الحكومية.
20	أرى أن من الصعب التعامل مع المواقع الحكومية.
	استشفاف فوائد الاستخدام
21	تمكنني المواقع الحكومية من استكمال معاملات الخدمات عبر الإنترنت بسرعة أكبر.

22	اعتقد أن المواقع الحكومية تقدم لي خدمة قيمة.
23	محتوى المواقع الحكومية ليس مجديا بالنسبة لي.
24	المواقع الحكومية تعزز فاعليتي في البحث ، وتساعدني في استخدام خدمات الحكومة الإلكترونية.
25	أرى أن المواقع الحكومية مفيدة.
	الثقة في الانترنت
26	الإنترنت به ضمانات كافية تجعلني أشعر بالراحة عند استخدامه للتفاعل في الأعمال الشخصية مع الجهات الحكومية.
27	أشعر بالاطمئنان من أن الهياكل القانونية والتكنولوجية تحميني بشكل كاف من المشاكل على الإنترنت.
28	بصفة عامة، تعتبر شبكة الإنترنت الآن بيئة قوية وآمنة للتعامل مع الجهات الحكومية.
29	أنا على ثقة من أن البيانات التي أقدمها من خلال المواقع الحكومية لن يساء استخدامها وسيتم التعامل معها بسرية تامة.
	الثقة في الحكومة
30	أعتقد أنني يمكنني الوثوق بالجهات الحكومية.
31	يمكن الوثوق بالجهات الحكومية لتنفيذ المعاملات عبر الإنترنت بأمانة.
32	أنا على ثقة من أن الجهات الحكومية تضع مصلحتي فوق كل اعتبار.
33	أرى أن الجهات الحكومية جديرة بالثقة.
	الفوائد المرتقبة
34	استخدام شبكة الإنترنت يعزز كفاءتي في جمع المعلومات من الجهات الحكومية
35	استخدام شبكة الإنترنت يعزز كفاءتي في التفاعل مع الجهات الحكومية.
36	استخدام شبكة الإنترنت يجعل من السهل التفاعل مع الجهات الحكومية.
37	استخدام شبكة الإنترنت يعطيني المزيد من التحكم في تفاعلي مع الجهات الحكومية.
	التوافق
38	أعتقد أن استخدام الإنترنت يتناسب بشكل جيد مع الطريقة التي أحب أجمع بها المعلومات من الجهات الحكومية.
39	أعتقد أن استخدام الإنترنت يتناسب بشكل جيد مع الطريقة التي أحب أن أتفاعل بها مع الجهات الحكومية.
40	استخدام الإنترنت للتفاعل مع الجهات الحكومية يناسب أسلوب حياتي.
41	استخدام الإنترنت للتفاعل مع الجهات الحكومية غير متوافق مع طريقتي في القيام بأعمالي.
	نظرة المجتمع
42	مستخدمو الإنترنت لجمع المعلومات من الجهات الحكومية لديهم مكانة عالية.
43	مستخدمو الخدمات الحكومية على شبكة الإنترنت لديهم مكانة عالية.
44	الأشخاص الذين يجمعون المعلومات من الجهات الحكومية بإستخدام الإنترنت لديهم تأثير أكبر من الذين

	لا يقومون بذلك.
45	التفاعل مع الجهات الحكومية عبر الإنترنت يعزز الوضع الاجتماعي للفرد.
	مدى التعقيد
46	تعلم استخدام تطبيق الإنترنت للخدمات سهل بالنسبة لي.
47	أعتقد أنه من السهل علي الحصول على الإنترنت للقيام بما أريد فعله.
48	التفاعل مع شبكة الإنترنت لاستخدام خدمات الحكومة الإلكترونية واضح ومفهوم.
49	في المجمل ، أعتقد أن استخدام الإنترنت في خدمات الحكومة الإلكترونية أمرا سهلا.
	البنية التحتية الإلكترونية
50	الحكومة تقدم التسهيلات الكافية (مثل مراكز تكنولوجيا المعلومات والاتصالات، ومراكز الخدمة أو مقاهي الإنترنت) للوصول إلى خدمات الحكومة الإلكترونية.
51	لدي الموارد اللازمة لاستخدام خدمات الحكومة الإلكترونية في المنزل (مثل توفر الكمبيوتر والإنترنت).
52	لدي الموارد اللازمة لاستخدام خدمات الحكومة الإلكترونية في العمل (مثل توفر الكمبيوتر والإنترنت).
	الوعي
53	لدي المعرفة الكافية لاستخدام خدمات الحكومة الإلكترونية (كالمهارات اللازمة لاستخدام خدمات الحكومة الإلكترونية).
54	الحكومة تفي بمسؤوليتها لتوعية الناس وتثقيفهم حول وجود خدمات الحكومة الإلكترونية.
55	الحكومة تعطي التدريب للمواطنين لتحقيق أفضل استفادة ممكنة من الخدمات عبر الإنترنت.
	التأثر بالعادات والتقاليد
56	من لهم تأثير على سلوكي يعتقدون أنني يجب أن استخدم الخدمات عبر الإنترنت.
57	المهمون عندي يعتقدون أنني يجب أن استخدم خدمات الحكومة الإلكترونية.
58	إنني استخدم النظام بسبب نسبة زملاء العمل الذين يستخدمون خدمات الانترنت.
59	استخدم الخدمات عبر الإنترنت فقط إذا كنت بحاجة إليها.
60	استخدم الخدمات عبر الإنترنت إذا استخدمها أصدقائي.
	الخصوصية
61	يستخدم الناس خدمات الحكومة الإلكترونية إذا كان لديهم عنوان دائم.
62	يستخدم الناس خدمات الحكومة الإلكترونية إذا كان لديهم عنوان واضح ومعتمد.
63	ليس هناك قناة اتصال آمنة بين الشعب والحكومة.
64	خدمات البريد في المملكة العربية السعودية ليست جيدة الأداء.
65	لن يستخدم الناس خدمات الحكومة الإلكترونية ؛ لأنهم يخشون من فقدان وثيقة شخصية ، حيث أن خدمات البريد الحالي غير جيدة الأداء.
	جودة الخدمات

66	خدمات الحكومة الإلكترونية تمكنني من الوصول إلى المعلومات الحكومية عندما أكون في حاجة إليها، أي 7/24 كل يوم.
67	خدمات الحكومة الإلكترونية أكثر ثقة في التعامل من الطريقة التقليدية في التعامل مع الحكومة.
68	خدمات الحكومة الإلكترونية قادرة على الاستجابة لاحتياجات المواطنين بسرعة.
69	خدمات الحكومة الإلكترونية توفر المعلومات الدقيقة التي تحتاج إليها.
70	خدمات الحكومة الإلكترونية توفر أحدث المعلومات.
71	يمكن الوصول إلى محتويات خدمات الحكومة الإلكترونية بسهولة عبر موقع الحكومة الإلكترونية.
	الاحترافية في انشاء بوابات الخدمات الالكترونية
72	دعم اللغات المحلية على مواقع الحكومة الإلكترونية تعتبر مفيدة لفهم محتويات الخدمة.
73	توفير دعم اللغة على موقع الحكومة يشجع المزيد من المستخدمين لاستخدام خدمات الحكومة الإلكترونية.
74	دعم الموقع الحكومي باللغات المختلفة (مثل اللغة المحلية ، الإنجليزية ، الفرنسية ، الصينية) تؤثر في نية المستخدمين إيجابيا لاستخدام خدمات الحكومة الإلكترونية.
75	أثق في استخدام المواقع الحكومية التي صممت على نحو كاف لتلبية احتياجاتي.
76	يجب على مواقع الحكومة الإلكترونية تقديم المعلومات بطريقة سهلة ومفهومة.
77	يوفر موقع الحكومة الالكترونية الوصول إلى الإنترنت طوال الوقت؛ في اي وقت و في اي مكان..
78	توفير الدعم للمستخدمين ذوي الإعاقات يشجع المزيد من الناس على استخدام الخدمات عبر الإنترنت.
79	يمكنني بسهولة استخدام خدمات الحكومة الإلكترونية في أي وقت وفي أي مكان.
80	جعل موقع الحكومة الإلكترونية صالحا للاستعمال يؤثر على نية المواطن بشكل إيجابي.
	الامن الالكتروني
81	قد تستخدم معلوماتي الشخصية بطريقة غير مقصودة من قبل الجهة الحكومية.
82	يمكن انتزاع معلوماتي الشخصية بينما أرسل المعلومات إلى الموقع الحكومي على الانترنت.
83	أشعر أن الأمر غير آمن للتعامل مع خدمة الحكومة الإلكترونية.
84	عادة تؤكد الحكومة على أن معلومات المعاملات على الانترنت محمية من تغييرها أو إتلافها بطريق الخطأ أثناء إرسالها على الإنترنت.
85	بصفة عامة ، أعتقد أن استخدام الخدمات الحكومية عبر الإنترنت أمر محفوف بالمخاطر.
86	أشعر أن المخاطر تفوق الفوائد في استخدام خدمة الحكومة الإلكترونية.
	المعرفة والمهارات
87	لدي مهارات جيدة وخبرات باستخدام الإنترنت.
88	من السهل بالنسبة لي التنقل داخل المواقع العامة دون مهارات استخدام الإنترنت أو الكمبيوتر.
89	ليس من السهل بالنسبة لي أن أفهم وأعي فوائد الإنترنت بدون المهارات المطلوبة لاستخدامه.
90	لدي مهارات الانترنت والكمبيوتر التي تمكنني من التنقل داخل المواقع لاستخدام الخدمات الإلكترونية

Appendix E

	المختلفة.
91	وجود مهارات الانترنت والكمبيوتر يحسن تفاعلي مع الحكومة على الانترنت من خلال استخدام مواقع الحكومة الإلكترونية المختلفة.
92	الفئة العمرية 18-40 هم أكثر احتمالا لاستخدام خدمات الحكومة الإلكترونية.
93	الفئة العمرية 18-40 لديهم ما يكفي من المعرفة والمهارات اللازمة لاستخدام خدمات الحكومة الإلكترونية.
94	المستخدمين ذوي المستوى العالي من التعليم هم أكثر احتمالا لاستخدام خدمات الحكومة الإلكترونية.
95	الفئة العمرية 18-30 تم تعليمهم وتزويدهم بالمعلومات ومهارات الكمبيوتر.
96	جنس المستخدمين يقيد عزمهم على استخدام خدمات الحكومة الإلكترونية.
97	جنس المستخدمين يزيد أعدادهم في استخدام الخدمات عبر الإنترنت.
	خدمات البريد الحالية
98	الاحترافية في انشاء بوابات الخدمات الالكترونية
99	دعم اللغات المحلية على مواقع الحكومة الإلكترونية تعتبر مفيدة لفهم محتويات الخدمة.
100	توفير دعم اللغة على موقع الحكومة يشجع المزيد من المستخدمين لاستخدام خدمات الحكومة الإلكترونية.
101	دعم الموقع الحكومي باللغات المختلفة (مثل اللغة المحلية ، الإنجليزية ، الفرنسية ، الصينية) تؤثر في نية المستخدمين إيجابيا لاستخدام خدمات الحكومة الإلكترونية.
102	أثق في استخدام المواقع الحكومية التي صممت على نحو كاف لتلبية احتياجاتي.

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