2017

Use of a modified UTAUT model to investigate Emirati Citizens' adoption of e-Government in Abu Dhabi

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UNIVERSITY
OF WOLLONGONG
IN DUBAI

Use of a Modified UTAUT Model to Investigate Emirati Citizens' Adoption of e-Government in Abu Dhabi

A Thesis submitted in partial fulfilment of the
requirements for the award of the degree of

Doctorate of Business Administration

from

UNIVERSITY OF WOLLONGONG

By

Khaled Ahmed Al Mansoori, MBA

Faculty of Business

2017

CERTIFICATION

I, Khaled Ahmed Al Mansoori, declare that this thesis, submitted in partial fulfilment of the requirements for the award of Doctorate of Business Administration, in the Faculty of Business, University of Wollongong in Dubai, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Khaled Ahmed Al Mansoori

16 November 2016

بسم الله الرحمن الرحيم

Abstract

The advent of information and communication technology (ICT) into many domains of public administration has accelerated the shift from traditional work to more ICT-based work in governmental departments. This new paradigm has paved the way for the implementation of e-Government initiatives and enhanced the efficiency, effectiveness, quality, speed, and accessibility of their public services. However, no specific model of e-Government has been universally accepted. There are various reasons for this, including socio-cultural norms, economic, and political factors that may affect the design of the system, and citizens' decision to adopt e-Government models. As a result, it is important that we investigate the factors that affect the adoption of e-Government services in developing countries that have recently undergone a transition to the information society, such as the United Arab Emirates (UAE).

This study probes the factors that social theories argue play a key role in motivating citizens to adopt the online public services provided by the Government of the Abu Dhabi Emirate as part of its e-Government initiative. The Modified Unified Theory of Acceptance and Use of Technology (UTAUT) model was used to detect adoption and acceptance of e-Government services. UTAUT model has been extended by including Government trust and Internet trust as both those concepts of trust are considered to be key components of any improvement in public management.

The study used an online questionnaire to survey citizens from heterogeneous groups of the Abu Dhabi population. To test this model, the questionnaire consisted of 41 questions sent by email to these groups to assess their intent to use e-Government services and their actual use of various and selected e-services; 638 respondents returned complete and usable questionnaires. The collected data was quantitatively analysed using regression and SEM. The results recorded statistically strong evidence for highly significant positive correlations between behavioral intention to

use e-Government services and the independent variables, performance expectancy, effort expectancy, facilitating conditions, trust in the internet, and trust in e-Government. However, the effect of social influence on behavioral intention is not found to be significant. Further, facilitating conditions do not significantly affect the use of e-Government services.

Gender as a moderating factor was found to impact the relationships between effort expectancy and behavioural intention whereas the other moderating factors (age, experience and education) did not affect the relationship. Age as a moderating factor has an impact on performance expectancy and behavioural intention, whereas the other moderating factors (gender, experience, and education) did not affect the relationship. Finally, experience impacts the relationship between facilitating conditions and behavioural intention whereas the other moderating factors (gender, age, and education) did not affect the relationship.

The researcher argues that the realization of e-Government benefits depends largely and critically on citizens' satisfaction with their experience and continuing use of e-Government services. Further research is required to expand the demographic and geographic scope of this study to better unpack the influence of moderating factors, such as gender, age, experience, and education.

Keywords: e-Government initiative, e-public services, human interaction, trust, adoption, unified theory of acceptance and use of technology, UTAUT, Abu Dhabi Emirate, the UAE.

Acknowledgement

First, I greatly thank **Allah** *the Mighty* for giving me the ability, patience and motivation to undertake and complete my DBA degree successfully. Special sincere thanks are due to my principal supervisor, **Dr**. **Jawahitha Sarabdeen**, for her unlimited support, efforts and knowledge. Without her encouragement and support, I would never have completed this research. Grateful appreciation is given my second supervisor **Dr. Abdellatif Tchantchane** for his keen and thoughtful advices, as he was always ready to help me. I would like to thank many people and friends who sharing me the interest of my study topic and assisted with their comments and recommendations during the course of my doctorate study. I also want to thank **Dr. Panagiotis Ganotakis** for his advice during the last stages of the writing up. Finally, and most importantly, my gratitude goes to my both mega and small families for always supporting me with words of encouragement, patience and standing by me during very hectic and stressful times that were endured whilst undertaking this research.

Dedication

To my beloved country, the UAE I proud to belong to

To my beloved parents and family

Table of Contents

List of Tables

List of Figures

Abbreviations and Acronyms

The following abbreviations and acronyms used this thesis

24/7	Twenty-four hours per week
AUT	Attitude toward Using Technology
B2B	Business-to-Business
B2C	Business-to-Consumer
C2C	Consumer-to-Consumer
DOI	Diffusion of Innovations
e-Government	Electronic Government
G2B	Government-to-Business
G2E	Government-to-Employees
G2C	Government-to-Citizens
G2G	Government-to-Government
GDP	Gross Domestic Product
ICT	Information and Communication Technology
MM	Motivational Model
MPCU	Model of PC Utilisation
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
SCT	Social Cognitive Theory
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action

Chapter 1: Introduction

1.1. Overview

E-Government is a new trend in Abu Dhabi's public management sector. It is rapidly expanding as evidenced by a phenomenal rise in the number of services provided by the Abu Dhabi Government since the UAE Government announced its Vision 2021 (UAE Vision 2021, 2015). The Abu Dhabi Emirate, like many advanced cities around the globe, is implementing e-Government reforms with the aim of providing quality public services to its citizens at minimal cost. This decision comes at a time when the e-Government initiatives are best known for the effective and efficient part they play in the management of public services. The Government ultimately wants to implement a holistic strategy which encompasses all Government processes and personnel, focusing on efficiency while keeping in mind the needs of its end-users (ADSIC, 2014).

The Government has already embarked on an extensive review of its processes and structures. Many services are being delivered electronically through e-Government initiatives and departments are being streamlined, with non-core services outsourced to the private sector (The Abu Dhabi Economic Vision 2030, 2008). In this research, an effort has been made to provide a holistic description of various aspects of e-Government and its adoption. This study investigates the factors affecting the adoption of e-Government services by Emirati citizens. This chapter outlines the research problem, together with the present research aims and questions.

1.2. Statement of the Problem

The Vision 2021 declares the Government's intention to build a strong ICT-based infrastructure for the delivery of quality services through e-Government. At the heart of Abu Dhabi's e-Government strategy lies the objective of encouraging its citizens to switch to the use of online public services as delivered by various departments. This plan comes at a time when people are already living in the digital era and have multifaceted preferences. However, when individuals are asked to choose whether or not to use e-Government services, it is difficult to foresee what they will decide. In other words, one cannot tell which factors will persuade them to adopt the e-services delivered by the Government (ADSIC, 2014).

This study explores the factors that impact citizens' adoption of Abu Dhabi's e-Government services. It is crucial to explore such factors, because the resulting insights will help Government leaders to plan and effectively deliver public services as e-Government services. The practical contribution of this study is that it highlights the factors that the local Government should focus on to increase the proportion of citizens that are inclined to use an online e-services platform by planning and executing an effective platform for conveniently delivering a bundle of e-public services.

1.3. Background

"E-Government refers to the use by Government agencies of information technologies (such as wide area networks, the internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of Government. These technologies can serve a variety of different ends: better delivery of Government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient

Government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions" (world bank http://go.worldbank.org/m1jhe0z280).

The transformation from traditional means of reaching citizens to the e-Government paradigm is one of the major objectives of local Governments around the world. The arab states, including the Abu Dhabi Emirate, are no exception in shifting to an e-Government approach. E-Government allows Governmental departments to provide quality services at all times extending beyond the physical premises of Government offices and beyond standard operating hours. In theory, these e-Government services can be delivered promptly, effectively and efficiently, by using advanced Information and Communication Technologies (ICT).

The Abu Dhabi Emirate has paved its own way for introducing and implementing advances to its administrative effort which best promote its aim of being a citizen-centred Government. In order to achieve its objectives and to offer its citizens what they deserve in the digital age, the Abu Dhabi Government, represented by the Abu Dhabi Executive Council, has allocated the necessary financial, technological, and human resources needed to attain these objectives. Implementing efficient and cost-effective e-Government services requires an advanced, reliable, and secure ICT infrastructure at its core to facilitate a smooth transition. The Abu Dhabi e-Government initiative is expected to deliver a variety of e-services in an up-to-date manner that satisfies its citizens and maintains the necessary interaction between the Government and civil society (ADXC, 2016).

"In late 2005, the Abu Dhabi Government – under the leadership of His Highness Sheikh Mohammed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi, Deputy Supreme Commander of the UAE Armed Forces and Chairman of the Abu Dhabi Executive Council – began to work on a far-reaching service transformation programme that transcends all Government departments, authorities, and

administrations. This programme strives to make the Abu Dhabi Government more effective and efficient in delivering modern services to its diverse customer base along a multitude of delivery channels" (ADSIC, 2014).

By May 2015, the Abu Dhabi Government was offering more than 420 e-services through 44 apps and 30 Government entities. These services range from the City Guard initiative, which enables citizens to report cases and incidents to the contact center via a smart phone app, to the e-Citizen programme which seeks to increase computer literacy amongst citizens. In July 2015, the Government was awarded the first-ever "Smart Government Award" by the Environmental Systems Research Institute (ESRI) User Conference, held in San Diego, California, for its Spatial Data Infrastructure.

The Abu Dhabi Government approach was not exceptional. Many Governments in both developing and developed countries have been searching for appropriate solutions to gain better public management. The potential to apply ICT to public management was of interest to many Governments as a means of introducing innovative access and delivery systems for citizen-oriented services to a wide spectrum of community groups. The impact of this system increases as the number of people that adopt and use the available e-Government-assisted services also increases (Streib & Navarro, 2006). Therefore, the citizen-centred initiatives of e-Government are always best implemented and analysed when the plans of any national Government are internalized by its citizens (Rana & Dwivedi, 2015).

To ensure a better fit to the local context, a modification of the UTAUT model is proposed to achieve the objectives of this research. This is based on insights obtained while reviewing the recent scholarly literature on citizen-focused e-Government approaches. Two variables have been added to the original UTAUT model, namely, i) e-Government trust, and ii) Internet trust. Trust has not been investigated in the

literature in relation to the UTAUT model in the context of the Abu Dhabi Emirate (further details regarding the modified model are discussed in chapter five).

The study also compares the adoption of existing e-Government services in the Abu Dhabi Emirate with nations in the Arabian Gulf Cooperation Council (GCC). This was achieved by emphasizing and exploring the factors that may be involved in promoting the acceptance and adoption of e-Government services in the context of Abu Dhabi. The comparison may help to explain the key determinants of citizen adoption, even though every nation, even in a fairly small geographical area such as the GCC, varies from others in many ways.

1.4. Objectives and Significance of the Study

Little is known about the effectiveness of the Abu Dhabi e-Government model and how citizens respond to it. Hence, the purpose of this study is to investigate the possible factors that may influence the adoption of e-Government services, and how the citizens have reacted to the use of e-services. Because the formation and implementation of e-Government is relatively new, the research seeks to answer questions about the impact of e-Government in the Emirate of Abu Dhabi. The ultimate goal of the study is to provide thoughtful and useful guidelines for supporting and implementing better e-Government plans, and encouraging the end-users to continue to use the e-Government services.

The literature reveals that there are two aspects of trust. *First*, the user must trust the entity that provides the needed services (i.e., Government). *Secondly*, the user must also equally trust the channel through which the service is provided remotely (e.g., the internet) (Tan & Theon, 2001). In this case, trust (which might be an abstract issue) is crucial in sustaining interest in the adoption process (Carter & Belanger 2005; Pavlou 2003). Thus, trust is added as a variable in this study.

1.5. Research Questions

The main research questions posed in this study are:

1. What are the main factors that affect the use of e-Government services by the citizens of Abu Dhabi?
    a. To what extent can Government trust and Internet trust increase e-Government adoption?
    b. Can the gender, age, education, and experience of potential users moderate the relationship between the constructs suggested by the modified UTAUT model and e-Government adoption?
2. How effective is the modified UTAUT model as a tool for evaluating the use of e-Government services by Abu Dhabi citizens?

The researcher has considered a range of models to answer these research questions. Therefore, the UTAUT model has been selected as the best model that could be adjusted and applied to Abu Dhabi's e-Government context. The research come with 24 hypotheses related to the research questions were proposed derived from a modified Unified Theory of Acceptance and Use of Technology (UTAUT).

1.6. Practical Contributions

Following a review of recent academic literature on the application of the UTAUT model, the researcher was motivated to adopt the study's revised model. Given its nature, the adoption and modification of UTAUT is highly desirable because the theory helps to explain the contemporary phenomenon of e-Government adoption. Indeed, the adopted model focuses on the factors that might encourage the Emirati citizens of the Abu Dhabi Emirate to use the bundle of public e-services provided through e-Government. Therefore, the researcher argues:

- *Firstly*, the present study focuses on expanding the body of knowledge about e-Government in Abu Dhabi. As E-Government implementation is new to the

Abu Dhabi Emirate, this research could guide Abu Dhabi's e-Government planners to consider the factors that help in achieving successful e-Government adoption. In this exercise, lessons could be learned from other countries that incorporated those successful factors. This could maximize the e-Government returns on ICT infrastructure investments and provide efficient services.

- *Secondly*, the findings of the research should advance our understanding of e-Government adoption among Abu Dhabi's citizens and are intended to guide policymakers in particular, and academics in general, to better replicate and execute a model of e-Governance which is academically informed and based on public acceptance.

- *Thirdly*, the research is the first of its kind in this context and it is hoped that it will contribute to filling the current gap in the literature on the evolving field of e-Government. As far as the author is aware, there are hardly any studies publicly available that document what influences citizens in Abu Dhabi to adopt e-Government services. Although other researchers such as Rodrigues et al. 2016 and Al-Zaabi 2013 had conducted related research however, the context of the current research is different.

1.7. Theoretical Contributions

The UTAUT model provides a framework that explains why people use e-Government services (Slade et al., 2015). As previously noted, the model is widely used in exploratory studies concerning public adoption attitudes. The major theoretical contribution of the study is that the researcher modified the UTAUT to suit a new context. That is, the modified UTAUT model is applied to the e-Government initiative proposed by the Abu Dhabi Emirate. The study adopts eight main hypotheses and 16 moderating hypotheses from the original model that was

introduced by Venkatesh et al. (2003). These hypotheses have been incorporated into the study to examine the modified UTAUT model in the current context.

The UTAUT model is well suited to address most of the identified gaps because they are influenced by people's socio-demographic characteristics. It has eight constructs (performance expectancy, effort expectancy, social influence, facilitating conditions, behavioural intention, perceived use of e-government, e-government trust, and internet trust) outlining the factors that influence people's adoption practices. Government trust and the Internet trust were added to the modified UTAUT because trust is considered to be one of the key components of any improvement in public management (Horsburgh et al., 2011). Furthermore, the researcher considered other moderation variables, such as gender, age, experience, and education which could help to fill some theoretical gaps in existing theory on e-Government adoption.

The study also conducted a test on the generalizability of the modified UTAUT model at both organizational and citizen level (i.e., in e-Government use). In the past, studies that used the UTAUT have investigated the phenomenon in organizational contexts where performance expectancy was the main driver of intentions and behaviours connected with technology use. However, the nature of citizens' acceptance of technology in the e-Government context is still largely unexplored. Hence, this study takes note of the theoretical literature relating to e-Government, and addresses such questions as how effective the modified UTAUT model is as a means of evaluating citizens' adoption of e-Government services. The original constructs contained in the UTAUT model have been amended to better fit the e-Government sector and the Abu Dhabi context. The present study thus provides an extension of the UTAUT model that could be used in developing countries such as the UAE.

1.8. Model Construct and Hypothesis

Using the UTAUT model as a starting point, this study seeks to develop a conceptual model for the adoption of e-Government services in the Abu Dhabi Emirate. The model contains four moderating variables (age, gender, experience, and education) that are anticipated will have an effect upon the direct variables. On this basis, the researcher developed the theoretical model to include the following proposed variables:

- Dependent variables: Behavioural Intention and Perceived use of e-Government.
- Independent variables: Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, e-Government Trust and Internet Trust.
- Moderator variables: Gender, Age, Computer Experience and Education.

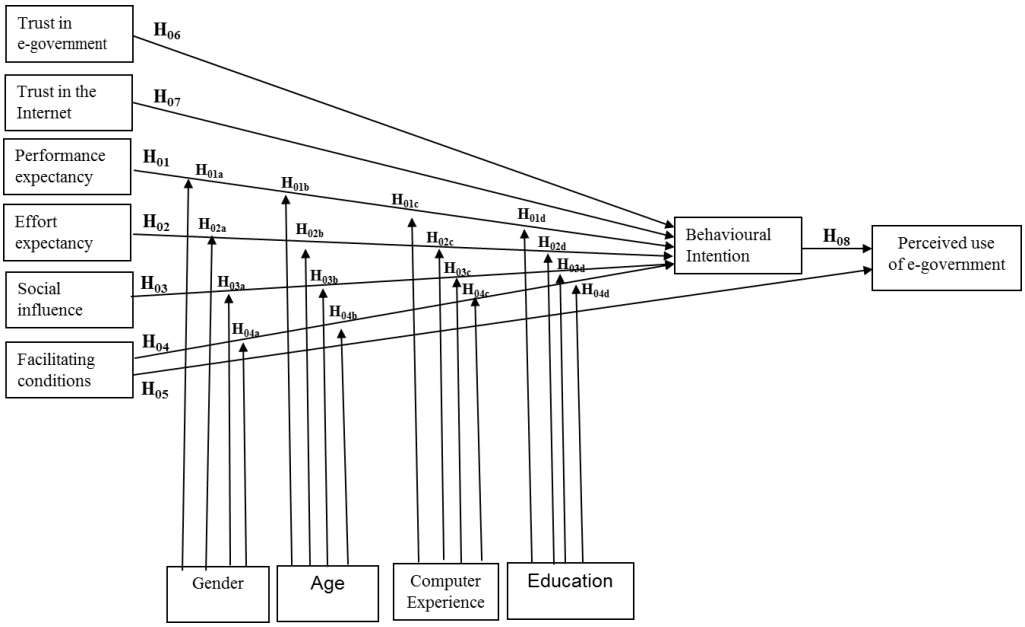


Figure 1.1 illustrates the modified schema of UTAUT hypotheses

The research hypotheses are the following:

H1: Performance expectancy will have a positive influence on behavioural intention to use e-Government services.

H1a: Gender differences positively moderates the relationship between Performance Expectancy and Behavioural Intention.

H1b: Age positively moderates the relationship between performance expectancy and behavioural intention.

H1c: Experience positively moderates the relationship between performance expectancy and behavioural intention.

H1d: Education level positively moderated the relationship between performance expectancy and behavioural intention.

H2: Effort expectancy will have positive influence on behavioural intention to use e-Government services**.**

H2a: Gender differences positively moderates the relationship between effect of Effort Expectancy and Behavioural Intention.

H2b: Age positively moderates the relationship between effect of effort expectancy and behavioural intention.

H2c: Experience positively moderates the relationship between effect of Effort Expectancy and Behavioural Intention.

H2d: Education level positively moderated the relationship between effect of effort expectancy and behavioural intention.

H3: Social influence will have a positive influence on behavioural intention to use e-Government services.

H3a: Gender differences positively moderates the relationship between Social Influence and Behavioural Intention.

H3b: Age positively moderates the relationship between social influence and behavioural intention.

H3c: Experience positively moderates the relationship between Social Influence and Behavioural Intention.

H3d: Education level positively moderated the relationship between social influence and behavioural intention.

H4: Facilitating conditions will have a positive influence on behavioural intention to use e-Government services.

H4a: Gender differences positively moderates the relationship between Facilitating Conditions and behavioural intention.

H4b: Age positively moderates the relationship between facilitating conditions and behavioural intention.

H4c: Experience positively moderates the relationship between facilitating conditions and behavioural intention.

H4d: Education level positively moderated the relationship between facilitating conditions and behavioural intention.

H5: Facilitating conditions will have a positive influence on perceived use of e-Government services.

H6: Trust in the government will have a positive influence on behavioural intention.

H7: Trust in the Internet will have a positive influence on behavioural intention.

H8: Behavioural intention to use e-Government services will have a positive influence on the perceived use of e-Government.

1.9. Outline of the Study

The study has nine chapters. This initial chapter sets the overall context in which the study was undertaken and the purpose of the research. It sets out the background to the research and presents the problem statement as well as the research questions and the contributions that could flow from the study. The introductory chapter also outlines the various hypotheses tested in the research.

Chapter Two sets out in more detail the history of the e-Government strategy and its implementation in the Abu Dhabi Emirate. The chapter also describes the physical geography and demographic features of the Emirate, which are important to

consider in relation to the moderating variables discussed later in the study. The various challenges experienced by the Abu Dhabi e-Government project are discussed and its successes and failures highlighted. The chapter also discusses the technological infrastructure that has been put in place to deliver e-Government services. The development of the e-Government web portal and the selection of various public services that could be delivered electronically are further discussed. Additionally, citizens' attitudes towards e-Government services, as expressed through a survey, are explored.

Chapter Three contains a review of the literature related to this research topic. It includes a discussion of the broader e-Government environment and the various forms of e-Government that exist, including peer e-Government (G2G), business focused e-Government (G2B) and the form of e-Government which functions as the nexus of this research, citizen focused e-Government (G2C). The actual needs and expectations of citizens in relation to e-Government are explored and the various factors that could influence different segments of the community are identified. The key factors (e.g., trust) that could pave the way to successful e-Government implementation and adoption are studied.

Chapter Four presents the key theories and models that deal with the acceptance of technology and the adoption of a paradigm. It reviews theories and models including the Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), Theory of Reasoned Action (TRA), Diffusion of Innovation Theory (DOI), Unified Theory of Acceptance, and Use of Technology (UTAUT), Model of PC Utilization (MPCU), and the Motivated Model (MM). The chapter explores whether these theories are appropriate for assessing e-Government adoption and use and explains why the UTAUT model was chosen for this research.

Chapter Five then sets out the proposed research questions and related hypotheses that drive the investigation of the effects of the ten independent variables

(performance expectancy, effort expectancy, social influence, facilitating conditions, e-Government Trust, and Internet Trust and moderators Age, Gender, Experience, and Education level), upon the two dependent variables (i.e., Behavioural Intention and perceived use of e-Government).

Chapter Six sets out the research methodology that has been adopted, including the philosophical basis of the choice of research methodology. The chapter includes an overview of the data collection method, sampling technique, sample size, response rate, validity and reliability tests. It also introduces the quantitative analytical approach (Regression, SEM). It further discusses the important considerations of ethics and research integrity.

Chapter Seven lays out the findings from the quantitative analysis of the collected data. A multi-regression analysis test was carried out for hypotheses H1 to H4 as well as H6, and H7 (i.e., performance expectancy, effort expectancy, social influence, facilitating conditions, e-Government Trust, and Internet Trust) against the dependent variable (i.e., behavioural intention). Another multi-regression analysis test was carried out for hypotheses H5 and H8 (i.e., behavioural intention and facilitating conditions) against the dependent variable (i.e., e-Government use). The moderators (i.e., gender, age, experience, and education) were tested to describe how they moderated between the independent and dependent variables.

Chapter Eight presents and interprets the findings from the data analysis. The findings are considered in relation to similar findings from other studies in this field. While not all the hypotheses are supported by the evidence, there is general agreement between these findings and the findings of well-respected researchers (e.g., Ajzen, 1991; Sun & Zhang, 2006; Venkatesh et al., 2003, etc).

Chapter Nine concludes the study by considering what recommendations can be made on the basis of the findings, including practical and policy recommendations to the Abu Dhabi Government to help overcome some of the challenges in attracting

and retaining e-Government users. It also suggests potential research areas for future study which could help sustain the use of e-Government, in particular, in the developing world.

1.10 Conclusion

In summary, this research uses a modified version of the UTAUT model to explore the factors that might influence the adoption and use of e-Government services in the Abu Dhabi Emirate. Practically, the research is designed to provide insights into citizens' attitudes to public e-services which could assist the Abu Dhabi Government in promoting and sustaining the use of these services. The research also seeks to extend the theoretical basis for research in this area, and contribute to the growing knowledge base, in particular in the context of developing countries.

Chapter 2: e-Government in the Emirate of Abu Dhabi

"E-Government and innovation can provide significant opportunities to transform information and public services to the people" (global e-government readiness report, 2004).

The Global e-Government Readiness Report of 2014 defined e-Government as "the use of Information and Communication Technology (ICT) and its application by the Government for the provision of information and public services to the people" (UN Report 2014). E-Government is generally defined as the use of ICTs to improve the delivery of public services; enhance information and data management; make working practices more effective and efficient; improve the provision of public services; and provide better channels of communication to optimize user engagement.

E-Government is a valuable tool in a Government's quest to introduce greener policies and better manage its natural resources, while simultaneously encouraging economic development and the inclusion and empowerment of citizens and potentially marginalized groups. Furthermore, ICTs allow the sharing of knowledge and development of skills. New ideas for the improvement of governance and infrastructure can easily be communicated to permit sustainable international development. E-Government can also bring significant benefits to the fields of employment, health, and education. (UN Report 2014).

2.1. Introduction

This chapter specifically considers the case of the UAE, focusing on the Emirate of Abu Dhabi, which, like many countries around the globe, has introduced e-Government with the aim of cutting the costs of providing services whilst making them more easily accessible, effective, and efficient. It presents a concise case study of the Emirate of Abu Dhabi which will demonstrate the importance of e-

Government; highlight the initiatives undertaken in implementing e-Government; provide key geographic and demographic data to illustrate the environment in which the new e-services function; and discuss the principal challenges faced by citizens in adopting and benefiting from them.

Although many countries have implemented e-Government, no one standard model or system has been devised. Each country must tailor e-Government to its own specific economic, cultural, political, and social needs (Al-Zaabi, 2013). Given that many e-Government initiatives have been made across the globe, the aim of this research is not to come up with a new government e-service; rather, it is to identify how e-Government services may be implemented in Abu Dhabi government departments in the most effective and efficient way, as well as to investigate the factors that motivate the emirati citizens to adopt the provided e-Government services.

2.2 Developing Countries and e-Government Challenges

One of the main advantages brought by the Information and Communication Technology (ICT) revolution in the past two decades was its making possible the digitised and technological dependence upon which everyday activities are increasingly based. Moreover, such welcomed dependency motivated old-fashioned Governmental to introduce innovative tools and approaches into a cost-effective system, which is highly responsive to the needs of the end-users. Many countries such as the United Kingdom (Hariri, 2014), Spain (Arenas et al., 2015), Saudi Arabia (Alsaif, 2013), Jordan (Aldajani, 2011), and UAE (Al-Zaabi, 2013) proposed initiatives to modernise the Government's public departments by using ICT, and modified their models of public administration to hasten the transformation of the paradigm into one that interacted with its citizens. Thus, ICT has assisted in developing "ICT-rich Government", commonly known as "e-Government", to

deliver its entire public services through the Web, and also to become more transparent, accountable and effective (Holden et al., 2003).

Many developing countries have shown a keen interest in e-Government in a bid to raise their citizens' living standards (Martínez-Frías, 2003; Al-Zaabi, 2013). Among those currently trying to introduce e-Government to streamline, improve and cut costs on their services are the Governments of the UAE, other GCC countries, Jordan and Egypt. (Al-jaghoub and Westrup, 2003; El Sayed and Westrup, 2003; Basu, 2004; Zaied et al., 2007; Kettani et al., 2008; Al-Shafi and Weerakkody, 2009; Al-Zaabi, 2013).

Not all of these initiatives, however, have had a successful outcome. Developed countries tend to possess sophisticated infrastructures that meet their specific cultural needs (Mofleh et al., 2008), whereas developing countries often lack them. This renders the introduction of e-Government initiatives problematic, and has frequently been seen as the principal cause of their failure.

Failure to successfully implement e-Government has also been seen as evidence that citizens may not trust or be aware of the new processes, or may not have the skills and funds necessary to access them. Equally, they may resist change or simply be uninterested in what is being offered. (Al-Shafi and Weerakkody, 2007; Al-Zaabi, 2013). However, the refusal of citizens to engage with e-Government ('people failure') is not the only cause of failure; there may be deficiencies in the Government's implementation strategy or framework. Furthermore, the characteristics in developed countries which allow successful implementation and use may be absent or different in developing countries. Such complications are frequently ignored by policymakers in developing countries, who simply go ahead with e-Government models used in developed countries, with predictably problematic results. The present research also aims to identify whether this has been the case in the Emirate of Abu Dhabi.

Like developing countries, Arab countries have seen a low level of acceptance of e-Government services, mostly because of the project failures that have been witnessed in the majority of other countries. The challenges they face are mostly internal, relating to organisational change and the implementation of an e-Government initiative. While most people understand that change is inevitable, they nevertheless resist it. Resisting change occurs because of inadequate training in information technologies and ignorance of its benefits. Al-Khouri, (2011) conducted a study which concluded that the most critical stage in the adoption of technology is the transaction stage, because it is the ultimate objective in the e-Government integration process.

Project failure often starts in an early phase, and can continue to the transformation stage (Booty, 1998 , Altameem, 2007). The digital divide within a country is a huge challenge in Arab countries. Some areas that are technologically better positioned, mainly through greater literacy, easily implemented the e-Government project. Language has remained another challenge; where most of the content is Arabic and the domains are also in Arabic, it may be difficult for non-Arabic speakers to have complete access to all the information on websites.

Lack of public confidence in the ability of the Government to offer an online service is another major challenge when Government tries to increase the use of its e-Government services (Ambali, 2010). Other challenges include privacy and security of information against its use by unauthorized persons, and protecting the system from sabotage. In a recent conference (2013), Dr Al Khouri, the Director General of Emirates Identity Authority in the UAE, spoke exclusively about the need for a data protection law and emphasized the need to raise people's awareness by promoting educational programmes that help them to keep data private and deter online identity theft.

2.3 UAE and e-Government

The United Arab Emirates (UAE) Government sought to make improvements to its public sector organisations to raise the standards of electronic services (ADSIC, 2014). The United Nations reports an increase in e-Government services in the UAE between 2005 and 2012 from the rank of 42nd worldwide, with an e-Government development index of 0.571 in 2005, to 32nd in 2008, with an index of 0.734 (against a world average of 0.488) (UN, 2008). In 2012, the UAE had risen again to 28th in the world, and 5th in Asia (UN, 2012). Whilst these are impressive results, there is still potential for the UAE to attain leadership within Asia, the Middle East, or even globally.

When oil was discovered forty years ago, the UAE was formed from seven emirates and has since seen rapid development. In particular, 'ICT diffusion and usage … has been impressive in recent years' (Global Information Technology Report, 2009:22), and this has been crucial in the implementation of e-Government. However, e-Government in the UAE now has to confront cultural challenges, lack of experience among personnel and foot-dragging by both staff and citizens in various organisations (Hesson, 2007). The movement toward implementation of e-Government in the UAE has in recent years received the attention of the authorities and policy makers, acknowledging the necessity of utilising the new electronics, information, and communication technologies.

2.4. Abu Dhabi Emirate: Geography and Demography

The Abu Dhabi Emirate is the largest of the seven emirates that federated in 1972, comprising 80% of the total area of the UAE state. The Abu Dhabi Emirate is located on the north eastern side of the Arabian Gulf in the Arabian Peninsula, and is full of archaeological evidence pointing to civilizations dating back to the third millennium BCE. Over the past twenty years, it has witnessed rapid development in infrastructure and urbanisation, coupled with a relatively high average income for its

population. Such socio-economic welfare has transformed the Abu Dhabi Emirate cities into large and advanced metropolises, such as Abu Dhabi city and Al Ain (SCAD, 2013).

The Abu Dhabi Emirate is also rich in oil resources, an OPEC member, and has recently implemented its own approach to diversifying its economy by investing in advanced business areas. Today, the Emirate is the UAE's centre of political and industrial activities, and a major commercial and financial service centre, as well as a centre of cultural events and a destination for tourism (Department of Economic Development, 2013). Further, the Abu Dhabi Emirate is the capital of the UAE, and, after Dubai City, is the second most populous. It also houses the federal Governmental departments.

According to the 2012 census, the population of the Abu Dhabi Emirate was estimated to be about 2,334,563. The Emiratis represent about 20.4% (476,722) of the population, outnumbered greatly by foreigners at 79.6% (1,857,841). Thus, a key demographic feature of the Abu Dhabi Emirate population is a multi-ethno-cultural society dominated by Asian expatriates. However, the varying IT literacy and awareness of such a diverse population is a critical factor in adopting and using e-Government (SCAD, 2013).

2.5. The e-Government Paradigm in the UAE

E-Government is a vehicle for delivering enhanced e-public services to citizens. This has been a major attraction of e-Government, that is, as one way for Government to serve the public as it should (Phang et al., 2005). E-Government refers to the strategic application of ICT to "provide citizens and organisations with more convenient access to Government information and services; and delivery of public services to citizens, business partners and suppliers, and those working in the public sector" (Phang et al., 2005).

In a UN survey conducted in 2010, which ranked countries according to their implementation and use of e-Government, the UAE was ranked 49th. This index offers Governments a chance to examine their short and long term strategy, their policy and overall performance (Al-Khouri, 2011). The ranking of 49th tells the Abu Dhabi Emirate that it is on the path to achieving a transformation of its Government activities to meet international standards.

The e-readiness world indices compiled by the UN in 2005 and 2008 bear witness to the UAE's relatively advanced position and highlight the developments made in the three years between these surveys, when the UAE rose from 42nd to 32nd. The UAE leads the region in e-readiness, but has a considerable way to go if it is to number among the best-practice nations, a group which has hardly changed since 2005, although members have moved within it.

The present results also provide a major incentive to the Government to respond to challenges to the transformation, despite the difficulties inherent in its economy. Implementing e-Government was a landmark, not only for Abu Dhabi but also for the UAE in general, given its national struggle to find employment for citizens in private firms.

Services in the Emirates are benchmarked against the common stages of e-Government, namely, information, interaction, transaction, and transformation. The UAE Federal Government is still at the information stage in most of its Emirates, and faces challenges with inter-agency integration, although it is progressing fast. Abu Dhabi which leads in the innovations, has successfully achieved the information stage, and has progressed extensively in the interaction and transaction stages. The federal Government has gained growing momentum towards increased integration and shared services. In Abu Dhabi, the Ministry of Economy, and the Economic Information Centre created an electronic database to serve the fast moving industries

of tourism, commerce, investment, and agriculture, which constitutes its fundamental axis.

The UAE has actively taken a leading position in improving the effectiveness of its governance by advanced technologies. Its leaders have initiated several e-Government programmes with the aim of enabling the Government to make effective policies, deliver services and enhance good governance. Between 2011 and 2013, the Abu Dhabi Government focused on improving services (education, judiciary, healthcare, and Government services in particular) and bringing them up to international standard. It concentrated on continuous cooperation between the local authorities and the Government, and development of human resources in the civil service with competence, leadership training, and effective Emiratisation at its heart.

It has also focused on amending regulations to improve its decision making processes and mechanisms. Upgrading its services to emphasize customer needs and increasing efficiency in its Government bodies more is also a key focus, along with empowering all the ministries to manage their activities in line with joint and public policies.

The aim of the e-Government project is to give people access to a broad range of public information to help them update and apply for a wide range of official documents, such as social security and medical records. Formerly, the Government used the efficient delivery of policy outcomes and efficiency gained to drive its e-Government programme. Now, however, along with advances in the global ICT infrastructure, the Abu Dhabi Emirate Government is focused on increasing accountability, facilitating engagement and improving services. Therefore, the e-Government entity has been customised in line with the interests of the Abu Dhabi Emirate Government to shift the delivery pattern of its traditional public services to cyberspace-based services (ADSIC, 2014).

2.6. The ADSIC Entity and the e-Government Initiative

2.6.1. Introduction

Abu Dhabi is fully aware of the potential of ICT as an instrument of reform by which the country's Government entities (ADGEs) can update service provision and improve Government performance in general. This was reflected in an Executive Council decree set up the Abu Dhabi Systems & Information Committee (ADSIC) in 2005, which emphasised the Government's commitment to providing effective services. As one block in the foundation of an e-Government strategy and master plan, ADSIC was charged with developing an e-enablement strategy within the Emirate, and rolled out this strategy in partnership with the ADGEs. Law No. 18 was issued to this effect in December 2008 by Sheik Khalifa Bin Zayed Al Nahyan, ruler of Abu Dhabi (ADSIC, 2014).

The stated aim of the Government of Abu Dhabi is to become a "High Performance Government Delivering World Class Services to the Benefit of All Its Customers" (ADSIC, 2014). This involves the development of a holistic strategy which encompasses all Government processes and personnel, maintains a focus on efficiency, and keeps the needs of its end-users in mind. This strategy should, furthermore, learn from the most advanced international models. For this reason, adapting the three dimensional Environment Readiness Usage (E-R-U) framework to the particular characteristics of Abu Dhabi was considered appropriate (ADSIC, 2014).

Focusing on the experience of end users, particularly those with special needs, the Abu Dhabi e-Government strategy seeks to make all Government information more accessible. To this end, the Abu Dhabi Government Portal displays all its content in Arabic and English, with the possibility of additional languages in the future.

2.6.2. Abu Dhabi Government Portal Services

The Abu Dhabi e-Government strategy relies heavily on the Abu Dhabi Government Portal (www.abudhabi.ae), the country's most sophisticated channel in terms of content and delivery. The Government Portal brings together all the principal Governmental services, hosts channels such as the Abu Dhabi Contact Centre and is designed to be user friendly, offering users an easily and widely accessible route into the Usage portfolio. Set up like a normal gateway and enhanced by a 'no wrong door' logic, the Portal allows its users to access all Government services around the clock, every day of the week. Other means of accessing Abu Dhabi Government Entity services continue to be provided, but they must be accessible via the portal, which features links to all other Abu Dhabi Government websites.

When the Abu Dhabi Emirate Government set up the Abu Dhabi Systems and Information Centre (ADSIC) in 2005 as a body in charge of the ICT agenda and future roadmap, there was a general view that ADSIC would be able to lead the successful implementation and operation of the e-Government programme. The Government's major driver for promoting ICT was cost reduction, which it aimed to achieve by replacing paper based processes with Internet applications in order to cut down the costs of entering and checking data. It also aimed to improve booking arrangements in order to make the best use of skilled staff and use its scarce resources efficiently. Better data management and sharing within Governmental departments would eliminate multiple data reconciliation, collection, and checking. Moreover, online applications would greatly reduce the distribution of printed documents, reducing the costs of stationery, workers, and the maintenance of the administrative work (ADSIC, 2015).

However, ADSIC proposed its own vision, mission, and values in relation to the strategy for e-Government implementation and the online delivery of e-public services. The ADSIC vision is to serve "a high performance Government delivering world class services to the benefit of all its customers" and its mission is "to enable

the modernisation of Government services through information technology", while its values reflect the intention to work with competency, citizen-focused care, innovation-oriented excellence, respect for socio-cultural norms, sustainability, transparency, accountability, and teamwork spirit. The civic focus of ADSIC's vision, mission, and values has helped to develop and encourage citizens' adoption of the service (ADSIC,2015).

In other words, the programme empowered the Abu Dhabi Government to identify and clearly map out the needs of its population and better engage them. The programme's aim is to foster a collaborative Government that offers value driven, citizen driven, technology driven and economic or cost driven services. Citizen driven services involve shared governance, transparency, and the active participation of citizens. Value driven services involve better decision making, safety, security, and service provision. Technology driven services present a collaborative platform and tools for Government and the citizens.

2.6.3. Milestones of e-Government Implementation

The development of the Abu Dhabi e-Government initiative has passed various milestones, from an embryonic idea to a mature operating entity. The progressive phases of the e-Government implementation were proposed in 2006-2007 to include three still on-going parallel tracks: i) setting the environment, ii) readiness, and iii) use. The Environment phase started by promoting e-Government to administrative and business bodies, followed by the launch of an extensive e-literacy programme in 2008, and ending with the granting of awards for the best e-Government practices in 2009.

Simultaneously, the Readiness phase was initiated by designing a prototype of the e-Government web portal and enriching its contents and useful links. In 2008, Governmental bodies in the Abu Dhabi Emirate were connected, but not before the security of Governmental information and customers' transactions had been ensured.

In 2009, the web portal reached a stage where it contained almost all of the current e-public services and Governmental information for citizens and in December 2014, the Abu Dhabi Portal has successfully managed to provide around 4,500 pages of content concerning 101 departments and containing over 1,100 services. Out of 1,100 services over 50 are fully integrated e-Services that are provided via e-Government portal (ADSIC,2015b). Since then, the web portal contents have been continuously updated and customised. The Usage phase started with the e-public service of tagging real estate and producing an inventory of it (eLMS) in 2006-7, and in 2008, usage escalated due to the interest of business, educational, and private organizations in moving to ICT-based services. In 2009, e-services were extended to health and environmental protection services.

Furthermore, in 2014, ADSIC has paid particular attention to promoting e-literacy (ICT literacy), as well as raising public awareness through an e-Literacy and Capacity Building Programme detailing ways to access and use the web portal's contents (i.e., navigation, searching, and information retrieval) (ADSIC,2014). This programme largely aims to encourage citizens to abandon paper based services and choose digital ones. ADSIC conducted a strategic investigation to identify the population segments with the most pressing need and the greatest potential for e-Literacy and Capacity Building improvement. Five key population groups of ICT illiterates who could benefit most from the programme were identified:

- Government employees
- Housewives
- People with special needs
- Unemployed people
- Retirees

2.7. Achievements of the Abu Dhabi Government

One of Abu Dhabi's greatest successes is its geospatial information technology and services, regularly used by several Government departments as a framework for unlocking spatial innovation. The Emirate's Vision 2030 is to empower society and businesses, install spatial thinking and access spatial information and services with a view to sustainable development, encompassing infrastructure assets, health, and education. It is also concerned with maintaining the culture, heritage, and values of the Emirate, and ensuring domestic and international security. Through this innovation, the Government has successfully created a continuous knowledge based economy, power for the private sector, and a transparent regulatory environment. The Emirate has been able to optimize its resources and contribute significantly to the activities of the UAE.

Together with ADSIC, the Abu Dhabi Emirate Government has developed an excellent ICT infrastructure that permits the effective dissemination and delivery of e-Government information. In 2006, the Government of Abu Dhabi Emirate published the first set of developed Government standards in any Arab country. Since then, the Government has managed to review and update the standards, the latest published version being released in 2012 (ADSIC,2014). The updated document represents the cornerstone upon which the Government can adopt e-Government e-public services.

Abu Dhabi Emirate e-Government is expected to bring great benefits to all Governmental entities through the provision of clear directions for the security, reusability, and interoperability of its ICT processes and systems in every Government department. The portal of the Abu Dhabi Emirate e-Government is a comprehensive platform that offers convenient user friendly services, and is a key element in its master plan of development. It provides direct access to nearly 1100 Government services for local and federal Government bodies and information on living and doing business in the Emirate.

By late 2007, ADSIC had launched the second phase of its portal platform and by June 2008, it had launched an initiative to deliver a unified platform where all Government departments could fully implement transactional services. Currently, nearly 60 e-public services are fully integrated in a one-stop portal based on best practices. Through these services, one may pay traffic fines, electricity and water bills, the costs of land management, vehicle registration, certificates of good conduct, and Zakat; search for trading names; apply for birth certificates, obtain medical check-up results, residence visas and access the school directories.

A policy and legislation framework has been set up to enable the Government to control the full potential of online service provision and ensure the maintenance of privacy and security. The framework outlines the obligations, rights, and applicable procedures in consumer protection, e-crime, the Internet or ICT standards and governance, intellectual property rights, the protection of personal data, electronic commerce and electronic documents, and transactions. The World e-Government Organization of Cities and Local Government (WEGO) recently awarded Abu Dhabi its distinguished award for promoting outstanding e–governance though the use of communication technologies. In the Open City Category, Abu Dhabi was awarded the outstanding e-Government prize in Barcelona, Spain (in 2012) for its AD-SDI programme, which transformed Government services through spatial enablement.

2.8 Abu Dhabi m-Government

Several means of communication have been adopted by e-Government to facilitate communication between citizens and Government agencies. Among them are the Internet, digital television, mobile technology, or mobile Government (m-Government). The use of mobile and wireless devices, applications, and technology is a central plank of the Government's planning and implementation of services. M-Government is thus part of e-Government; given the widespread mobile phone

ownership, agencies can communicate directly with citizens (Ghyasi and Kushchu, 2004). Successful m-Government depends on being flexible in scale and use, as well as open and safe. It also requires communication channels to be interoperable (Antovski and Gusev, 2005).

The recent rapid developments in the ICT sector have been followed by innovation in mobile technology. Governments internationally have taken note and chosen to use mobile technology to communicate with citizens and improve or increase the services they offer. With the widespread in some countries, almost universal ownership of mobile or smartphones, optimal conditions have been created for societies to become better connected. M-Services enable Governments to personalize their services, offer them to a wider range of users, and work around the mobility which today characterizes the lives and needs of citizens, private enterprise, and Government agencies.

In Abu Dhabi, the Government has supplied increasingly effective digital services in the public and private spheres to agencies and individuals, and aims to continue to do so. Taking into account the increased mobility and digital communication of its citizens, a portfolio of mobile Government services, which are particularly important to end-users, will be made available to allow easy, convenient, and wide access. Accordingly, the Abu Dhabi Mobile Government Services m-Services Strategy has been drawn up for the benefit of all ADGEs in providing, modernizing and digitizing their services by the appropriate means of mobile communication.

Importantly, m-Government complements rather than replaces e-Government. Indeed, it is integral to e-Government as much as it makes use of services and infrastructure already provided by e-Government and shares its platforms. When setting up m-Services, ADGEs should consider certain steps which are laid out in the Abu Dhabi Government M-Services Strategy Implementation Guide. This guide serves to introduce the overall m -Services Strategy, and helps strategic decision

makers, IT managers, architects, service portfolio planners, and other professionals as they plan, develop, and implement m-Services.

2.9 Gulf Cooperation Council (GCC) e-Government Research Findings

The adoption of various e-Government paradigms by the governments of the Gulf Cooperation Council (GCC) states has attracted many scholarly studies. This research revealed that each state has implemented the specific components of the e-Government system that are suitable to its own socio-economic and administrative context. Table 2.1 summarises the key studies and findings with regard to technology adoption in the GCC states.

Table 2.1 summaries key studies in GCC

Authors	Title	Country	Framework theories	Sample Size	Contribution & other research findings
Rodrigues et al, 2016	Factors that Influence Consumer Adoption of E-Government Services in the UAE: A UTAUT Model Perspective	UAE	UTAUT	380	The main limitation of this research is that the questionnaire was not completely free of subjectivity and was distributed at a single point in time.
Almalki, 2014	A framework for e-Government success from the user's perspective	Saudi	TAM, self-efficacy theory and trust	40	The hypothesis-testing revealed that e-Government portal success (i.e. net benefit) was directly affected by actual use and user satisfaction. They were indirectly affected by a number of factors concerning system quality, service quality, information quality, perceived risk, and computer self-efficacy.
Alsaif, 2013	Factors Affecting Citizens' Adoption of e-Government	Saudi Arabia	UTAUT	692	The findings reveal that performance expectancy is a strong predictor of the intention to use e-Government, followed by trust of the internet. In addition, intention to use behaviour, computer self-efficacy and the availability of resources were found to be

Authors	Title	Country	Framework theories	Sample Size	Contribution & other research findings
					significant predictors of use
Alanazi, 2013	e-Government continuance from the perspective of expectation confirmation theory: Survey research on citizens' experience	Saudi	UTAUT	846	The survey participants were Saudi citizens, who tend to be well educated. This research explored the research questions only in the context of the transactional e-Government services provided by Saudi Arabia's Ministry of Higher Education (MOHE) portal.
Alsharif, 2013	Investigating the Factors Affecting On-line Shopping Adoption in Saudi Arabia	Saudi	UTAUT	472	The research found that this phase requires all those involved in this process to find a unified system of joint work and effort and develop the necessary short- and medium- to long-term plans to ensure a satisfactory level of on-line shopping adoption that is parallel with the evolution in developed countries of e-commerce and on-line shopping.
Al-Zaabi, 2013	Adoption, Diffusion and Use of e-Government Services in the Abu Dhabi Police Force	UAE , Abu Dhabi	qualitative research	50	The research showed that lower-position individuals in departments not using e-services emerged, suggesting that awareness should be inherent in the organisation.
Tabsh, 2012	An investigation of the Adoption by Banks and Acceptance by Bank Customers of internet Banking in the Sultanate of Oman	Oman	UTAUT	611	The model of this study identifies some critical differences between the previous (Western) literature and the Omani context.

Authors	Title	Country	Framework theories	Sample Size	Contribution & other research findings
Abu Nadi, 2012	Influence of Culture on e-Government Acceptance in Saudi Arabia	Saudi	UTAUT	674	The research findings indicate that Saudi citizens trust and accept the technology itself, but not the Government agencies that oversee operations.
Al-Sobhi, 2011	The Roles of Intermediaries in the Adoption of e-Government Services in Saudi Arabia	Saudi	UTAUT	626	The regressions analysis showed that performance expectancy, effort expectancy, social influence, trust of the Internet and trust of the intermediary contribute significantly to e-Government acceptance. This result suggests that the above factors help to explain e-Government adoption and acceptance.
Al-Shafi, 2009	Factors affecting e-Government implementation and adoption in the state of Qatar	QATAR	UTAUT & Institutional Theory	1146	The research outlined the importance of organisational, technological, social, and political challenges facing e-Government systems, and citizens' behavioural intention to use e-Government services.
Al Awadhi, 2007	E-Government in Kuwait: attitudes and perceptions	Kuwait	UTAUT	880	Facilitating conditions and behavioural intentions, derived from performance expectancy, effort expectancy and peer influence were found to be significant to the use of e-Government services.

The above table would be helpful in getting better explanation about the key determinants factors that affect citizens to adopt e-Government services. Despite the GCC sharing many common socio-cultural and political features, there are

appreciable differences in the factors that justified the implementation of suitable e-Government services in each GCC state.

2.10. The need of e-Government

Governments are nowadays paying increasing attention to efficient interactions with their citizens who have great access to digital connectivity and interactions. The reason for this growing interest is that Governments have realized that traditional personal trust no longer serves them and that people need to develop new capacities to establish their emerging identities. The Abu Dhabi Emirate Government is strongly committed to implementing its national strategy as it strives to implement e-Government processes and provide secure services for its citizens.

The local Government of Abu Dhabi Emirate began introducing appropriate reforms to public services after launching the Abu Dhabi Government (e-Gov) Strategy in 2005. The aim of the city Government is a clear one, i.e., to become a "High-Performing Government Delivering World Class Services to the Benefit of All Its Customers". Accordingly, the UAE Federal Government has initiated many improvements in public sector organisations, aiming to raise the performance of electronic services to meet the needs of a knowledge based society. The UN reports demonstrate an increase in e-Government services provided in the UAE between 2005 and 2012 (UN, 2012). From a ranking of 42nd worldwide and an e-Government development index of 0.571 in 2005, the country moved up ten ranks to 32nd worldwide and an index of 0.734 (against a world average of 0.488) in 2008. In 2012, the UAE had risen again, to 28th in the world and 5th in Asia (UN, 2012). Whilst these are impressive results, there is still room to improve citizen adoption of

E-Government services so that the UAE can become a leader within Asia or the Middle East, or even globally.

The implementation of e-Government has served different areas of Government, including utilities and infrastructure, society, population, sustainable environment, modern Government, social equity, research, and development (R+D), and a knowledge-based economy. The path is still in the process of being designed, but Governments have already managed to create affordable ICT and sectoral awareness of its benefits (Holden et al., 2003).

Customers and the business sector are using these innovations widely in their business and are starting to enjoy the benefits of them. Much more needs to be done, but if the public is included in the initiatives, future stakeholders are more likely to embrace it and seek ways to expand e-Services in their businesses. There will be less resistance to technology as different sectors decide to use the e-Services in Government dealings. E-Services can be made attractive to the general population, providing that the Government strengthens security and updates its information and technologies. This will encourage individuals to become ICT entrepreneurs and will have the effect of modernizing their Government.

Citizens will trust it if they feel that it improves the provision of services, and believe that it carries out administrative work both efficiently and at little cost (Alsharif, 2013). However, this will not happen immediately: heavy investment is required and lessons have to be learned after early projects have failed (Criado, 2003; Evans & Yen, 2006). As the scope of Government responsibilities increases, so do its costs. However, Governments must be wary of levying high fees for e-Government, since these may put citizens off using e-Services. While wanting costs

to be kept low, citizens also want Governments to deliver the uninterrupted model of service provision that the modern world of employment demands from employers and employees. Whereas in a previous age Government services could be accessed only during the traditional forty hour working week, most users no longer find this acceptable.

Given that an increasing number of services are required from Government at minimal cost, and that citizens do not want to take time off work to queue in Government offices, waiting to be attended to, it must find ways to provide those services efficiently and cost effectively (AlMalki ,2014). Key to achieving this is ensuring that the delivery of services is as efficient as possible. Governments are grasping the opportunities offered by the fact that 60% of all current Internet users interact with Government websites to bring about reductions in their administrative and other costs by operating through the Internet. If citizens were properly advised and trained in the use of this new method of service delivery, enormous savings could be made, since so many of them already have Internet skills and can already at no public cost access online services at home (Alsaghier et al., 2009).

2.11. Conclusion

This chapter explored the Abu Dhabi e-Government initiatives and the path to implementing them. The Government of Abu Dhabi is investing heavily in improving its public services. The Government is greatly concerned with improving service delivery and promoting civic engagement. Abu Dhabi is significantly increasing its investments in ICT based infrastructure. This surge in ICT enabled services signals that the motive of the country's Government is to increase efficient interactions with its citizens in the digital age. The civic engagement and public

administration reforms are flourishing with the digital connectivity and plans of the UAE.

The next chapter presents a literature review which addresses the research questions developed for this study. Moreover, it serves as a basis for developing and creating the hypotheses that are designed to answer these research questions. It also reviews the scholarly published works retrieved from peer reviewed sources that relate to this subject so as to consider the background theory and to help further refine the research problem.

Chapter 3: Reviewing The e-Government Literature

3.1 Introduction

The introduction of the e-Government paradigm has ushered in a new era in the relationship between citizens and Governments throughout the world. Since its introduction in the early years of this century, many observers have predicted that e-Government will revolutionise the way Government services are delivered. The new models of Government aim to enhance public services and render their delivery more efficient and effective, while maintaining their focus on the needs of citizens. E-Government requires administrations to base the delivery of services and resources on the needs expressed by their customers, who may be citizens, Government employees or private enterprises. However, the efficiency and effectiveness of this new model of Government also depends on Government administration's proper use of the resources available to it, in order to keep costs down while maximising gains; and on citizens being provided with the requisite technology enabled services (Bertot et al., 2008).

Given the greater volume of business activity and the increased demands of citizens, users expect continual improvements in the quality of Government, and the effective provision of services and information at all times. In previous eras, Government had to limit its services to traditional working periods, but users soon grew accustomed to the instant availability of services made possible by advances in information technology (IT) and no longer considered this acceptable. Indeed, given that most people these days believe that citizens should spend their working time actually working, rather than having to leave the workplace in order to access Government services, Governments are now being called on to introduce and administer cost-effective and timely 'service bundles' (Evans & Yen, 2006).

The effectiveness of any e-Government system depends, therefore, on Governments knowing the requirements of various stakeholders, and taking into account that these

requirements may differ between user groups, and may continually change and increase. This chapter presents a review of the academic literature that relates to the development and roll out of effective e-Government services which are centred on the needs of citizens (the 'demand side perspective'), paying particular attention to the work which addresses the three key elements of the research: adoption, intention and use.

3.2 E-Government Definitions

The new paradigm of Government under review in this chapter has been made possible by improvements in Information and Communications Technology (ICT). Many administrative and Governmental functions can now be based on the sophisticated ICT offered by web-based applications, many of which have become an integral part of how the Government delivers its services. The introduction of the new technology is generally believed to have enabled Governments to provide customer oriented services faster, more efficiently and cost effectively.

With the rush to use ICT and web applications to aid the delivery of these services, a wide range of models and definitions of this new Government activity has emerged; it is usually termed 'electronic Government,' or 'e-Government' (Holden et al., 2003). Different legislation has come up with slightly different definitions of e-Gov. USA legislation from 2002, for example, describes e-Government as "the use by the Government of web-based Internet applications and other information technologies, combined with processes that implement these technologies". The US E-Government Act of the same year goes on to describe the new paradigm as one which improves both access to, and the delivery of Government information and services to users in and outside the Government, in terms of effectiveness, efficiency, service quality, and transformation (Grönlund, 2004).

The European Union (EU), for its part, regards e-Government as "the use of ICTs in public administrations, combined with the organisational changes and new skills …

to improve the delivery of the public services to the citizens" (Kumar et al., 2014). The UN Public Administration Network (UNPAN) describes it in similar terms: "the use of the ICTs (Internet, the web, mobile devices, network tools, social media, etc.) to enable the Governmental agencies … [to communicate] virtually with customers, businesses, and other Government partners, as well as delivering its service bundles by electronic means" (UNPAN, 2002).

Evidently, then, definitions of utilisation of the ICT applications can vary in accordance with the perspectives, objectives, structure, and targeted users of the relevant legislation. These perspectives tend in particular to concentrate on either the general benefits conferred by using ICT, or those conferred on citizens.

Table 3.1 shows e-Government definitions from an IT perspective; table 3.2 shows e-Government definitions from a citizen-focused services perspective, and table 3.3 shows e-Government definitions from the perspective of the benefits of e-Gov.

Table 3.1 E-Government definitions of IT benefits in general

Definitions from the perspective of Information Technology benefits	**References**
E-Government conveys the use of ICT in public administration with the aim of improving access for citizens, business and Government agencies to Government-supplied data and services. Constant improvement in service quality is sought, as the expansion of opportunities to participate in democratic institutions and processes.	Lambrinoudakis et al. (2003)
E-Government includes the use of different technologies in order to provide users with more convenient access to information and services; and to deliver those services to citizens, businesses, suppliers, and public sector workers.	Turban et al. (2002)
E-Government is the use of ICT in support of Government transactions, the engagement of citizens, and the provision of public services.	Cook et al. (2002)
E-Government is the use of ICT to deliver its services directly to all categories of users at any time.	Duffy (2000)

Table 3.2 E-Government Definitions from the citizens' perspective

Definitions/Description from the perspective of citizen-focused services	References
E-Government harnesses technology to put citizens at the centre of all Governmental business and transactions.	Waller et al. (2001)
E-Government is the use of varying technologies to ensure the provision of information and fully-integrated services to citizens.	Burn & Robins (2003)

Table 3.3 E-Government definitions of the civic benefits of e-Government

Definitions Focusing on the Benefits of E-Government	**References**
E-Government uses technology to allow all users to carry out cost-effective transactions online.	Whitson & Davis (2001)
E-Government allows Governments to use advanced innovative ICTs, particularly web-based applications, to offer users convenient access routes to Government services and information, thus enabling the democratic process and strengthening democratic institutions	Fang (2002)
E-Government rests on using the internet and other ICTs to offer fast, efficient, cost-effective and customer-focussed access to Government information and services 24/7.	Ke & Wei, (2004)

The review of e-Government literature in the present chapter illuminates a range of perspectives that have given rise to such differing definitions. It can clearly be seen that no one definition of e-Government has been accepted by all the Governments when they introduce the new models, or by the various researchers when they study them (Yildiz, 2007). In this research, the researcher adopted the definition that has been used by the UNPAN in 2002 as it provides a close description of what has happened in Abu Dhabi government departments when providing e-services.

3.3 Types of e-Government

The basic model of e-Government is the provision of e-service bundles to users, whether individuals or organisations, through the use of ICT, including cloud

computing technology, which will bring major benefits. However, it is important to realize that e-Government is concerned not only with bringing about improvements in internal communication (i.e., between different departments), or external communication (i.e., with its citizens), but also improvement in communication between Governments and citizens.

One feature common to all the various models of e-Government which have emerged, whatever their aims and structures, is that the services delivered should focus on meeting the needs of citizens regardless of their attitude towards the e-Government services. Research in e-Government research should consider some key areas:

- *Dimensions of e-Government implementation:* Government-to-Citizen (G2C), Government-to-Business (G2B), Government-to-Employee (G2E), Government-to-Government (G2G), Citizen-to-Government (C2G), and Business-to-Government (B2G).
- *Levels of e-Government or implementation*: e-Government can be implemented locally, federally, nationally or (where applicable) at state level.
- *Overall aim of e- Government*.

- *E-government implementation*: the ultimate aim of Governments is to use ICT to enhance service provision to their customers, who may be businesses, Government bodies, or citizens.

- *Access and availability*: e-Services should be constantly available to all customers, or certain groups of them (such as businesses, Government bodies or citizens).

The related literature that analyses some of the dimensions of e-Government implementation is discussed below.

3.3.1 Government-to-Government (G2G)

The Government-to-Government (G2G) dimension concentrates principally on the interdepartmental exchange of information and services, both domestically (i.e., in the same country) and internationally. For this reason, the G2G type is taken to be the most basic e-Government system, from which others may be developed. Several scholars have suggested that the G2G could improve internal intercommunication by integrating services and grouping all agencies under one domain (Huang & Bwoma, 2003). To this end, a single Government service portal could provide services by tracking down and accessing various services across several links and websites.

It has frequently been suggested that the smooth introduction of this type of information exchange depends principally on Governments' readiness for e-Government (Gil-Garcia et al., 2007), in terms of the technology that they already employ, and their ability to change the modes and structures of their public administration (Irani & Elliman 2008).

An example of G2G services in the Abu Dhabi e-Government services is the Statistics Information service, which provides access to data from the Information Services on Government Public Statistics (including general Government information and statistics for policy planning) and data from the Information Services on International Statistical Databases (which store information on international statistics).

3.3.2 Government to Business (G2B)

The Government to Business (G2B) model generally caters for the provisions of information, goods, and services by the public sector to the private sector via the internet in order to increase communication and therefore, the competition among businesses, by improving procurement practices, reducing cost and drawing together more information and data (Evans & Yen, 2006). Furthermore, a major benefit of

G2B is that itprovides a timely and effective means of transacting key services, such as the registration of information or the processing of taxes. Such a model could improve Government-business communication in various ways, including the digitalisation of procurement mechanisms through the use of ICTs. The improvements offered to exchanging information, cutting costs, and enhancing the convenience of access would greatly benefit business (Seifert, 2003).

The Government, too, would benefit, as such a system would enhance decision-making and yield a greater volume of data on the employment, environmental, health, safety and tax rules that are accessible via a single portal, rather than having to be gathered from various different places (Evans & Yen, 2006; Wimmer & Tambouris 2002; Moon, 2002).

A G2B model provided by the Abu Dhabi e-Government services is the Tenders Participation services, which fall into the category of 'Selling/Buying to and from Government'. Through this service, applicants can register a consulting firm to participate in tenders for municipal works. A further example available on the www.abudhabi.ae web portal is the service to obtain Soil Materials Loading from Approved Quarries Permits. Through these services, applicants can become eligible to manage and transport the soil material required for construction projects and brick factories, according to specific design metrics (abudhabi.ae, 2016).

3.3.3 Government-to-Citizens (G2C)

The key feature of the G2C model is that it is a gateway to the online provision of public services. In particular, it enables information to be exchanged electronically between Government and citizens, offering citizens better opportunities and means to interact directly with Government. Among the services provided by a G2C model are the delivery of information on community services such as libraries, the payment of bills, education, health care, and applications for permits or licenses. For many commentators, this type of interaction between Government and citizens is, indeed,

the principal goal of e-Government (Al-Khouri & Bal, 2007) because the relationship that it establishes allows civic links between the two sides (provider and users) to be forged, which in turn encourages greater participation in democracy. Examples of this might be the sharing of polling data and the opportunity to vote online (Huang & Bwoma, 2003).

The UN and ASAP (2002) define e-Government as "the delivery of Government information and services to citizens through the World Wide Web." Fundamental to the idea of G2C is the need to end nepotism and cronyism, together with bureaucratic inefficiency, ineffectiveness, and lack of accountability. A successful model of G2C shows how e-Government can bring about improvements in the relationships between Government agencies, and between a Government and its stakeholders, while simultaneously improving transparency for the benefit of all citizens (Shahkooh et al, 2008; Alawneh et al, 2013).

E-Government is therefore important not only in increasing communication between a Government and its citizens, but also in bringing about democratic goals efficiently, and effectively by fairly providing Government services. Governmental recognition of the importance of interaction with citizens allows it to concentrate on the need to speed up and simplify the provision of services for all users, whatever the relationship between them (Weerakkody et al., 2011; Lee et al., 2005; Silcock, 2001).

The www.abudhabi.ae web portal maintained by the Abu Dhabi e-Government includes various examples of a G2C e-Government relationship. For example, it allows the Abu Dhabi Government to recruit its citizens and also contains information and links to 'Life Events' e-services.

3.3.4 Government to Employee (G2E)

The Government to Employee (G2E) model involves online interaction tools for use by a Government and its employees. Among the services that this model offers to Government employees are a space for self-development (otherwise known as e-Learning), the opportunity to share knowledge, exchange information, greater collaboration and the possibility of using intranet systems to improve employee productivity (Fang, 2002). Additionally, it provides a more secure, easier maintenance and archiving of personnel records, policies and information.

This model is not limited to interaction between Government departments, but may also be used to enhance communication between other organisations and agencies (Fang, 2002). The concept behind the G2E systems is to raise the quality and simplify the Government workers' communication. This could eventually have a positive effect on the government's ability to offer citizens an efficient service (abudhabi.ae, 2016).

The Abu Dhabi e-Government offers different services on its G2E portal, encompassing four service areas, *namely* human resources, support services, business support services, and information and advice. A specific example of available employees' services is allowing them to apply online for personal certificates such as employment certificates and salary certificates (Al Ain Municipality Website am.abudhabi.ae).

3.4 Characteristics of e-Government

The advent of the Internet has brought with it great changes in the quality and means of establishing and maintaining interpersonal relationships, largely because of the widespread use of cyberspace communities and social multimedia. Willoughby et al. (2010) have identified the characteristics of good e-Government as follows. It should be:

1) *Comprehensive*: citizens are able to access all necessary services from home through a single portal.
2) *Integrated*: e-Government applications are integrated so that the citizens do not need to submit the same information each time they use e-Government services; for example, one username and a password will suffice for all transactions.
3) *Ubiquitous*: all citizens have the same quality of access to e-Government services.
4) *Transparent*: all the required information is available to citizens and is easily accessible, even by those with the least ICT experience.
5) *Accessible*: e-Government should also take into consideration those users with special needs so all citizens have equal opportunities to reach e-Government services.
6) *Safe*: citizens need to be sure their data are protected and kept confidential when they use e-Government services.
7) *Re-engineered*: old processes need to be redesigned to make services simpler and faster through a G2C portal.
8) *Intraoperative*: Government should aim for excellence in e-Government services, with links among entities for working together.
9) *Developed towards e-Government*: citizens should participate in e-Government services development, to exercise e-democratic processes and e-participation.

3.5 E-Government Stages and Adoption

Lee (2010) investigated about twelve academic studies published between 2000 and 2009, and categorised them according to the typical stages of e-Government implementation. This investigation revealed two key themes linking the stages of an e-Government roll-out. These were **i**) operations/technology; and **ii**) citizen-centred services. Lee further identified nine elements of e-Government as follows **i**)

information, **ii**) interaction, **iii**) integration, **iv**) transaction, **v**) streamlining, **vi**) participation **vii**) transformation, **viii**) involvement, and **ix**) process. Fan & Luo (2014), AlHomod & Shafi (2012), and Fath-Allah et al., (2014) also compared the e-government stage from a different perspective and they agreed that a government should evaluate its maturity level and build its E-Government strategy to stage four or five at least.

The interaction between these two themes and the several differentiated elements has finally yielded an appreciation of five distinct stages concerned with e-Government maturity. They are **i**) presenting, **ii**) assimilating, **iii**) reforming, **iv**) morphing; and **v**) e-Governance, as illustrated in Figure 3.1.

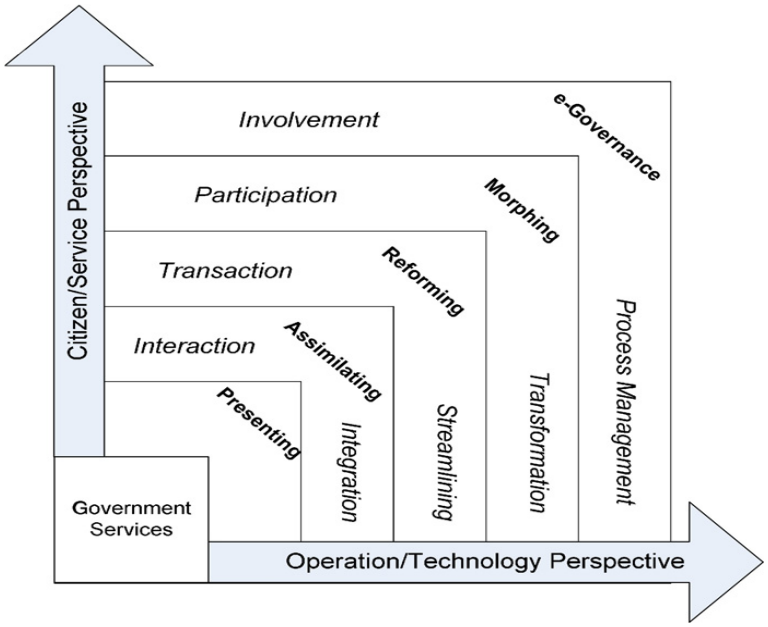


Figure 3.1: Illustration of the stages of e-Government adoption.(Source : Lee, 2010)

3.6 Citizens' Adoption of e-Government

An IT project can be deemed successful only if it is accepted and adopted by users (Pinto & Mantel, 1990). Different definitions of user acceptance have been put forward: Al-Gahtani defines it as "a potential user's predisposition toward personally using a specific system" (Al-Gahtani, 1995: 21), while Venkatesh et al. (2004) suggest an "initial decision made by the individual to interact with the technology" (Venkatesh et al., 2004: 446). Venkatash et al. (2004) also state that individual users

decide to adopt a given technology only after making direct use of it (Venkatesh et al., 2004). For this reason, widespread acceptance by users of the new technology is essential if e-Government is to function properly. Several studies have investigated the theoretical frameworks illustrating the adoption of IT and Information Systems (IS) and those include Ajzen (1991), Davis (1989), Davis et al. (1989), Mathieson (1991), Al-Gahtani & King (1999), and Taylor & Todd (1995). The following section expands on this point.

3.7 Adoption Processes

As ever-wider interest is demonstrated in e-Government, Governments must identify how their new e-services can best be adopted and used by their stakeholders. One definition of the process by which the new system is adopted takes into account the "*entire mental process*" undergone by any user between first hearing about an innovation and deciding to make use of it (Kotler and Armstrong, 2004). The new adopter must actively make the decision to use the product or service in question and thus the strategies chosen by Government to encourage the take-up of e-services by its customers must consider the transition from one stage to another along the journey of becoming aware of the new service.

Also in 2004 Kotler & Armstrong suggest that this process consists of five separate stages. It is, therefore, reasonable to conclude that the adoption of new technology is the salient point in ensuring the widespread acceptance of new modes of delivering public services. Table 3.4 below briefly presents the conclusions of Gilbert et al. (2004) regarding adoption.

Table 3.4: The evolutionary stages of e-Government*(Adapted from Kotler and Armstrong, 2004)*

Stages	Effects
Awareness	Individual becomes aware of new product/service but lacks information about it.
Interest	Individual obtains information about the new product/service.
Evaluation	Individual evaluates the pros and cons of trying out the new product/service.
Trial	Individual carries out a small-scale trial of the new product/service to gauge its value.
Adoption	Individual decides to make full and regular use of the new product/service.

Citizen engagement, therefore, is vital to the successful development of e-Government in any country (Jones et al., 2007), although the means of engagement and the stages of adoption outlined above had not been clearly defined when earlier models of e-Government were rolled out. In 2002, Warkentin et al. (2002) considered that the adoption of e-Government was synonymous with the intention of citizens to engage with it in order to access public information and services. Developing countries, in particular, must be aware of the issues surrounding the adoption process so that the new systems can be easily rolled out and the adoption encouraged.

3.8 Citizen Trust

The traditional public services of Abu Dhabi Emirate has continually been accepted by the citizens (ADSIC, 2015b); however, the newcomer, e-Government services, did not enjoy the same level of trust from citizens (Welch et al., 2005). This could have significant implications for public trust not only in political and administrative performance, but also in the quality of public services (Welch et al., 2005). As far as e-Government is concerned, citizens will be ready to take the perceived risk of adopting a new system only if they trust it and its administrators, particularly because the transactions they will make using this system may require them to give up sensitive, confidential, personal data (Alsaghier et al., 2009).

Citizen trust, therefore, is widely regarded as an essential component in the process of adopting e-Government and there are many ways in which Governments can set about encouraging trust among their stakeholders which will have the knock-on effect of encouraging the take-up of these innovative and important systems. Among the elements which Governments must consider in building citizens' trust in the new modes of administration is the degree of individuals and communities acceptance of risks inherent in using new technology, including any perceived loss of control (Warkentin et al., 2002).

Socio-cultural norms may vary, but certain psychological habits are common to most nations and individuals, and certainly the degree of general online knowledge of service transactions among potential e-Government users should be taken into account when planning how to encourage trust Horst et al.(2007). In his study of e-Government adoption, Horst et al.(2007) identifies two specific elements in the trust-building process: i) *trust in e-Government*, which he defines as users' trust in the commitment of Government to implementing e-Government; and ii) *ability and motivation*, which is the will to adopt e-Government on the part of users.

During the initial e-Government system implementation, its ultimate beneficiaries were not yet fully aware of the services that it provides (Carter & Weerakkody, 2008); in this initial stage of building a new relationship between Government and users, trust is crucial. Many scholars have examined and attempted to define trust, and a wide range of definitions have been discussed. Many academics have relied on the definition elaborated by Rotter (1971), cited in Belanger & Carter, (2008), which is now considered standard. Namely, that trust is "an expectancy that the promise of an individual or group can be relied upon" (Belanger & Carter, 2008).

Belanger & Carter (2008) propose that trust has two main targets: i) the entity providing the service (party trust); and ii) the mechanism through which the service is provided (control trust). Within the context of e-Government and according to this

proposition, users' trust in an e-Government model combines both trust in the honesty and effectiveness of the Government body which is introducing it, and trust in the reliability of the Internet or other ICTs that the Government has chosen to use. The latter element of trust, in particular, has been identified by many researchers as an accurate predictor of the speed and width of adoption of a given e-Service (Alsaif 2013, Abu Nadi 2012).

Kim et al. (2009) point out that privacy is another vital element in encouraging citizens to trust e-Government services. Citizens using e-Government will entrust it with sensitive data, for example, medical and financial records, if they believe the system and its Governmental administrators can be trusted to keep such data private. This will improve their relationship with the Government. However, if citizens' privacy is not respected, they will reject e-Government services and the implementation of an e-Government project (Mcknight et al., 2002; Alawneh et al, 2013).

Coulter & Coulter (2002) define customer trust as a set of beliefs held by an online consumer concerning certain characteristics of the e-supplier, as well as the possible behaviour of the e-supplier in the future. Lee & Lin (2005) believe that the volume of online purchasing, and customer attitudes to e-retailers, depend on the level of trust customers feel. A study carried out by Kim et al. in the USA in 2009 reveals another facet of online customer trust, namely that it correlates strongly with loyalty (Alawneh et al, 2013). Similarly, Lean et al. (2009) conclude that trust, as well as customers' perceptions of usefulness, relative advantage and image impact directly and positively on their intentions to use e-Government services. Perceived complexity, conversely, is shown to strongly dissuade potential users from adoption (Lean et al., 2009).

There is no consensus in the relevant academic literature over defining citizens' trust in e-Government, and the process by which this may be acquired or lost. However,

most writers believe that this trust determines the extent of the actions and cooperation of the community (Ruscio, 1996; Thomas, 1998). Most people's trust in their Government tends to rest upon presumptions which spring from or are coloured by the social context or interaction. Three separate types of trust are identified. They are (a) fiduciary trust, which features asymmetric relationships and offers extensive possibilities of wrongdoing; (b) mutual trust, which rests on repeated interaction between actors; and (c) social trust, which is placed in well-known and respected public or private institutions.

In the Abu Dhabi context, where confidence in using e-Government is limited (ADSIC,2015b), building trust in e-Government initiatives is crucial while other interrelated moderators, such as education, computer experience, age, and gender are taken into account when considering citizens' adoption of e-Government services. It is particularly crucial given that government has, in the past, put citizens off as the systems and procedures took too long to address their concerns. They, therefore, might think that the E-Government might not help in enhancing service delivery. Privacy issues (sensitive information) could also cause the citizens to mistrust the Internet technologies within e-Government. This may affect citizens' trust in the features of the services provided.

3.9 Conclusion

This chapter's analysis of e-Government literature illustrates the broad perspectives from which e-Government may be defined. The differences between the various doctrines outlined clearly show that no one definition of e-Government has been universally accepted. As Yildiz (2007) stated, different disciplines have come up with their own definitions. Further, the target customer and scope of the services mean that there are different types of e-Government: Government-to-Citizen (G2C), Government-to-Business (G2B), Government-to-Employee (G2E), Government-to-Government (G2G), Citizen-to-Government (C2G), and Business-to-Government

(B2G), each with its own characteristics and challenges. However, this study focused merely on G2C paradigm.

The literature review highlights what citizens need from e-Government, including comprehensive, ubiquitous, and equal access to services. It also highlights the challenges facing Governments in introducing e-Government programmes. Particularly relevant to the Abu Dhabi context is the issue of trust, which plays a major role in creating the initial relationship between the citizens and the emerging e-Government system. At this point, the benefiting citizens still do not know about the e-service provided (Carter & Weerakkody, 2008). Citizens' trust is generally considered a crucial lubricant in the process of e-Government adoption and is one of the factors that this thesis will particularly explore.

Chapter 4: Technology Adoption Theories

4.1 Introduction

Many theories have been proposed to explain individual adoption of new technology. This chapter reviews some of the common theories and related models used in testing adoption and acceptance of e-Government services by citizens. Previous researchers on the adoption of e-Government services have discussed extensively the key roles of information communication technology (ICT) in providing practical solutions in various domains and applications of e-Government services. These aspects are practical when users decided to select unusual systems or e-service delivery mechanisms over the normal ones (Gilbert et al. 2004; Zhao & Khan, 2013). Akkaya et al. (2012) reviewed about 164 published scholarly works to probe the various elements involved in the implementation of efficient e-Government services, as well as the factors and determinants of citizens' adoption of these e-services.

4.2 Theories and Models

4.2.1 Diffusion of Innovation Theory

In 1995, Rogers proposed the Diffusion of Innovation (DOI) theory, which states, "The adoption of innovation is modelled as a process of information gathering and uncertainty reduction with a view to evaluate the technology". Rogers (2003) adapted the DOI theory and proposed a general model of adoption: the diffusion of innovation model. In this context (e-Government services), while a creative idea means a new concept or technology, diffusion means the transfer of information into the community.

Rogers' model classifies five ideas that influence the selection of a likely adopter:

1) *Relative advantage* refers to the belief that a new innovation (e-Government services) has benefits that are more effective than the existing structure (traditional Government services).
2) *Complexity* refers to the perceived difficulty of understanding and using a new system (e-Government services).
3) *Compatibility* where an innovation is easily adopted when it does not contradict the values of people and experiences. A compatible idea (e-Government services) that is less uncertain will fit more closely with the individual's life situation.
4) *Trialability* means that an innovation (e-Government services) has been tried and has been found to be beneficial. New ideas that can be tried are generally adopted more than innovations (e-Government services) that are not tried.
5) *Observability* proposes that one can easily adopt an innovation (e-Government services) if the results of an innovation (e-Government services) are visible to others, clear and understandable.

An individual's decision on whether to implement the technology is determined by their perception of the specific technology. The perception of a person is determined by the following: the benefits associated with the technology, ease of use, reliability, compatibility with existing technologies and observability. The aim of this theory is to determine how, why and the speed at which new concepts and technology are passed through cultures (Lean et al., 2009; Carter & Weerakkody, 2008).

Based on the findings of various empirical studies, Agarwal and Prasad (1998) testified that three of the DOI factors are actually significant variables. The three factors are: i) complexity, ii) relative advantage, and iii) compatibility. In 2012, Al-Jabri & Sohail applied the theory of diffusion of innovation in the study of Mobile Banking adoption that examined the behaviours of 330 actual banking users. The

DOI model contributed to the study by facilitating the examination of many factors affecting mobile banking adoption, thus addressing an existing gap as most researchers prior to this only studied factors influencing the design of mobile banking services in order to ensure that they are appropriate and can be easily utilized by customers. The study found that relative advantage, compatibility and observability all positively influenced customer adoption.

The DOI model is irrelevant to the current study as DOI does not foster a participatory approach and it assumes the effect of the person's social support and resources in adoption. It does not cover other factors like Government trust and internet trust that may affect citizens from using e-Government services.

4.2.2 Theory of Reasoned Action

The Theory of Reasoned Action (TRA) was developed by Ajzen and Fishbein (1967). The theory was drawn from Social Psychology and is used to predict a wide range of behaviours. It has two constructs: i) attitude towards an act or behaviour "*an individual's positive or negative feeling about performing the target behaviour*" and, ii) subjective practice – "*The person's perception that most people who are important to him think he should or should not perform the behaviour in question*" (Ajzen & Fishbein, 1977) as shown in *Figure 4.1*.

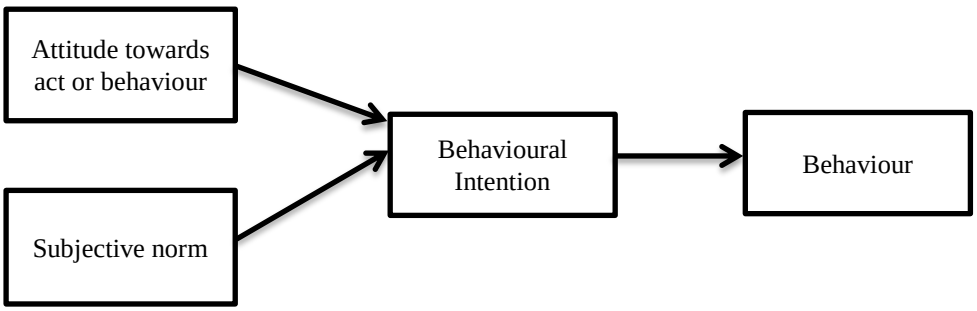


Figure 4.1: Theory of Reasoned Action (TRA) .(*Source: Ajzen and Fishbein,1980*)

The TRA model proposes that a person's behaviour is determined by several intended motives that are in line with the attitude of the person concerning behaviour

and subjective practices. The theory assumes that an individual takes into consideration the consequences of their *behaviour* before they do it. As a result, the intention is the most important factor in determining the change of behaviour, which will evolve according to the individual's expectations about a positive or negative attitude from society. Therefore, our intentions take a form, which is commensurate with the community culture and this is essential in the implementation of such behaviour or any changes later. Suh and Han (2003) assert that the model is applied by scholars of information systems to research the factors influencing the adoption of IT creative applications.

In 2014, Mishra, Akman and Mishra applied the theory of reasoned action (TRA) to research on the utilization and acceptance of Green Information Technology. The study found that behavioural intentions positively affect practical behaviours. Further, they found that external factors, for instance, an individual's associated beliefs and level of knowledge, also influenced their attitude towards the adoption of Green Information Technology. The TRA contributed to establishing factors that are related to the intentions and actions of an individual.

In this study, the researcher will not use TRA as the main theory guiding the research because it does not consider other factors that influence behavioural intention which are expected to be important in the e-Government context. Factors like Government trust, internet trust, performance expectancy, effort expectancy and facilitating conditions are not considered in TRA.

4.2.3 The Technology Acceptance Model

In 1989, Davis established the Technology Acceptance Model (TAM) using the TRA to illustrate that what an individual believes affects his attitudes regarding the adoption and application of IT systems, resulting in behavioural intentions and, consequently, practically adopting the technology. Davis stated "the features that could enhance the system usage included **i**) the supposed usefulness, regarding

increasing the efficiency in performance; and **ii**) the expected ease of adopting the technology".

Perceived *usefulness* was for the very first time explained by Davis, as "*the degree to which a person believes that the use of a particular system would enhance his or her job performance*". Perceived *ease of use* refers to "*the degree to which a person believes that using a particular system would be free of effort*" (Phang et al. 2005; Carter & Weerakkody, 2008) as shown in Figure 4.2.

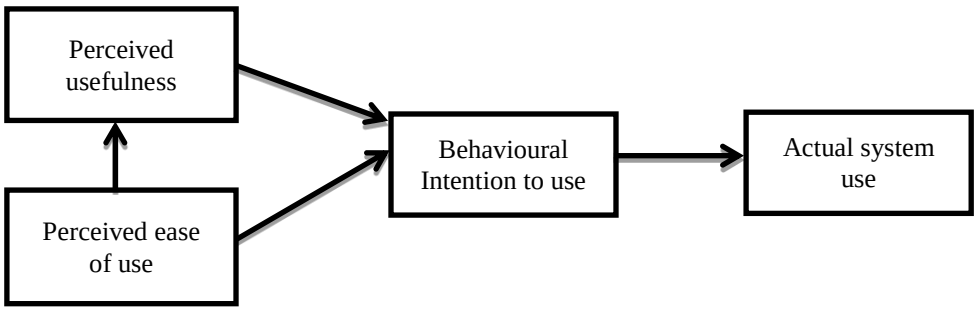


Figure 4.2: Theory of Technology Acceptance Model (TAM) (*Source: Davis,1989; Venkatesh et al., 2012*)

The TAM represents an important theoretical contribution towards understanding ICT usage and acceptance behaviour. The principal objective of TAM is "to provide an explanation of the determinants of computer acceptance that is generally capable of explaining user behaviours across a broad range of end user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified" (Phang et al., 2005).

Several studies that have employed TAM have clearly indicated that perceived usefulness is a critical factor in influencing the intention to adopt a technology, whereas perceived ease of use is considered to be of minimal significance during the time of sustained use (Szajna, 1996; Venkatesh, 2003). Additionally, the TAM model outlines that when the expected benefit and the simplicity of use are high, the chances of implementing the system are also high. All other variables being constant,

the expected simplicity of use is predicted to affect the perceived usefulness, as a simply implemented system becomes beneficial in usage (Davis, 1989; Carter & Weerakkody, 2008).

Additional variables for the TAM has been posited which consist basically of factors in the dimension of subjective practices, which comprise a vital section of TRA but are not found specifically within TAM. According to Venkatesh and Davis (2000), this is significant and has modernized the TAM (TAM2) by incorporating subjective practices. Several of the TAM studies have been conducted with both workers and users to understand their usage of ICT based services. Bobbitt and Dabholkar (2001) have tried to incorporate several models which illuminate people's attitudes (TAR, Theory of Planned Behaviour, Theory of Trying) with external variables (such as the product/service category and perceived risks) to elucidate why people may prefer self-service technology alternatives.

TAM is taken to be a developed, well-evaluated, dynamic, dominant, and validated theory for forecasting user acceptance of technology (Venkatesh and Davis, 2000), with research including such technologies as emails, text editors, and word processing structures as well as graphical computer applications. TAM and Rogers's DOI are two theories that were principally used by the researchers to study the user adoption of information systems (Carter & Weerakkody, 2008).

However, the author believes that the TAM is inappropriate for this study since it presumes that when an individual intends to do something, they do it without any constraint (Wallace & Sheetz, 2014). TAM also holds some limits, including: (i) the lack of consideration of different user task environment and limits (Fu et al. 2006); (ii) the lack of assessment of the role of facilitating conditions; and (iii) the assumption of data homogeneity in empirical studies, which may lead to potential invalid conclusions (Becker et al. 2013).

4.2.4 The Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) is an extension of the TRA (Fishbein & Ajzen, 1977), which was developed to overcome the *original* theory's weaknesses by addressing conduct over which users possess unwillingness to be regulated. As in the early theory of reasoned action, a significant factor in the TPB is an individual's motivation to act in a specific manner. It has three constructs: i) attitude towards behaviour, ii) Subjective norm and, iii) Perceived behavioural control. The first two constructs are adapted from the TRA and the additional construct, perceived behavioural control, is defined as *"The perceived ease or difficulty of performing the behaviour*" (Ajzen1991; p. 188).

The major difference between the TRA and the TBP is the accumulation of a third factor influencing their behaviour, the Perceived behavioural control. In reality, the TPB is a model that forecasts behaviour that is purposeful. Chau and Hu (2002) state that TPB is to general unlike TRA which added extra factor in TPB (perceived behaviour control).

Perceived behavioural control shows that an individual's enthusiasm is affected by how difficult they perceive the behaviour to be and their opinion about the likelihood of success or failure in performing the activity. In turn the enthusiasm a person has as well as the belief concerning the success when carrying out an activity could influence the person's behavioural intention. Intentions, are then expected to affect actual behaviour and to indicate a person's desire to use new systems. Normally, when a person is highly intended to involve in behavioural control, there is high probability of achieving a better performance.

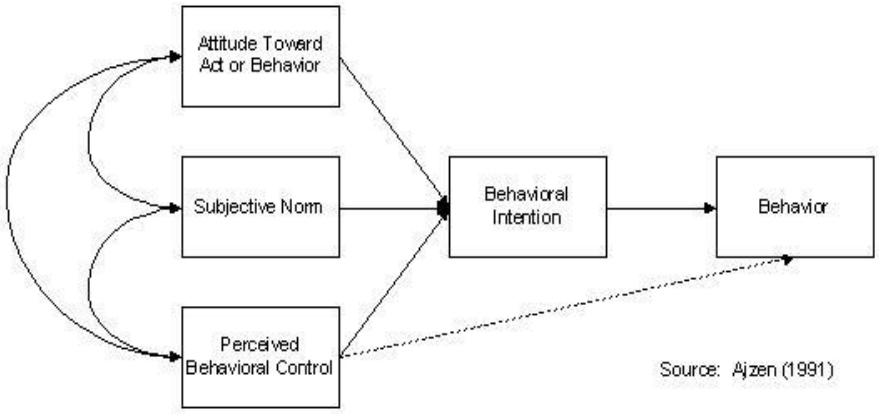


Figure 4.3: Structural Diagram of the Theory of Planned Behaviour (TPB)

(Source: Fishbein & Ajzen, 1975; Alsaif, 2013)

Many studies have applied TPB to analyse online behaviour (Crespo & Bosque, 2008; Picazo-Vela, Chou, Melcher, & Pearson, 2010; Wu, 2006, Seyal, & Turner, 2013; Yen & Chang, 2015). However, Cheng and Huang (2013) used the TPB-based model to explore the backgrounds and implications of groups of people's intentions to purchase online, providing an extended perspective on the TPB. Their study concluded that the quality of the services provided greatly influences new customers' intention to engage in online purchases and business transactions. The theory contributed to the establishment and analysis of normative factors that influence the planned behaviour of the customers.

The researcher holds that the TPB is not suitable for this study, because TPB considers only normative factors without considering the variables of trust-in-Government, trust-in-Internet, facility conditions, and performance expectancy, where these variables are significant in this study for investigating the use of e-Government service acceptance and adoption of the citizens.

4.2.5 Model of PC Utilization

The Model of PC Utilization (MPCU) presents a competing theoretical perspective to TRA and TPB (Venkatesh et al., 2003). Thompson et al. (1991) described the core

components of the MPCU which are based on a theory containing six *constructs* that influence the use of computing devices, these are (as shown in Figure 4.4):

- Social Factors: “Individual's internalization of the reference groups' subjective culture and specific inter personal agreements that the individual has with others, in specific social situations";
- Long-term consequences: "Outcomes that have a pay-off in the future”;
- Affect towards PC use: “Feeling of joy, pride, or displeasure that might associate with a particular act";
- Complexity: "Degree to which an innovation is perceived as relatively difficult to understand and use";
- Job-fit: "Extent to which an individual believes that using a PC can enhance the performance of his or her job";
- Facilitating conditions: "Objective factors ‘out there’ in the environment that several judges or observers can agree to make an act easy to accomplish".

Thompson, Higgins & Howell (1994), found that the experience has a direct effect on the utilization of ICT-based devices. The PC utilization model led to the establishment and distinction of direct and indirect influencers of utilization. However, the author feels that the model of PC utilization is limited in application as it does not include other factors that may affect the adoption of e-Government, such as Government trust, Internet trust etc. Hence, it is not relevant to the current research.

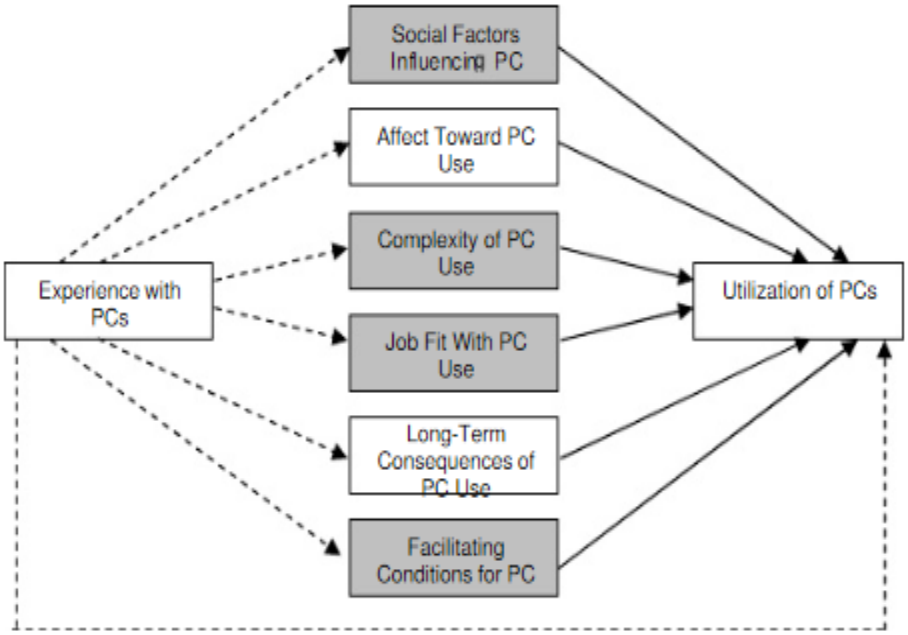


Figure 4.4: Model of PC Utilization (MPCU) *(Source: Thompson et al. (1991,p.131); Aldajani 2011)*

4.2.6 Motivational Model

The Motivational Model (MM) is an explanation for user behaviour, which examines the potential motivation that facilitates the adaption of specific contexts (Venkatesh et al., 2003). The MM has two constructs:

i) Extrinsic Motivation: "The perception that users will want to perform an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved job performance, pay, or promotions".

ii) Intrinsic motivation: "The perception that users will want to perform an activity for no apparent reinforcement other than that of the process performing the activity peruse" (Davis et al., 1992).

However, the Motivational Model (MM) does not fully explore most of the e-Government adoption factors and it relies heavily on perceptions of the users, so it is not considered an appropriate methodology for this research.

4.2.7 Social Cognitive Theory

The Social Cognitive Theory (SCT) outlines a process through which people get and keep certain behavioural designs, while setting out the foundation for intervention approaches. The SCT has been noted as one of the most powerful theories of *human* behaviour (Bandura 1986) as shown in Figure 4.5. Venkatesh et al. (2003) defined five constructs in the SCT model:

i. "Outcome Expectations Performance: The performance related to consequences of the behaviour.
ii. Outcome Expectations Personal: The personal consequences of the behaviour.
iii. Self-efficacy: Judgment of one's Ability to use a technology to accomplish a particular job or task.
iv. Affect: An individual's liking for a particular behavior.
v. Anxiety: Evoking anxious or emotional reactions when it comes to performing behaviour." Venkatesh et al. (2003, P.432)

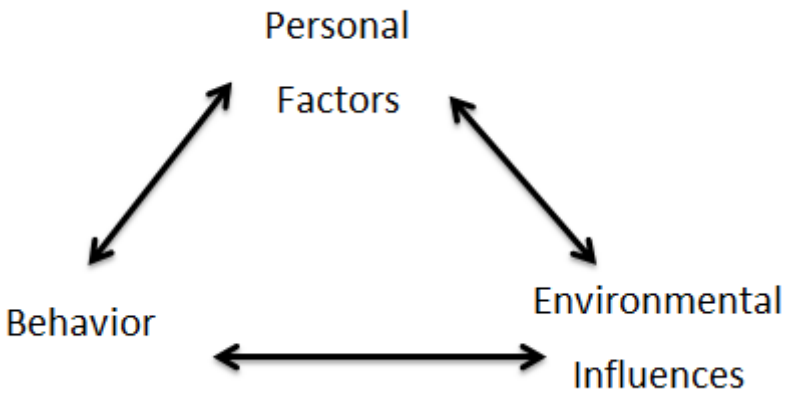


Figure 4.5: Social Cognitive Theory (SCT) *(Source: Bandura, 1986)*

However, the model of Social Cognitive Theory (SCT) does not fully explore e-Government adoption factors and is not commonly used by researchers who explore e-Government adoption as it does not consider crucial factors like trust. Thus, this theory may not be useful to achieve the objective of this research.

4.2.8 Unified Theory of Acceptance and Use of Technology

From the literature review, it is apparent that there are a number of theories and models that are used to analyses technology acceptance. Although the literature is well developed and contains a number of descriptive theories, there is no single comprehensive theory or model that could be relied upon. This encouraged Venkatesh, Morris, Davis and Davis to establish a synthesized theory that provides a clearer picture of the acceptance phases than the earlier theories. The resulting theory is known as the Unified Theory of Acceptance and Use of Technology (UTAUT) model (Venkatesh et al. 2003).

The UTAUT consists of four *predictors*: i) Performance Expectancy; ii) Effort Expectancy; iii) Social Influence, and iv) Facilitating Conditions; two *outcomes:* i) Behavioural Intention, and; ii) Use behaviour, as well as four *moderator variables*: i) Gender, ii) Age, iii) Experience, and v) Voluntariness of use. The model posits that three constructs have a direct influence on usage intentions: i) Effort expectancy (complexity), ii) Performance expectancy (relative advantage), and iii) Social influence. (Venkatesch et al., 2003).

The UTAUT combines eight behavioural models of technology adoption:

- The theory of reasoned action;
- The technology acceptance model;
- The motivational model;
- The theory of planned behaviour;
- A theory merging the technology acceptance model and the theory of planned behaviour;
- The model of PC utilization;
- The innovation diffusion theory, and
- The social cognitive theory.

Furthermore, the UTUAT includes determinants that moderate the four direct factors: gender, age, experience, and usage voluntariness. According to Sharma et al. (1981) a moderator is a factor that progressively alters the form of the power of the relationship existing amongst a criterion factor and a predictor. Venkatesh et al. (2003) determined that the implication of activity of the performance perceived on the motive is affected by age, experience and gender; and the effect on the implication on social variable on motive is influenced by age, gender, desire of usage and experience. Moreover, the theory posits three determinants that are not postulated to directly affect intention: anxiety of using a computer, individual efficiency and the motive of people regarding technology use (Venkatesh et al. 2003); see Figure 4.6 (UTAUT model).

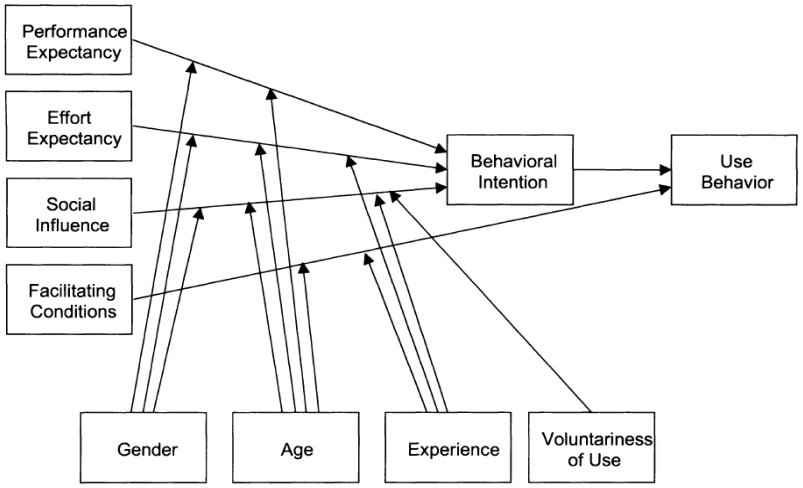


Figure 4.6: Unified Theory of Acceptance and Use of Technology (UTAUT)
(Source: Venkatesh et al. 2003)

Many studies have used UTAUT-based models to test e-Government services. For example, Martins, *et al.*(2014) used UTAUT to get a better understanding of the adoption of online banking. The findings of the study supported the correlations of the UTAUT variables. For example, performance expectancy, effort expectancy, social influence, as well the responsibility of risk was found to be strong predictors of intention. The authors found that the UTAUT contributed to the establishment and

analysis of the relationships between variables. A summary of studies using the UTAUT-based models in the public sector are listed in Table 4.1.

Table 4.1: Summary of studies using the UTAUT model in the public sector (*Adapted from Al-Sobhi. 2011*)

Context	Descriptions	Level of analysis	References
Citizens adoption of information kiosks	UTAUT helps researchers to investigate factors influencing behaviour regarding information Kiosks. Use of UTAUT helps information kiosk development and implementation in public sector, furthering adoption of e-Government among citizens.	Individual	Wang & Shih, 2009
Determine the public acceptance of e-Government services	UTAUT is applied to investigate factors that influence public to use online tax filing and payment system. This will help to provide gaudiness for strategy makers about success factors that will increase the user acceptance of e-Government services.	Individual	Hung et al., 2006
Explore adoption of information communication technology in public sector	UTAUT is used to examine the adoption behaviour of employees towards using internet as internal communication channels at organisation	Organisation	Gupta et al., 2008

UTAUT is useful and seems like a complete model since it covers the other seven major adoption models. Furthermore, its explanatory power in technology is higher than other technology acceptance theories (Venkatesh & Zhang, 2010). The recent publications on e-Government also tent to adopt this model as it highlights most of the variables that could explain the factors in e-Government adoption.

4.3 Summary of the main theories used to test e-Government adoption

Early studies that examined the implementation of e-Government to citizens generally applied the DOI and TAM theories to determine the catalyst moderators. For example, Gefen and Straub (1997), Igbaria, & Iivari (1995), Davis (1989), Davis et al.(1989), Davis & Venkatesh (1996), Mathieson (1991), Taylor and Todd (1995), Venkatesh and Davis (1996), Venkatesh, et al. (2000) and Al-Gahtani and King (1999) used DOI and TAM.

Previous research on the adoption and usage of technology which employed various theories is summarised in the three tables below.

- Table 4.2 shows various theories that include variables such as social, psychological, technical and personal characteristics that may influence citizens' behaviour when adopting e-Government public services
- Table 4.3 presents a meta-analysis of the studies using theories of *adoption*.
- Table 4.4 illustrates the gaps revealed from the findings of various research studies on the topic.

Table 4.2: Summary of the main theories used to test e-Government adoption

#	Models and Theories	Constructs
1.	TRA	Attitude towards using technology
		Subjective norm
2.	TAM/TAM2/ C-TAM-TPB	Perceived usefulness and Perceived ease of use
		Subjective norm
		Attitude towards using technology
		Subjective norm
		Perceived behavioural control
3.	MM	Extrinsic motivation
		Intrinsic motivation
4.	TPB/ DTPB	Attitude towards using technology
		Subjective norm
		Perceived behavioural control
5.	MPCU	Job-fit
		Complexity (reversed)

		Long-term consequences
		Affect toward use
		Social factors
		Facilitating conditions
6.	DOI	Relative advantage
		Ease of use
		Result demonstrability
		Trialability
		Visibility and Image
		Voluntariness
		Compatibility
7.	UTAUT	Performance Expectancy
		Effort Expectancy
		Social Influence
		Facilitating Conditions
		Behavioural Intention to adopt
		Adoption Behaviour
		Gender & Age
		Education Level
8.	SCT	Outcome expectations
		Self-efficacy
		Effects & Anxiety

Table 4.3: A meta-analysis of studies using the adoption theories *(Adapted from Ahmad et al., 2012)*

Authors	**Studies**
Al Harby et al.(2012)	End-Users' Acceptance of Biometrics Authentication to Secure E-Commerce within the Context of Saudi Culture: Applying the UTAUT Model
Venkatesh et al., (2011)	Just What the Doctor Ordered: A Revised UTAUT for EMR System Adoption and Use by Doctors
Schaupp, et al., (2010)	E-file adoption: A study of US taxpayers' intentions
Wang & Shih (2009)	Why do people use information kiosks? An authentication of the Unified Theory of Acceptance and Use of Technology
Al-hujran & Chatfield (2008)	Toward a Model for E-Government Services Adoption: The Case of Jordan
Hung et al. (2007)	User Acceptance of E-Government Services. Kaohsiung
Fu et al (2006).	Acceptance of Electronic Tax Filing: A Study of Taxpayer Intentions

Ebrahim (2005).	The adoption of e-Government in the Kingdom of Bahrain

One can conclude from these various studies that the UTUAT model is proficient in addressing most of the identified gaps as they are influenced by the socio-demographic characteristics of people. Its eight constructs (performance expectancy, social influence, facilitating conditions, behavioural intention to adult, adoption behaviour, gender, age, and education) clearly provide insights into what influences people's adoption practices. The inclusion of demographic factors and experience as constructs makes this the most appropriate model for a study which seeks to fill some of the theoretical gaps listed in Table 4.4. UTAUT provides a framework that explains people's adoption of e-Government services (Slade et al.,2015).

Table 4.4: Summary of the gaps identified in research results

Work	Results	Gaps
David et al. (2004)	Used DOI and TAM to evaluate e-Government acceptance	Finding if trust, information quality and security factors have a major effect on e-government adoption.
Scholl (2004)	Involvement will increase acceptance of e-Government	Finding if involvement of stakeholders while implementing IT projects that required BPR will increase acceptance of e-Government
Carter & Belanger (2005)	The effect of compatibility, ease of use and trustworthiness in the acceptance of e-Government services	Testing a new combined model based on two theories to test e-Government adoption: TAM and trust theory
Keng & Yuan (2005)	Defined the main five e-Government stages.	Using Meta-synthesis to study the different e-Government stages
Wing (2005)	17 barriers that can be categorized in four groups 1) strategy, 2) technology, 3) policy, 4) organization	Finding barriers in e-Government

Work	Results	Gaps
Zakareya & Zahir (2005)	Found the main barriers for integration are i- IT infrastructure, ii- security and privacy, iii- cost, iv- IT skills, v- organization	Find a framework for e-Government integration and alignment between IT and business process in Government.
King & He (2006)	The key TAM constructs in this study are i- Perceived usefulness, ii- Perceived ease of use, iii- Behavioural intention, and iv- Attitude	Using meta-analysis to study the TAM to know what makes a user accept, use and implement one system and reject another.
Shackleton et al. (2006)	Found e-commerce and e-Government maturity models can't be used in some local Governments especially on activities related to community that need interaction with citizens.	Study e-Government improvement Progress in Victoria, Australia
Streib & Navarro (2006)	Citizens expect three things from e-Government: 1) easy access to information, 2) efficient service delivery, 3) improved communication	Find what Citizens expected from e-Government
Gonzalez et al. (2007)	The relationship between Government and users, customers, business, other Governments or employees are the main elements for successful e-Government implementation.	Find the successful principles for e-Government implementation (in Spanish)
Kolsaker & Lee-Kelley (2008)	Found frequent e-Government users are motivated to acquire knowledge and prefer to participate in e-Government than the other users.	Studied whether trans formational Government strategy will help to improve services.
Al-Fakhri et al. (2008)	Citizen / user/ employee awareness, availability of legal mandate about security	Find the successful implementation factors in e-Government in Saudi Arabia.
Carter & Weerakkody (2008)	Major impact on e-Government acceptance in U.K.	Compare UK e-Government adaptation element with the USA.
Prybutok et al. (2008)	The main factor that affects the e-Government is readiness.	Defined the e-Government stages
Mosbeh & Soliman (2008)	The important factors in use's' acceptance in Tunisian Company.	Find the acceptance factor in Tunisia Company

Work	Results	Gaps
Lean et al. (2009)	Trust is the main factor in e-Government adoption.	Find the element that would encourage Malaysian citizens to access e-Government by using three theories TAM, DOI and trust Model to evaluate
Ibrahim (2010)	Showed the relationship between stakeholders and innovation, which affect e-Government usage.	Find the relationship of Innovation and e-government usage factors in Turkey
Lee (2010)	Created a framework that has two themes and nine elementary concepts	Investigated what the e-Government development stages are by studying 12 articles from a period of 10 years from 2000 to 2009 using qualitative meta-synthesis

The above three tables (4.2, 4.3, and 4.4) highlight the various theoretical frameworks for the adoption of e-Government within a variety of contexts. These studies clearly show that there is a gap in our current understanding of the factors that influences citizens to adopt e-Government services.

Within this study, a conceptual framework has been developed to address this gap in the context of the UAE's capital city Abu Dhabi and the UTAUT model has been selected as the most appropriate for this study.

4.4 Theoretical research relating to the adoption of e-Government by citizens

Many research studies have investigated e-Government implementation using the variables of DOI, TAM, UTAUT and TPB. Some researchers applied a full model of TAM, DOI, TPB, and others applied a section of them or tried to create extensions. For a particular execution of innovations or utilization of IT, such as e-Government, these theories are widely used as a foundation and determine the usage of this

innovations (Ozkan & Kanat, 2011). Alsaif summarized different research studies in citizens' adoption of e-Government, using various theories adoption models in table 4.5 below.

Table 4.5: Summary of research into adoption of e-Gov (*Adapted from Alsaif, 2013*)

Study	Place	Base Models	Factor/Constructs	Sample
Carter & Belanger (2004)	USA	(DOI)	Compatibility and image, relative advantages	140 students
Carter & Belanger (2005)	USA	(DOI)+ (TAM) + Web Trust	Perceived ease of use, trust, and perceived usefulness	140 Students
Warkentin et al. (2002)	USA	TPB	Trust	1,000 taxpaying citizens in several nations
Dimitrova & Chen (2006)	USA	(TAM)+ (DOI)	Perceived usefulness, perceived uncertainty, interpersonal communication, mass media channels and civic mindedness	447 web-based survey
Horst et al. (2007)	Netherlands	(TPB)+(TAM)	Perceived usefulness, personal experiences, subjective norm, perceived behaviour control, risk perception and trust	238 a convenience sample
Van Dijk et al. (2008)	Netherlands	UTAUT	Internet availability, knowledge of availability, digital channel preference and skill and experience of the technology	1225 a random e-mail samples (n=800), telephone sample (n=416),
Kumar et al. (2007)	Canada	TAM	Characteristics of the user, website design and service quality	

Study	Place	Base Models	Factor/Constructs	Sample
Shareef et al. (2011)	Canada	(TAM)+ (DOI) + (TPB)	Resource availability, perceived information quality, perceived awareness, perceived trust, perceived image, computer self-efficacy and multilingual options	239 four cities in Ontario, Canada
Gilbert et al. (2004)	UK	Attitude - based and Service - quality – based	Perceived barriers and perceived relative advantage	111 Stratified random sampling in Guildford
(Choudrie and Dwivedi, 2005)	UK	E-Government awareness and demographic variables	Age, gender, social class, education and availability of home internet	358 People Finder database
Carter and Weerakkody, (2008)	UK	(TAM)+ (DOI) + Trust	Relative advantages and trust	260 participants
Lean et al. (2009)	Malaysia	(TAM)+ (DOI) + Trust Model	Perceived relative advantage, perceived usefulness, trust and perceived image	195 Malaysia citizen who work in northern region of Malaysia
Hung et al. (2006)	Taiwan	(TPB)	Perceived usefulness, perceived risk, ease of use, compatibility, external influence, self-efficacy, interpersonal influence, trust and facilitating conditions	1099 Online taxpayers
Doong et al. (2010)	Taiwan	Psychological traits	Citizen's innovative, cognitive style and involvement	206 e-housekeeper users

Study	Place	Base Models	Factor/Constructs	Sample
Wangpipatwong et al. (2008)	Thailand	(TAM)	Computer self-efficacy, perceived usefulness, and perceived ease of use	614web-based survey with a probability list-based method
Lin et al. (2011)	Gambia	(TAM)	Information quality (IQ), perceived usefulness and perceived ease of use	167 e-Government users in Gambia.
Yonazi et al. (2010)	Tanzania		Perceived organisational preparedness, intrinsic service issues, citizen's preparedness, access limitation and organisational context	Case study-Three Government Departments
Akman et al. (2005)	Turkey	Demographic variables	Gender and education	83judgemental sampling
AlAwadhi and Morris (2008)	Kuwait	UTAUT	Performance expectancy, peer influence effort expectancy, facilitating condition and behaviour intention	880 Undergraduate students
Al-Shafi & Weerakkody (2009)	Qatar	UTAUT	Performance expectancy, social influence and effort expectancy.	250 Undergraduate students

4.5 E-Government Adoption Studies Using the DOI Theory

Carter & Belanger (2005) assimilated variables from the TAM, DOI and web trust theories to create an all-inclusive theory of constructs that influence the implementation of citizen of e-Government services which they tested with a sample of 140 students. The results indicated that expected simplicity of use, compatibility

and dependability are key influencers that motivate people to use e-Government amenities.

Tung and Rieck (2005) evaluated constructs influencing the implementation of e-Government amenities by companies doing merchandise activities in Singapore. The scholars utilized the DOI model and other variables derived from earlier studies – obstacles to implementation, external connections and the effect of social factors – to establish a hypothetical structure of six assimilated factors. This suggested structure was evaluated using a survey with a sample of 128 commercial companies in Singapore. The outcome showed that a positive association exists between social implication, outside stress, expected advantage and the decision of the institution to utilize e-Government services.

Lastly, Liang and Lu (2013) conducted their research in Taiwan to evaluate the variables that influence people's desire to use online tax-filing services. They gathered data via internet surveys using 400 participants who met all the requirements for the study. The findings indicated that compatibility, complication, expected characteristics of the comparative benefits and social practices had a major impact on their decision to complete their tax online.

4.6 e-Government Adoption Studies Using the TPB

Since TPB was used in the information systems studies, the model has been adopted and utilized in several research investigations. Yang and Wang (2008) used the TPB in the sector of e-Government as a posited structure to examine the effect of the three principal social attributes: behavioural regulation, subjective practice and attitude towards the reception of e-Government. The writers used Structural Equation Modelling (SEM) in empirical data analysis. The results indicate that behavioural regulation and attitude have a powerful effect on behaviour. These findings are correlated with the findings of the initial general investigation on information systems specifically on e-commerce.

Kanat and Ozkan (2009) studied the adopters' expectations of the Government. The adopted theory was founded on the TPB. The aim of this study was to find out what factors caused a minimized rate of G2C services implementation. The theory adapted a quantitative case study and established a hypothetical study theory. The study was evaluated empirically for validity and reliability and provided a new creative strategy of e-Government implementation, utilizing the TPB.

Seyal and Turner (2013) implemented the TPB as a reference structure to examine the adopter's motives for using biometrics in e-Government. Biometrics have been found to be amongst the vital optional tools in adopter validation to a structure. This research was conducted in a specific Government setting, the Government of Brunei. The data was obtained from ten ministries from 155 executive participants to discover their behavioural motives in biometrics application. The data was interpreted through the application of structural equation model software (smart-PLS).

4.7 e-Government adoption studies using a combine constructs from TAM, DOI and TPB and others

Fu et al. (2006) incorporated two significant theories into their study, the TPB and the TAM. The writers discussed the variables that motivate tax payers' to adopt a tax-filling approach (i.e. online, manual and barcode). The data was collected through a large survey conducted in Taiwan. Results indicated that the expected usefulness for taxpayers positively affected their intentions to use online tax filling. This research led to an improved comprehension of the variables influencing taxpayers' choices that can lead to better planning and establishment of online Government services.

Lean et al.'s (2009) explanatory research on Malaysia's e-Government examines the variables that motivate citizens to use Malaysian e-Government services. It

incorporates variables from various identified information systems implementation theories, namely the DOI and the TAM, modified by a culture variable and the five aspects of confidence theories. The information was obtained from surveys conducted on the widely varying Malaysian population. The results indicated that expected usefulness, expected picture, expected relative benefits and confidence have a positive correlation with the intent to use e-Government services.

Ozkan and Kanat (2011) posited a theory to describe the implementation of e-Government in Turkey. This theory combined variables from the TPB and the TAM to suit the requirements of researching acceptance of e-Government. The research was chiefly done regarding the loans service to students in Turkey. The questionnaire was distributed to more than 400 students. Partial least squares modelling was used in the evaluation of the gathered information. The results showed that the posited theory improved upon the traditional TAM in terms of forecasting strength.

Zhao and Khan (2013) did research to determine the variables that affect the United Arab Emirates (UAE) citizens' desire to adopt e-Government services. The adopted theory used encompassed variables from research in the TAM, computer self-efficiency, and confidence. The results postulate that behavioural intention is influenced by people's culture. This research led to an improved comprehension of the implementation of variables.

4.8 e-Government adoption studies using the UTAUT model

According to a number of prior studies, the UTAUT model is the benchmark and most predictive model in the technology acceptance literature (Al-Shafi & Weerakkody, 2010; Alawadhi and Morris, 2008). Many studies have adopted the UTAUT to investigate individual attitudes towards information systems adoption in both the private and public sector contexts. Table 4.6 summarises the utilisation of UTAUT and the public sector contexts where the theory has been applied.

The vast application of the UTAUT theory in the public sector with dissimilar evaluation levels motivated the researcher to use the UTAUT as a study tool to comprehend the various factors' effect on e-Government implementation. Various researchers have tried to identify the variables affecting e-Government implementation via various channels of information technology (such as kiosks, mobile technology, and internet). The range of e-Government users, the dissimilar personal characteristics that usually affect implementation (for example age of user, IT skills, and confidence level and prior knowledge with internet) and correlated obstacles motivated the researcher to apply the UTAUT theory as the hypothetical foundation because of its ability to map against these different angles.

4.9 Demographic Analysis and E-Government

Demography statistics indicate that sex, age, features of employment, and the general level of internet usage are having an impact on utilization of information technology. The UTAUT theory includes four modifiers, which allow the implementation of the technology with the view of the user, providing another set of direct correlations between the modifying behavioural factors and the utilization of technology. In the UTAUT, the idea that enabling factors affect the application of technology is directly founded on the concept that in an institutional setup, enabling factors can act as a substitute for practical behavioural regulation and thus directly affect individuals (Ajzen, 1991). The influence of enhancing conditions on behavioural motive could be moderated by age, gender, experience, and education.

4.9.1 Age

Age is a vital variable to consider when evaluating the behaviour of users and their interests in the adoption of IT. Elderly users seem to encounter a lot of challenges in understanding sophisticated information, which has an impact on their capacity to learn about new IT issues. (Morris et al., 2005; Plude & Hoyer, 1985). This may be associated with the deterioration of cognitive and remembrance abilities that is mostly found among the elderly (Posner, 1996). Therefore, unlike the young users,

elderly users appear to place greater importance on support accessibility to help them (Hall & Mansfield, 1975). Older people have settled in to a certain way of doing things that have worked for them in the past. Therefore, they are more likely to not use a new method that they are unsure about and are unlikely to be influenced by any positive information on the usage of the technology from the external environment (social influence). Therefore, age has a negative moderating effect.

4.9.2 Gender

Gender is another significant user feature that must be explored when evaluating user's interests in utilising ICT. Findings from studies indicate that male respondents are more motivated to explore and find solutions to problems and chase their objectives, unlike female respondents who mostly focus on the extent of the energy put in while achieving their goals (Henning & Jardim, 1977; Rotter & Portugal, 1969; Venkatesh & Morris, 2000). Therefore, men are minimally dependent on enabling factors when considering whether to use new IT, while women seem to focus on external supportive variables.

This can be understood partially by perceptions of gender roles in particular society where men are seen as the ones involved in executing most tasks (e.g., Lynott & McCandless, 2000). Males are more likely to respond positively to information regarding the use of new technology given that they are more involved with the application of new technology (social influence). Findings from studies indicate that male respondents are more motivated to explore and find solutions to problems and challenges and to chase their objectives. Because of this, they will also expect to get more from using this new technology (performance expectancy) (Henning & Jardim, 1977; Rotter & Portugal, 1969; Venkatesh & Morris, 2000).

4.9.3 Experience

Experience and prior knowledge can also influence the association between enabling factors and behavioural interests. Deep prior knowledge easily leads to advanced ICT literacy and an improved understanding of systems to enhance the learning of consumers to minimize the dependency on outsourcing support (Al-Shafi & Weerakkody,2010). In other words, gaining more experience with similar technologies increases the likelihood that citizens using such technologies will increase their chances of accessing e-Government services.

4.9.4 Education

Education (as moderator) levels can also influence the association between the proposed four factors (i.e., Performance expectancy, Effort expectancy, Social influence, and Facilitating conditions) and behavioural interests. Highly educated citizens are expected to espouse the new paradigm of access and use e-services with greater ease than those with low-level education; since education is directly associated with experience acquisition and the use of IT-based devices. Highly educated people are also more likely to be exposed one way or the other to new technologies.

4.10 Conclusion

This chapter provides a review of models that could help to explain the population's attitude towards the adoption of new technologies. These models are based largely on sociological and psychological concepts. Some models have been very popular in research in this area, including the UTAUT, the DOI and the TRA because of their ability to identify barriers to the adoption and integration of technology, including in the e-Government context, in a range of countries. However, theories such as the TAM, the TPB and the MPCU have limitations and weaknesses which render them inappropriate or irrelevant for this study. It has been shown that socio-demographic

characteristics such as age, gender, education and employment influence people's attitudes towards and acceptance of modern web-based technologies, and this research thus adopts the UTAUT model that incorporates these moderating factors as well.

Chapter 5: Hypotheses and Research Model

5.1 Introduction

The previous chapter discussed a number of IT adoption models that were tested and validated in different contexts. This chapter describes the UTAUT model and the extensions that were made to it in this study to evaluate Abu Dhabi's e-government.

The UTAUT model is widely used in exploratory research into adoption attitudes. This research has developed a modified version by adding two new constructs concerned with citizens' trust. These are (1) *Internet trust*, and (2) *e-Government trust.* A *voluntariness* moderator was excluded from the modified UTAUT model, because both the online and the at-desk e-Government services provided by the Emirate of Abu Dhabi are optional.

This modified UTAUT model is designed to address the research questions related to the adoption of e-Government in this Emirate:

1. What are the main factors that affect the use of e-Government services by the citizens of Abu Dhabi?
    a. To what extent can Government trust and Internet trust increase e-Government adoption?
    b. Can the gender, age, education, and experience of potential users moderate the relationship between the constructs suggested by the modified UTAUT model and e-Government adoption?
2. How effective is the modified UTAUT model as a tool for evaluating the use of e-Government services by Abu Dhabi citizens?

5.2 Why Use UTAUT in E-Government Adoption?

The integration in the UTAUT model of the eight theories mentioned above, make it a suitable, valid, recent, and reliable model of technology adoption to accommodate a high percentage of variances (R^2) in usage intention (Al Awadhi & Morris, 2008). The review of recent literature that utilised UTAUT persuaded the researcher to adopt the model to help him examine the adoption levels of Abu Dhabi Emirate's e-Government. This research will, it is hoped, highlight the main factors in the adoption of e-Government public services. The adopted model focuses on the factors that might encourage the citizens of this Emirate to use the bundle of e-public services provided by e-Government.

Venkatesh et al. (2003) reiterated the need to test the model in different contexts. Similarly, Straub (2009) stated the essential need for further validation of the UTAUT based model, since its general factors have not yet been tested from an e-Government perspective in enough settings; in particular, settings in the UAE and other GCC states. However, the purpose of using the UTAUT model is to test a set of variables which could predict e-Government acceptance and use (e.g., Beenkens, 2011; Holden & Karsh, 2010).

Moreover, this study has benefitted from the findings of related studies on the UTAUT model that drew their material from developed and developing countries, (Carter & Belanger, 2005; Carter et al., 2008; Carter &Weerakkody, 2008). It is essential for this study to weigh these factors when carrying out an investigation on citizens' intention to use e-Government services in Abu Dhabi. In addition, this study must consider and incorporate additional factors into the UTAUT model that are specifically related to the context of Abu Dhabi. Since this Emirate maintains intermediaries to facilitate e-Government adoption, each construct used in the model must be evaluated so as to identify the relevant factors for measuring the citizens' attitudes to the e-Government services provided.

5.3 UTAUT Constructs

The UTAUT model consists of several constructs. Each UTAUT variable developed as an aggregation of constructs that were used in the eight models underlying UTAUT:

1. Combined TAM and TPB (C-TAM-TPB)
2. Diffusion of Innovation Theory (DOI)
3. Model of PC Utilization (MPCU)
4. Motivational Model (MM)
5. Technology Acceptance Model (TAM)
6. Theory of Planned Behaviour (TPB)
7. Theory of Reasoned Action (TRA)
8. Social Cognitive Theory (SCT)

Table 5.1 The link between the constructs of the eight original models and the four UTAUT constructs

#	Original Models	Construct utilised in the original model	UTAUT Construct
1.	TRA	Attitude toward using tech.	Behavioural Intention
		Subjective norm.	Social Influence
2.	TAM/ TAM2	Perceived usefulness	Performance Expectancy
		Perceived ease of use	Effort Expectancy
		Subjective norm	Social Influence
3.	MM	Extrinsic motivation	Performance Expectancy
		Intrinsic motivation	Behavioural Intention
4.	TPB/ DTPB	Attitude towards using tech.	Behavioural Intention
		Subjective norm	Social Influence
		Perceived behavioural control	Facilitating Conditions
5.	C-TAM-TPB	Perceived usefulness	Performance Expectancy
		Attitude toward using tech.	Behavioural Intention
		Subjective norm	Social Influence
		Perceived behavioural control	Facilitating Conditions
6.	MPCU	Job-fit	Performance Expectancy
		Complexity (reversed)	Effort Expectancy
		Long-term consequences.	
		Affect towards use.	Behavioural Intention
		Social factors.	Social Influence
		Facilitating conditions	Facilitating Conditions
7.	DOI	Relative advantage	Performance Expectancy
		Ease of use	Effort Expectancy

		Result demonstrability	
		'Trialability'	
		Visibility	
		Image	Social Influence
		Compatibility	Facilitating Conditions
		Voluntariness	Voluntariness
8.	SCT	Outcome expectations	Performance Expectancy
		Self-efficacy	With no significant influence on behavioural intention
		Affect	Behavioural Intention
		Anxiety	With no significant influence on behavioural intention

5.3.1 Performance Expectancy

Performance expectancy is defined as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al., 2003; p.447). Performance expectancy in the UTAUT model was developed from five original models' constructs which had been used in certain technology adoption models, namely, perceived usefulness from the *TAM* and the *combined TAM-TPB* model, extrinsic motivation from the MM model, job-fit from the MPCU model, relative advantage from the IDT (DOI) model, and outcome expectancy from the SCT model (Venkatesh et al., 2003). Many researchers have considered Performance expectancy to be the strongest predictor of intention to use e-Government services (Venkatesh & Davis, 2000; Venkatesh et al., 2003).

An example of this construct in the Abu Dhabi e-Government context is when a citizen perceives that using e-Government services (e.g., to set up a hospital appointment, pay a traffic fine, request supported food from the municipality, etc.) would be more effective in terms of speed, reduced effort, reduced cost, and the ability to contact a Government entity easily with the desired service outcome. In the context of this study, therefore, the following hypothesis can be stated:

H1: *Performance expectancy will have a positive influence on the behavioural intention to use e-Government services.*

Tables 5.2 UTAUT Performance Expectancy construct as aggregated from the original constructs description (*Adopted from Venkatesh et al.,2003*)

Original Constructs	Description/Definition
Perceived Usefulness (Davis 1989; Davis et al. 1989)	"The degree to which a person believes that using a particular system will enhance his or her job performance." (Venkatesh et al.,2003; p.448)
Extrinsic Motivation (Davis et al., 1992)	"The perception that users will want to perform an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved job performance, pay, or promotions." (Venkatesh et al.,2003; p.448)
Job-fit (Thompson et al., 1991)	"How the capabilities of a system enhance an individual's job performance." (Venkatesh et al.,2003; p.448)
Relative Advantage (Moore & Benbasat, 1991)	"The degree to which using an innovation is perceived as being better than using its precursor." (Venkatesh et al.,2003; p.449)
Outcome Expectations (Compeau & Higgins, 1995; Compeau et al., 1999)	"Outcome expectations relate to the consequences of the behaviour. Based on empirical evidence, they were separated into performance expectations (job-related) and personal expectations (individual goals). For pragmatic reasons, four of the highest loading items from the performance expectations and three of the highest loading items from the personal expectations were chosen from Compeau's works (1995; 1999) for inclusion in the current research. However, our factor analysis showed the two dimensions to load on a single factor." (Venkatesh et al.,2003; p.449)

5.3.2 Effort Expectancy

Effort expectancy is defined as "the degree of ease associated with the use of a system‖" (Venkatesh et al., 2003, p. 450). Effort Expectancy in the UTAUT model has been developed from three constructs used in certain technology adoption models, namely, perceived ease of use from the TAM/TAM2 Models, complexity from the MPCU Model, and ease of use from the IDT (DOI) model (Venkatesh et al., 2003). Venkatesh et al. (2003) have shown that effort expectancy plays a key role in facilitating the acceptance of technology. Many, such as Venkatesh et al. (2003), have shown that effort expectancy had a significant influence on behavioural intention (e.g. Alsaif (2013), Alanazi (2013), Hariri (2014), and Davis (1989)).

An example of this construct in an e-Government context is when a citizen perceives that it is very easy to use an e-Government service, for example, to pay a traffic fine. This study therefore sets up the following hypothesis:

H2: *Effort expectancy will have a positive influence on the behavioural intention to use e-Government services***.**

Table 5.3: Relationship of Effort Expectancy with constructs from the eight original models *(Adopted from Venkatesh et al.,2003)*

Original Constructs	Description/Definition
Perceived Ease of Use (Davis 1989; Davis et al. 1989)	"The degree to which a person believes that using a system would be free of effort." (Venkatesh et al.,2003; p.451)
Complexity (Thompson et al. 1991)	"The degree to which a system is perceived as relatively difficult to understand and use." (Venkatesh et al.,2003; p.451)
Ease of Use (Moore & Benbasat, 1991)	"The degree to which … an innovation is perceived as being difficult to use." (Venkatesh et al.,2003; p.451)

5.3.3 Social Influence

Social influence is defined as "the degree to which an individual perceives that others believe he or she should use the new system" (Venkatesh et al., 2003; p.451). In the present research, social influence is defined as the importance of family or colleagues or a friend's opinion/belief in affecting the intention to use e-government. Social influence in the UTAUT model has been developed from three constructs used in certain technology adoption models, namely, the subjective norm from the TRA, TAM2, TPB/DTPB, and C-TAM-TPB Models, social factors from the MPCU Model, and image from the IDT (DOI) model (Venkatesh et al., 2003). Many researchers find that social influence is important in persuading people to accept and use new technology, for example, Al Awadhi and Morris (2008), Rogers (1995), Taylor and Todd (1995), Venkatesh et al., (2003), Rogers, (2003), and Lakhal et al., (2013).

An example of this construct in an e-government services context is when a citizen perceives that all his friends or family are using e-Government services instead of normal services, and therefore, he should do the same. This is a demonstration of the influence of this construct. In the context of this study, the following hypothesis can be stated:

H3: *Social influence will have a positive influence on the behavioural intention to use e- Government services*.

Table 5.4: Relationship of Social Influence with other constructs from the eight original models*(Adopted from Venkatesh et al.,2003)*

Original Constructs	Description
Subjective Norm (Ajzen 1991; Davis et al. 1989; Fishbein and Azjen 1975;Mathieson 1991; Taylor and Todd 1995)	"The person's perception that most people who are important to him think he should or should not perform the behavior in question."(Venkatesh et al.,2003; p.452)
Social Factors (Thompson et al. 1991)	"The individual's internalization of the reference group's subjective culture and the specific interpersonal agreements that the individual has in the Abu Dhabi Emirate with others in specific social situations." (Venkatesh et al.,2003; p.452)
Image (Moore & Benbasat, 1991)	"The degree to which the use of an innovation is perceived to enhance one's image or status in one's social system." (Venkatesh et al.,2003; p.452)

5.3.4 Facilitating Conditions

Facilitating conditions are defined as "the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system" (Venkatesh et al., 2003; p.453). In the e-government context, facilitating conditions refer to the degree to which citizens expect that the e-government system is supported with a functioning helpdesk and a technical team with good infrastructure. The facilitating conditions in the UTAUT model haven been developed from three constructs used in certain technology adoption models, namely, perceived behavioural control from the TPB/DTPB and C-TAM-TPB Models, facilitating conditions from the MPCU Model, and compatibility from the IDT (DOI) model (Venkatesh et al., 2003). In the study by Venkatesh et al in 2003, it was expected that the availability of technical support to help citizens with any difficulty or problem

that might affect them could lead to increased satisfaction on the part of citizens (Shea et al., 2005). Research in the information technology adoption field has found that the facilitating conditions construct has a positive influence on e-Government adoption (e.g. Jong & Wang 2009; Lakhal et al. 2013; Thompson et al., 1991; Venkatesh et al., 2003).

In 2012, Venkatesh argued that facilitating conditions had an effect on behavioural intention because women with less experience of the Internet tended to emphasise the need for external help; thus the facilitating conditions were an important factor in the behavioural intention to use the e-government system. Thus this study advances the following hypothesis:

H4: *Facilitating conditions will have a positive influence on the behavioural intention to use e-Government services.*

Facilitating conditions also have another effect; in the original UTAUT model *Facilitating conditions* had a positive effect on *perceived* use of e-Government services. This was expected, since old people tend to receive help and support in their use of new technology (Venkatesh et al. 2003). Thus, the researcher developed the following hypothesis:

H5: *Facilitating conditions will have a positive influence on perceived use of e-Government services*.

Table 5.5: Relationship of facilitating conditions with constructs from the eight original models*(Adopted from Venkatesh et al.,2003)*

Original Constructs	Description
Perceived Behavioral Control (Ajzen 1991; Taylor and Todd 1995)	"Reflects perceptions of internal and external constraints on behavior and encompasses self-efficacy, resource facilitating conditions, and technology facilitating conditions." (Venkatesh et al.,2003; p.454)
Facilitating Conditions (Thompson et al., 1991)	"Objective factors in the environment that observers agree make an act easy to do, including the provision of computer support." (Venkatesh et al.,2003; p.454)
Compatibility (Moore & Benbasat 1991)	"The degree to which an innovation is perceived as being consistent with existing values, needs, and

	experiences of potential adopters." (Venkatesh et al.,2003; p.454)

5.3.5 Trust Constructs

Trust is a variable that will be incorporated in the model for the purposes of this study; it is not used in the original UTAUT model. Research about online behaviour shows the importance of adding the trust factor in adoption models because it provides for a means of understanding users' behaviour when they accept and use electronic services (Carter & Weerakkody, 2008, Gefen et al., 2003; Pavlou 2003; Pavlou & Fygenson 2006). Trust is defined as an expectancy that the words in the spoken or written statements given to people can be relied on (Rotter, 1967). Trust has great value for research in the area of social psychology and personality (Rotter, 1967). Online trust has been referenced in a number of research works (McKnight et al., 2002; Carter & Weerakkody, 2008). The literature related to online trust has focused on two types of trust. *First*, trust in the entity providing the service – in our context, the Abu Dhabi Government departments (e-Government trust) *Second*, trust in the media through which the service is provided – in our context, the Internet (Carter & Weerakkody, 2008, Tan & Theon, 2001).

5.3.6 e-Government trust

Trust has been shown to be an integral part of e-Government adoption (Carter & Belanger 2005). Oxendine et al. (2003) compared the level of citizens' adoption of electronic networks in different regions of the USA; they found that system adoption was more prominent in localities where citizens are more trusting. Due to the impersonal nature of the Internet, citizens must believe that the agency providing the service is reliable.

Wang and Emurian (2005) envisage that lack of trust is one of the most formidable barriers to e-public service adoption, especially when financial or personal information is involved (Carter & Weerakkody, 2008). For example, a citizen wants to be sure in making transactions via e-Government services that her/his personal

information is secured. In the context of this study, the following hypothesis can be posited:

H6: *Trust in the e-government will have a positive influence on behavioural intention.*

5.3.7 Internet trust

"Trust in the Internet is a salient predictor of e-public service adoption " (Carter & Weerakkody, 2008). Trust in the Internet is critical when the information that is shared with other is sensitive. (Carter & Weerakkody, 2008). This construct in the e-Government context is exemplified when a citizen wants to use certain services. The question that arises is whether he should trust the Internet and provide his personal or credit card information. Thus, this study will consider the following hypothesis:

H7: *Trust in the Internet will have a positive influence on behavioural intention*.

5.3.8 Behavioural Intention (BI)

Behavioural Intention is defined as "[a] person's subjective probability that he or she will perform the behaviour in question" (Fishbein and Ajzen, 1975; p. 288). Another definition by Davis (1989) is the readiness of an individual to act, use, or adopt a behaviour towards a specific thing. Intentions refer to people's willingness to try or plan to do something but not to the effort to get the thing or perform the behavior (Ajzen, 1991). In the e-government services context, behavioural intention is the intention of citizens to use e-government services in the future. Researchers have found that behavioural intention has a positive effect on the actual use of a technology system (Venkatesh et al., 2003; Ajzen, 1991). In the present study, it is expected that the six independent variables of Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Trust in e-Government and Trust in Internet will have a marked effect on behavioural intention, which will affect the *perceived use* of the e-government services.

An example of this construct in the e-Government context is when a citizen intends to use the e-Government system to obtain government services in the future. In the context of this study, the following hypothesis is raised:

H8: *Behavioural intention to use e-Government services will have a positive influence on the perceived use of e-Government.*

5.3.9 Moderators

In this section the research will describe the moderators, their role and how they affect the hypotheses; it will discuss the theoretical justification for this. Sun and Zhang (2006) have highlighted the importance of moderators such as age, gender and experience and the key roles that they play in technology adoption (e-Government services, in the present study. Sun and Zhang were among the few researchers to explore moderators and their effect in the technology adoption model; they help describe the different effects of these moderators in the technology adoption model constructs. In addition, moderation explains the differences in the findings between the technology adoption models. Some of them ignore the moderation or deal with it in different ways (Sun & Zhang, 2006).

In 2012, Venkatesh also mentioned that his original UTATU model was not fully used by most of the subsequent studies. For instance, Al-Gahtani et al. (2007) and Armida (2008) used only the main constructs and omitted the moderators. Venkatesh recommended investigating and theorizing about various moderators when testing UTAUT in different contexts. The present research will examine Gender, Age, Experience, and Education level as moderators to test the modified UTAUT model in the context of Abu Dhabi's e-Government.

5.3.9.1 Gender

Gender, could also act as a moderator for technology adoption, including e-Government services. Differences in gender are expected to be significant; they indicate that males tend to be more highly task-oriented than females (Venkatesh,

2000). In 2003, Venkatesh suggested that gender moderates the effects of Performance Expectancy, Effort Expectancy, and Social Influence on Behavioral Intention. Moreover, Venkatesh found in 2012 that gender had other moderating effects between Facilitating Conditions and Behavioral Intention. This was also supported by other researchers, such as Sun and Zhang (2006), Venkatesh et al. (2003) , and Venkatesh et al.(2012).

According to the original UTAUT model, gender may affect the relationship between Performance Expectancy and Behavioural Intention. This is expected if men are more task-oriented than women, as Venkatesh et al.(2003). The following hypothesis can therefore be put forward:

H1a*:* *Gender differences positively moderate the relationship between Performance Expectancy and Behavioural Intention.*

Gender also affects the relationship between the effect of Effort Expectancy and Behavioural Intention. In the original UTAUT (Venkatesh et al. 2003), it is argued that males rely more on performance when deciding to adopt an IT technology (Tai and Ku, 2013). Moreover, other researchers such as Venkatesh & Morris in 2000 and Alsharif in 2013 support this hypothesis. In this study, the following hypothesis is tested:

H2a*:* *Gender differences positively moderate the relationship between the effect of Effort Expectancy and Behavioural Intention.*

The relationship between social influence and behavioural intention is affected by gender because women are more sensitive to other people's opinions when adopting new technology to increase their decision-making capabilities (Venkatesh et al. 2000; Park et al. 2012). This hypothesis was supported by Alsharif in 2013, Wang in 2009, Bem and Allen in 1974 and Tai and Ku (2013). In the context of this study, the following hypothesis is advanced:

H3a*:* *Gender differences positively moderate the relationship between Social Influence and Behavioural Intention.*

Because of the different characteristics of men and women, facilitating conditions are expected to be affected by gender more strongly as people age (Alsharif,2013). In 2012, Venkatesh argued that men tend to rely on facilitating conditions when using new technology, whereas women like to get external support. This contention is supported by other researchers such as Sun and Zhang in 2006 and Venkatesh et al., 2012. In the context of this study, the following hypothesis is formulated:

H4a*:* *Gender differences positively moderate the relationship between Facilitating Conditions and Behavioural Intention.*

5.3.9.2 Age

In the present research, Age has been considered a moderator that affects the adoption of e-government services in Abu Dhabi. Sun and Zhang (2006) argue that Age is a less effective moderator than other moderators, such as gender and experience, but it is still effective. Venkatesh et al. (2003) found that young users gave more weight to extrinsic rewards. According to the original UTAUT model, age may affect the relationship between Performance Expectancy and Behavioural Intention (Venkatesh et al. 2003). This is supported by other researchers such as Hall & Mansfield in 1975 and Plude and Hoyer in 1985.

According to the original UTAUT model Age my affect the relationship between Performance Expectancy and Behavioural Intention. because younger people may place more importance on extrinsic rewards (Venkatesh et al. 2003). This hypothesis is also supported by other researchers such as Venkatesh et al. in 2012, and Tai and Ku in 2013. In the context of this study, the hypothesis that age acts as a moderator between *performance expectancy* and *Behavioural Intention* are the following:

H1b: *Age positively moderates the relationship between performance expectancy and behavioural intention*.

Moreover, age plays an important role when it comes to effort expectancy as older people try to avoid complex process and this affects their decision to use or not use IT systems (Venkatesh et al., 2003). This hypothesis is supported by Plude and Hoyer in 1985, Venkatesh & Morris in 2000, and Tai and Ku in 2013. In the context of this study, the hypothesis that age plays a moderating role between *effect of effort expectancy* and *Behavioural Intention* are the following:

H2b: *Age positively moderates the relationship between the effect of effort expectancy and behavioural intention.*

Previous research has found that affiliation needs growth as people get older (Rhodes 1983; Venkatesh & Morris, 2000). In 2003, Venkatesh argued that older people are influenced by others in deciding whether to accept or reject IT technology (Tai and Ku, 2013). The present study, then, advances the following hypothesis:

H3b: *Age positively moderates the relationship between social influence and behavioural intention.*

Older people face difficulties when dealing with complex systems and usually ask for help and support which they secure before deciding to use any system (Morris et al. 2005; Posner 1996, Hall and Mansfield 1975). Moreover, older women put more emphasis on facilitating conditions (Venkatesh 2013). This prompts the study to consider the following hypothesis:

H4b: *Age positively moderates the relationship between facilitating conditions and behavioural intention.*

5.3.10.3 Computer Experience

In this research computer experience has also been considered a moderator that affects the adoption of e-government services in Abu Dhabi. Experience as a moderator in work contexts was tested by Davis in 1989 and Venkatesh and Davis in 2000. In 2003, Venkatesh also suggested that experience moderates the effect of Effort Expectancy and Social Influence on Behavioural Intention. In 2012,

Venkatesh also found other effects of experience as a moderator between facilitating conditions and behavioural intention. Internet experience has been tested by many researchers and has been shown to be a moderator that strongly affects behavioural intention (Jiang et al. 2000). Similarly, Al-Sobhi in 2011 maintained that people with more internet experience were more likely to accept and use e-government than people with less Internet experience. It cannot be denied that computer experience is an important factor in citizens' use of e-government services, since by definition e-government requires basic experience of computers to use it at all.

Sun and Zhang (2006) argue that experience plays a moderating role between performance expectancy and behavioural intention. Other researchers, such as Taylor and Todd in 1995, Venkatesh and Davis in 2000, and Venkatesh et al. in 2003, have also proposed that experience affects the relationship between performance expectancy and behavioural intention in the adoption of new technology. This study therefore adds the following hypothesis:

H1c*:* *Experience positively moderates the relationship between performance expectancy and behavioural intention*.

According to the original UTAUT model, experience may affect the relationship between the *effect of Effort Expectancy on Behavioural Intention*, especially among people who have little experience of the system. (Venkatesh et al. 2003). In the context of this study, the following hypothesis may be advanced:

H2c*:* *Experience positively moderates the relationship between the effect of Effort Expectancy and Behavioural Intention*.

Social influence has become a more important factor, especially when a new system is introduced to people with little experience (Miller 1976; Venkatesh et al. 2000). Thus, the study posits the following hypothesis:

H3c*:* *Experience positively moderates the relationship between Social Influence and Behavioural Intention*.

In 2012, Venkatesh argued that women with less experience tend to place much weight on external help, which makes experience play a moderating role in the facilitating conditions. Thus this study puts forward the following hypothesis:

H4c*: Experience positively moderates the relationship between facilitating conditions and behavioural intention.*

5.3.9.4 Education level

Education level has been added as moderator in this research, though it is not included in the original UTATU or the extended UTAUT. It has been added because it has been found by many researchers, such as Quazi and Talukder in 2011 and Wu & Lederer in 2009, that oureducation level affects the acceptance level of new technologies (Hariri 2014). Education level has been noted as an important moderator in technology acceptance because highly educated people tend to adopt new technologies more (Kang & Yoon,2008). Other researchers who have examined the adoption of information technology, such as Choudrie and Lee in 2004 and Choudrie and Papazafeiropoulou in 2006, have mentioned the importance of education level as a moderating factor that affects behavioural intention (Al-Shafi,2009).

People with a high level of education are likely to be more capable of benefiting from an e-government system (Al-Sobhi, 2011). As a consequence, performance expectancy is expected to be moderated by education level when it comes to the adoption of new technology. This study therefore includes the following hypothesis:

H1d*: Education level positively moderated the relationship between performance expectancy and behavioural intention.*

In 2010, Niehaves and Plattfaut found that education level affected the relationship between Effort Expectancy and behavioural intention. Since people with low education expect less effect from any new system that they use, this is an important factor for them (Niehaves and Plattfaut, 2010). In 2013 Alsharif also maintained the

importance of the moderating role of education. Thus this study considers the following hypothesis:

H2d*:* *Education level positively moderates the relationship between the effect of effort expectancy and behavioural intention.*

Education level has also been noted as an effective moderator between social influence and behavioural intention (Alsaif,2013), because people with a low education level tend to follow others in trying to use new technology (Al-Gahtani et al., 2007; Venkatesh and Zhang, 2010). Hence, this study adds the following hypothesis:

H3d*:* *Education level positively moderates the relationship between social influence and behavioural intention.*

Research has found that the relationship between facilitating conditions and behavioural intention is moderated by education level (Mahmood et al., 2001; Venkatesh et al., 2000).

This is because a low education background leaves people needing more support and help if they use new technology. In the context of this study, the following hypothesis is adopted:

H4d*:* *Education level positively moderates the relationship between facilitating conditions and behavioural intention.*

5.4 Research Model

Various technology adoption studies used the original UTAUT model, while others also included constructs added to reach a comprehensive framework for IT adoption. In this research, the UTAUT model (see 4.2.5 for further details) is used and modified to test the level of citizens' adoption and acceptance of e-Government services in the Abu Dhabi Emirate.

The Government of Abu Dhabi intends to attract citizens to the e-Government paradigm in order to increase the use and benefits of the e-Government initiatives.

The expected outcome from this study is that key factors in influencing citizens' adoption of e-Government in the Abu Dhabi Emirate will be identified. This will be tested using a modified UTAUT model, which appears to be the most suitable model for this study. The research constructs will be tested for their reliability and construct validity before the findings are presented. Cronbach's coefficient alpha values will be used to examine the internal consistency of the measure (Hinton et al., 2004; Field, 2009).

Three direct determinants of behaviour intention to use the technology are included in the UTAUT model, namely, social influence, effort expectancy and performance expectancy. Two direct determinants of the actual use of technology are included in UTAUT: facilitating conditions and behaviour intention. In addition, the model contains four moderating variables that have an effect upon the direct determinants – age, gender, and experience – along with two added variables (trust in e-Government and trust in the Internet), and one moderator (the educational level). On this understanding, the researcher developed the theoretical model to include the following proposed variables:

- *Dependent variables*: Behavioural Intention and the *perceived use* of e-Government.
- *Independent variables*: Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Trust in e-Government and Trust in the Internet.
- *Moderating variables*: Gender, Age, Computer Experience and Education.

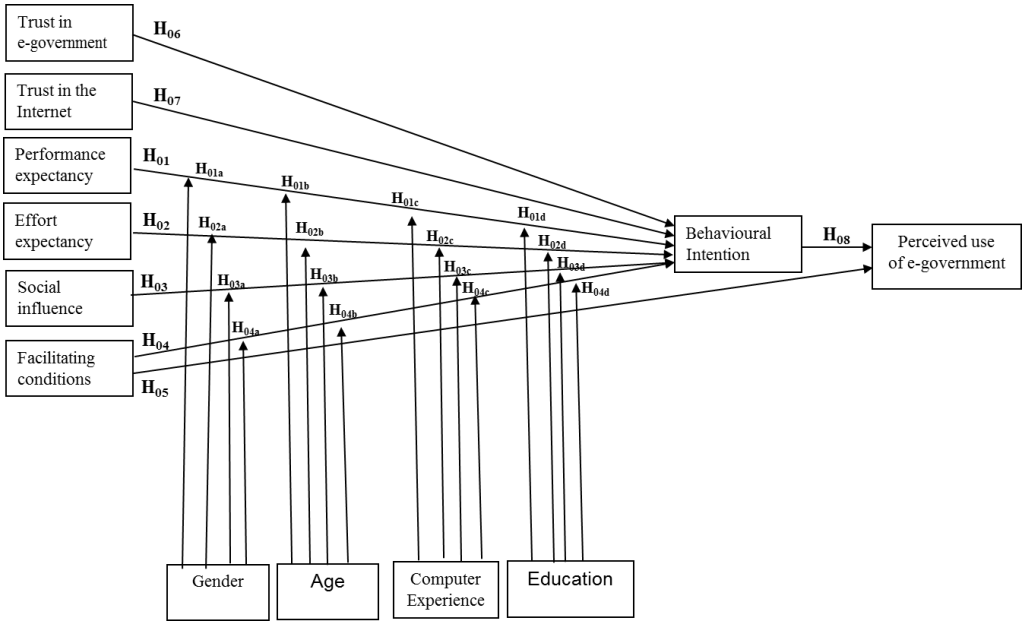


Figure 5.1 : The modified schema of UTAUT hypotheses

The research model has several constructs; the definitions of these constructs are listed in **Table 5.6**, which presents the various factors investigated in the related research studies on technology adoption.

Table 5.6: Factors employed to examine technology adoption

Construct	Description	Sources
Performance expectancy	"the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al.,2003; p.447)	Venkatesh et al., 2003.
Effort expectancy	"the degree of ease associated with the use of a system" (Venkatesh et al., 2003, p. 450)	Venkatesh et al., 2003.
Social influence	"the degree to which an individual perceives that others believe he or she should use the new system" (Venkatesh et al., 2003; p.451)	Venkatesh et al.,2003
Facilitating conditions	"the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003; p.453)	Venkatesh et al., 2003
Behavioural intention	"the person's subjective probability that he or she will perform the behaviour in question" (Fishbein and Ajzen, 1975; p. 288)	Venkatesh et al., 2003
Actual use of e-government (*perceived use*)	The actual use and associated behaviour to using e-government	Venkatesh et al., 2003
Trust in e-Gov	Trust in the entity providing the service and the ability to provide e-Government services	Horst et al., 2007

Trust in the Internet	An individual's perceptions of the institutional environment, including the parameters and directives that make an environment feel safe	McKnight et al. 2002

5.5 Hypotheses summary

The study hypotheses related to the model are listed in the table below:

Table 5.7: A list of study hypotheses

H#	Hypothesis	
H1	*Performance expectancy will have a positive influence on behavioural intention to use e-Government services.*	
	H1a	*Gender differences positively moderate the relationship between performance expectancy and behavioural intention.*
	H1b	*Age positively moderates the relationship between performance expectancy and behavioural intention.*
	H1c	*Experience positively moderates the relationship between performance expectancy and behavioural intention.*
	H1d	*Education level positively moderates the relationship between performance expectancy and behavioural intention.*
H2	*Effort expectancy will have a positive influence on behavioural intention to use e-Government services.*	
	H2a	*Gender differences positively moderate the relationship between the effect of effort expectancy and behavioural intention.*
	H2b	*Age positively moderates the relationship between the effect of effort expectancy and behavioural intention.*
	H2c	*Experience positively moderates the relationship between the effect of effort expectancy and behavioural intention.*
	H2d	*Education level positively moderates the relationship between the effect of effort expectancy and behavioural intention.*

H3	*Social influence will have a positive influence on the behavioural intention to use e-Government services.*	
	H3a	*Gender differences positively moderate the relationship between social influence and behavioural intention.*
	H3b	*Age positively moderates the relationship between social influence and behavioural intention.*
	H3c	*Experience positively moderates the relationship between Social Influence and behavioural Intention.*
	H3d	*Education level positively moderates the relationship between social influence and behavioural intention.*
H4	*Facilitating conditions will have a positive influence on the behavioural intention to use e-Government services.*	
	H4a	*Gender differences positively moderates the relationship between facilitating conditions and behavioural intention.*
	H4b	*Age positively moderates the relationship between facilitating conditions and behavioural intention.*
	H4c	*Experience positively moderates the relationship between facilitating conditions and behavioural intention.*
	H4d	*Education level positively moderates the relationship between facilitating conditions and behavioural intention.*
H5	*Facilitating conditions will have a positive influence on the perceived use use of e-Government services.*	
H6	*Trust in the e-government will have a positive influence on behavioural intention.*	
H7	*Trust in the internet will have a positive influence on behavioural intention.*	
H8	*Behavioural intention to use e-Government services will have a positive influence on the perceived use of e-Government.*	

5.6 Conclusion

Few research studies consider the adoption e-Government in the context of Abu Dhabi's government. Thus, the two key questions for this study to address are: **i**) understanding what influences citizens to adopt e-Government services in Abu Dhabi, and **ii**) how effective the modified UTAUT model is in evaluating citizens' adoption of e-Government services in Abu Dhabi. In order to evaluate the UTAUT based model with e-Government, the study adapted five hypotheses introduced by Venkatesh et al. (2003) and the additional hypotheses incorporated into the study, in order to examine the modified UTAUT model.

Chapter 6: Research Methodology

6.1. Introduction

This chapter provides an explanation of the research paradigm that will guide the research methodology used in this study. Based on the main aim of the study, i.e., to explore the factors affecting the Abu Dhabi citizens' adoption of e-Government services, a quantitative approach is adopted, using an online-administered questionnaire. An essential step in the process involves the development of a quantitative survey instrument. Once the variables were collected and measured, the links between them were investigated, while the final step entailed the interpretation of the results. All the steps described in previous chapters provide a comprehensive outline of the research methods used in this study. We will summarize in the following sections the various paradigms and philosophies adhered to in the research. We then detail our quantitative research paradigm on a survey based approach. Data Collection, sampling and data analysis approaches will be discussed.

6.2 Research Philosophies

Creswell (2014) states that describing the philosophical position underlying the research becomes essential as it can direct and justify the research activities. According to Galliers (1991), a research philosophy involves the researcher's belief regarding the manner in which the data about a phenomenon should be collected, analysed and applied. This echoes Lincoln & Guba (1985) who posit that no researcher should go into the field without having a clarity regarding the paradigms that inform and guide their approach to inquiry. Guba (1990) defines the paradigms as basic beliefs that guide the actions of an individual while Creswell (2014) defines these to be the worldview of an individual.

Fitzgerald and Howcroft (1998) hypothesise that the literature on the research approaches, is broad and contentious which is concerned with the fundamental research philosophies that are often seen as dichotomous to each other. Paradigms play a number of roles in the conduct of research which include:

i. Assisting in the development of models and theories that permit practitioners to solve these issues
ii. Helping in establishing criteria for using various tools, such as methodology, instruments, and data collection methods which would enable researchers to solve these issues
iii. Providing the principles, procedures, and methods to be considered when similar issues (phenomena) appear again

Corbin and Strauss (2008) define methodology as a manner of reflecting and studying a phenomenon, referred to by Bryman (1984) as an epistemological position, and by Corbin and Strauss (2008) as a rationale for picking a particular method over others. Guba and Lincoln (1994) suggest that the selection of a methodology is guided by the ontological question, the epistemological question and the methodological question. The ontological question concerns the researcher's view of the world in terms of what they believe to be the nature of reality and what it is that exists physically.

The epistemological question asks about the nature of the relationship between the researcher and what can be known. Finally, the methodological question relates to how the researcher can go about discovering knowledge that they want to know. The process of inquiry is guided by four main paradigms which are positivism, post-positivism (which are predominantly quantitative), critical theory and constructivism (which are predominantly qualitative).

6.3 Positivism

The positivist paradigm holds assumptions and beliefs which include the realist ontology and the representative epistemology. The realist ontology assumes that there exists an unchangeable reality that the researcher can study independently (Sanders et al., 2009). In that regard, the object of study is independent of the researcher. Representational epistemology assumes that it is possible for people to know this reality through direct observation and that by using symbols, they can accurately explain and describe it. In other order words, this paradigm posits a reality that is separate from the common knowledge of it, so that the object and the subject are each autonomous.

The positivist paradigm offers an objective reality for researchers to compare their claims and establish the truth. It assumes that there are existing cause and effect patterns that can be used to predict and control natural occurrences. Its main objective is, therefore, to determine the patterns. It assumes that individuals can rely on their views of the world for accurate data and that research is free of subjectivity bias and can achieve its objectivity through the researcher following strict methodological protocol (Coolican, 2004). This approach relies heavily on manipulative and experimental methods as they ensure a distance between the researcher's subjective biases and the objective reality under study. This involves generating hypotheses and testing them by using quantitative methods.

According to Coolican (2004), many researchers have operated within agreed-upon practices, norms, and ideas that could be used in distinguishing between more and less plausible claims that cannot be answered by a single research study. It involves observing and collecting data, looking for patterns in these data. It includes also developing a theory and formulating hypotheses from which research may either support or adjust the theory. This confirmatory approach involves starting out with a theory about the recurrence of a particular phenomenon and then developing a prediction model based on the theory. The researcher then conducts an empirical

inquiry to test the hypothesis and whether the data supports the hypothesis, hence supporting the causal theory.

Positivism uses a quantitative approach based on mathematical and statistical techniques for identifying facts and causal relationships. Its main advantage rests on facilitating the use of samples. The larger the sample, the better it would be represent the target population. So, based on a sample, inference about a population can be made within known limits of error.

6.4 Interpretivism

Interpretivism is guided by the assumption that reality is socially constructed and therefore is subjective and multiple (Creswell 2014; Hesse-Biber 2011). It involves attempting to understand and reconstruct the constructions that people initially hold, including the researcher. Lincoln and Guba (2000) classify it as social constructivism and it involves the researcher playing the roles of both the facilitator and a participant in the process. Interpretivism operates from a premise that there is no universal truth and all phenomena are understood and interpreted from the researcher's own frame of reference. In the case of interpretivism, the researcher assumes multiple realities exist as subjective constructions of the mind.

Objectivity is, therefore, impossible as socially transmitted terms direct how reality is perceived and this will vary across different languages and cultures. The distinction between the researcher and a research situation is collapsed and the research findings emerge from the interaction between the researcher and research situation with the values and beliefs of the researcher acting as central mediators. Having its origins in anthropology, the interpretivist research orientation is centered on the native/insider’s view.

Interpretivism is generally associated with qualitative research (Creswell 2014). The approach is characterised by the use of thick descriptions to derive meaning with the focus being on determining what things exist rather than how many there are. It is a

less structured approach and is more responsive to the needs and nature of the research situation. It is exploratory in nature and is concerned with discovering patterns in research data to explain and or understand them. It may lead to the generation of hypotheses (Sanders et al., 2009).

There are two broad forms of Interpretivism: critical theory and constructivism. The critical theory assumes that reality can be understood from a historical perspective so that the inquirer and the inquired are interactively linked to an extent that the values of the inquirer and significant others influence the study resulting in findings that are value-mediated. Constructivism holds the view that there is no singular reality, so for understanding one has to view it as consisting of varied and intangible mental constructions that are socially and experientially based, and are local and specific in nature (Guba, 1990).

6.5 Inductive *vs*. Deductive

Induction is the process of reasoning by which a conclusion follows necessarily from the stated premises. It involves inference by reasoning from the general to the specific. Inductive arguments are primarily grounded on observation or experience and are expressed inductively. The arguments are based on rules, laws and other generally accepted principles and are expressed deductively (Trochim, 2006).

In the deductive approach, a causal link or relationship that is implied in a particular case or theory can be true in several cases. A deductive approach design could test whether the researched link or relationship is actually being observed in more generalized circumstances. When using a deductive approach, the researcher formulates some hypotheses to be tested. The study then, with relevant methodology, seeks to prove whether the hypothesis is either right or wrong. The whole process moves from theory, to testing the hypothesis, to observation, which will then result in confirmation or a rejection.

Saunders et al. (2003), state that the inductive approach is useful in data collection and in the development of a theory to lead to data analysis. The deductive approach on the other hand is useful in the development of a theory where the research strategy aims to test this theory. Research approaches whether inductive or deductive inform whether a phenomenon is studied using qualitative or quantitative research design. In 1998 Fitzgerald & Howcroft summarizes the differences between positivist and interpretivist paradigms, lending an understanding of the current study's choice of research framework and design as showing in Table 6.1.

Table 6.1: Summary of Research Dichotomies (Adopted from *Fitzgerald & Howcroft 1998*)

Paradigm Level	
Interpretivist	**Positivist**
No universal truth. Understand and interpret from the researcher's own frame of reference. Not committed neutrality is impossible. Realism of context is important	Belief that the world conforms to fixed laws of causation. Complexity can be tackled by reductionism. Emphasis on objectivity, measurement and repeatability.
Ontological Level	
Relativist	**Realist**
Belief that multiple realities exist as subjective constructions of the mind. Socially transmitted terms direct how reality is perceived and this will vary across different languages and cultures.	Belief that external world consists of pre-existing hard, tangible structures which exist independent of an individual's cognition.
Epistemological level	
Subjectivist	**Objectivist**
Distinction between the researcher and the research situation. Research findings emerge from the interaction between the researcher and a research situation, and the values and beliefs of the researcher are central mediators.	Both possible and essential that the researcher remain detached from the research situation. Neutral observations of reality must take place in the absence of any contaminating values or biases on the part of the researcher.
Methodological level	
Qualitative	**Quantitative**
Determining what things exist rather than how many there are. Thick description. Less structured and more responsive to needs and nature of research situation.	Use of mathematical and statistical techniques to identify facts and causal relationships. Samples can be larger and more representative. Results can be generalized to larger populations within known limits of error

6.6 Research Framework

The main aim of this study is to explore the factors that affect the Abu Dhabi citizens' adoption of the e-Government services. To achieve this goal, methodological conventions from the field of social sciences and information systems, were utilized in the development of an appropriate research methodology and in the development, customisation and contextualisation of the research instrument (Dwivedi et al., 2006).

In the recent IT and E-Government literature, there have been extensive discussions of epistemological research paradigms, such as positivism and interpretivism (Burrell & Morgan 1979; Chen & Hirschheim 2004; Fitzgerald & Howcroft 1998; Hirschheim & Klein 1989; Iivari et al. 1998; Lee 1991; Weber 2004). Epistemological, ontological, and methodological assumptions were taken into account while identifying and describing the distinct paradigms as well as differentiating them from each other (Table 6.1).

Different sets of paradigms were found to answer different core questions, thus, providing various perspectives on the IT research. These perspectives are not exclusive but complementary as has been demonstrated by many researchers, who have shown that both positivism and interpretivism can be used in critical as well as non-critical research.

In this study, the researcher will adopt a positivist view and use quantitative methods, as they are more suited to address the research aim. The following characteristics found in the quantitative rather than the qualitative methods will assist in answering the research questions and addressing the hypotheses:

- The research findings can be generalized when the data which is used has been derived from a random sample of an acceptable size.

- Data obtained will allow the formation of quantitative predictions and measurement of levels of occurrence such as quantifying opinions, attitudes, and behaviours; thereby, making it possible for the establishment of some form of cause and effect relationships.

Given the above two points, the factors that affect the adoption of e-Government services can be generalized to the whole population of Abu Dhabi, something that essentially can inform policy initiatives from the Government. For example, Government officials can gain a better understanding of the actions that need to be taken in order to increase the percentage of citizens that start using e-Government services, and/or in order to increase the number of services that citizens are using online.

In addition, by adopting a quantitative approach, the study benefited from the following:

- A relatively faster method of collecting data using an internet-based survey.
- Data lends itself to statistical analysis, which is less time-consuming
- The researcher's interference with the results is minimized as a result of the use of the survey method adopted.
- A large numbers of people can be sampled and their opinions investigated.
- Hypotheses informed by the literature were developed and tested.

To conclude, a quantitative approach offers the researcher a detailed understanding of the factors influencing the acceptance of e- Government public services in Abu Dhabi from the citizens' perspective. In addition, it will allow strategy formulation regarding the action that Government officials need to take in order to increase the rate of citizens that adopt e-Government services, in an informed manner.

6.7 Survey Based Quantitative Approach

Guided by a positivist paradigm, this study will use a survey-based quantitative approach to investigate the e- Government adoption in the Abu Dhabi

Emirate. The purpose of a survey is to generalize and infer some characteristics of the citizens from the sample to the population under study. A survey is an ideal method of collecting data, in this instance, as it makes it easier to collect data from a large group of people rapidly and at a comparatively lower cost (Sanders et al., 2009). There are a number of advantages of obtaining details of a large population from a smaller sample. For example, Henry (1990), states that the use of sampling enables the researcher to achieve higher levels of overall accuracy than when dealing with a census because of the availability of time to focus on the checking and testing of a few carefully selected cases. A survey design makes it possible to get a quantitative description of the trends, being studied (Creswell, 2014). Further, Internet surveys offer the researcher a rapid and inexpensive data collection tool. The survey strategy has several benefits which include: lending itself to the study of a greater number of variables in a manner that is economical yet ensuring a quick way of collecting data from a large group while providing a description of the real-world situations and enabling the generalization of the findings to the larger population of Abu Dhabi.

The survey strategy presents the study with a number of advantages:

1. Makes it possible to use a questionnaire to collect, large amounts of data in a cost-effective manner.
2. The data collected from a survey is then quantitatively analyzed using descriptive and inferential statistics, both of which are necessary to answer the study's research questions
3. provide evidence to support or disprove the research hypotheses (Carter & Belanger, 2005).
4. Furthermore, such a design presents an accurate profile of the items being studied while also making it possible to establish causal relationships between the variables (Sanders et al., 2011).

5. A survey makes it possible to know the quantitative description of the developments, views, and attitudes of a population by studying a section of it

The survey approach has its roots in the work of economists and sociologists and is usually used to validate models and hypotheses. (Creswell 2014).

The survey method is ideal for this study given the need to get an understanding of what influences citizens to adopt e-Government services in Abu Dhabi. In this instance, the survey will facilitate the collection of data from a large group of people.

6.8 Research Design

A research design includes a string of decisions that form an approach to answering the research questions and testing the hypotheses. Cavana et al., (2001) consider a research design as a controlled set of coherent guidelines or decision-making choices to help the generation of reliable and valid research results. In a positivist setting, a research design covers decisions regarding the choice of a method for data collection, scaling, samples, procedures, and data analysis.

Based on the above narrative, the researcher can determine precisely the type of research approach, in terms of methodology, to be used. The current research follows the quantitative approach which is justified for the following reasons:

1) At the paradigm level, this study follows the positivist school of philosophy. Consequently, this study begins by constructing a theory by creating a set of testable hypotheses, which allows deductive interpretation.
2) At the level of epistemology, this research is objectivist, since the researcher remains detached from the research situation. Neutral observation of reality must take place in the absence of any contaminating values or biases on the part of the researcher.
3) At the level of methodology, this study uses a quantitative research method based on the research questions and method of data collection. While there

are several variables in this study, the researcher will identify the causal relationships between them and measure each variable separately. Thus, it is clear that the nature of the data is numerical and therefore, it needs to be analyzed by statistical analysis techniques.

This research aims at testing and checking the validity of the proposed hypotheses. However, it is a logical explanation the researcher follows the positivist paradigm and a quantitative methodology. In terms of causality, the researcher uses a deductive approach, which implies that quantitative research is inclined to be logical; i.e. it tests the theory. This is in contrast to most qualitative research, which tends to be inductive; in other words, it generates theory.

Therefore, this study started with the formulation of a theory and hypotheses which will be investigated and validated in order to confirm the results so that they can be generalized to the population. In this study, the quantitative model is adopted by using a questionnaire-based approach. Accordingly, the following elements related to our survey will be discussed: questionnaire development, pilot study, questionnaire translation, and the sample used in the study.

6.9 Questionnaire Development

This survey was conducted to understand the citizens' perceptions in using e-government services in Abu Dhabi. The respondents were advised to choose the most suitable way to answer the questionnaire in either English or Arabic. Additionally, the participants have been informed and assured of privacy and confidentiality, and not writing any name that might reveal their identity. A five–point likert scale was used as the main instrument in the questionnaire.

The original UTAUT was modified to reflect the subject of this study (e-Government adoption). This modification is done in order to use appropriate words and paraphrasing related to an e-Government context. Additional questions are added to

capture the overall use of the e-Government. An example of the modification that will be included is as follows:

1) *(Original) 'I would find the system useful in my job*
2) *(Modified) 'I would find the e-Government service useful in my interaction with Government'*

Table 6.2: Survey questions used in the study.

#	Questions	Factor To Test	Adapted From
1.	I would find the e-Government services useful to get Government services.	Performance expectancy	Venkatesh *et al.*, 2003.
2.	Using e-Government services enables me to get Government services more quickly.		
3.	Using E-Government services would increase my overall productivity.		
4.	If I use e-Government services, I will increase my ability to get services.		
5.	My interaction with e-Government services would be clear and understandable.	Effort expectancy	Venkatesh *et al.*, 2003.
6.	It would be easy for me to become skilful in using e-Government services.		
7.	I would find the e-Government services easy to use.		
8.	Learning to operate e-Government services is easy for me.		
9.	People who influence my behaviour think that I should use e-Government services.	Social influence	Venkatesh *et al.*, 2003.
10.	People who are important to me think that I should use the e-Government services.		
11.	The senior management in the Government encourage people to use e-Government services.		
12.	In general, the Government has supported the use of e-Government services.		
13.	I have the resources necessary to use e-Government services.	Facilitating conditions	Venkatesh *et al.*, 2003.
14.	I have the knowledge necessary to use e-Government services.		
15.	E-Government services are compatible with other technologies I use.		
16.	I can get help from others when I have difficulties using e-Government services.		

17.	The Government departments have the skills and expertise to perform online transactions in an expected manner.	Trust in e-Government (TGOV)	Bhattacherjee, 2002; Carter & Belanger, 2005 Belanger & Carter, 2008; McKnight *et al.* (2002)
18.	The Government departments have the ability to meet most citizen needs about e-services.		
19.	The Government departmental portals can be trusted to carry out online transactions faithfully.		
20.	I trust the Government departments to keep my best interest in mind.		
21.	I think I can trust the e-Government services.		
22.	The Internet has enough safeguards to make me feel comfortable to use e-Government services.	Trust in Internet (TNET)	Carter & Belanger, 2005; 2008.
23.	I feel assured that legal and technological structures adequately protect me from problems on the Internet.		
24.	I feel confident that encryption and other technological advances in the Internet make it safe for me to use e-Government services.		
25.	In general, the Internet is a robust and safe to use e-Government services.		
26.	I intend to continue using e-Government services to get Government services in the future	Behaviour Intention (BI)	Carter & Belanger, 2005. Venkatesh et al., 2012
27.	I will always try to use e-Government services to get Government services		
28.	I plan to continue to use e-Government services to get Government services frequently.		
29.	Have you ever used any e-Government services?	Use behaviour	Wang & Shih, 2009
30.	How often do you use e-Government services?		

6.10 Questionnaire Translation

The original questionnaire was developed and written in the English language, however, because some respondents have Arabic as their first language it was thereafter translated into Arabic by a professional translating service to ensure consistency in the content of questions between the Arabic and English versions. Some UAE citizens prefer to use English over Arabic in answering technical issues, that is why the questionnaire circulated in both languages to maximize the data collection from the target population.

6.10.1 Pilot Study

The questionnaire survey was distributed by six researchers and four practitioners from different population groups as a pilot study. The purpose of the test was to achieve certain modifications, such as improving the initial questions, testing the respondents' comprehension as well as content clarification, and resolving any ambiguities in the questionnaire, before the full-scale study was administered (Saunders et al., 2003; Miles & Huberman 1994).

6.10.2 Pilot survey testing

A pilot test of the survey instruments was conducted using 40 volunteers who completed the survey. The pilot survey test was carried out in order to achieve the following objectives (Sanders et al., 2009; Creswell 2014):

- get an idea of the amount of time it takes to complete the questionnaire.
- establish respondent understanding based on the instructions given on the questionnaire.
- ascertain the respondents' uniform understanding of the wording of the questions and to identify ambiguous questions, if any.
- ensure similar understanding of the wording of the questions between the researcher and the respondents.
- identify the questions which the respondents' may have problems in answering
- identify any kind of glaring omissions.
- establish the validity of the questions presented.
- establish the reliability of the questions.
- ensuring that the questionnaire layout is clear and user-friendly.
- provide data to carry out preliminary tests to check the practicality of the proposed analyses.

6.10.3 Sample Population

The setting of the study was Abu Dhabi Emirate. It represents a high concentration of citizens of e-Government services. The population of a study is defined as a group of individuals who possess the same characteristics (i.e. they reside in Abu Dhabi and are Emiratis).

The target study population was Abu Dhabi citizens, which numbered around 221,700 in 2014. The inclusion criteria are that participants should have interacted with any kind of e-Government services in the past year. The study was conducted in three main cities in Abu Dhabi emirate; Abu Dhabi District, Al Ain District and Gharbia District. The study samples reflect equivalent representation for the diverse population of Abu Dhabi, so that it covers all citizen segments, as shown in Table 6.3.

Table 6.3: Census by Region, Citizenship and Gender

Region	Nationals		Non- Nationals		Total
	Males	Females	Males	Females	
Abu Dhabi	121.7	114.2	795.3	279.0	1,310.3
Al Ain	90.4	88.1	292.1	114.2	584.8
Gharbia (West region)	14.3	10.3	185.9	15.1	225.7
All (Abu Dhabi Emirate)	226.4	212.6	1273.3	408.3	2,120.7

The target population for the study in Abu Dhabi consisted of all Abu Dhabi citizens above 18 years of age, had prior experience with the e-Government services and have access to the Internet. These participants were chosen because they could understand the issues in the research as they are or will be using the e-Government

services and they will be able to make an informed decision in participating in this survey.

6.10.4 Sample Size Estimation

A non-probability sampling design was used in this study called quota sampling. Because of the diversity of the target population and the resources available for this study, it would have been difficult to use probability sampling as the researcher could not have a sampling frame for the target population. One of the advantages of non-probability sampling is that such designs are cheaper and easier to carry out as compared to the full-probability designs (O'Sullivan & Rassel 1999).

The optimal sample size of this research was 400 citizens based on the Slovin's formula as it calculates the sample size (n) given the population size (N) and a margin of error (e). It is computed as $n = N / (1+N e^2)$. By using the Slovin's formula, the sample size was 400 citizens for the three regions with a margin of error of 5%:

- Population size (N) = 221,700 (UAE citizens older than 18 years)
- Sample size calculation is as follows: n = 221,700 / (1+221,700 *0.0025) = 400.
- The required target sample size, as estimated by the above formula, is 400

The survey was distributed using the online survey tools. A hard copy of the survey was submitted for the citizens who may have limited access to the internet. The survey responses will be collected, processed and stored in a database for further analysis.

6.10.5 Potential Participants

Potential participants approached consisted of the Emirati employees working in the Department of Municipal Affairs (DMA) in Abu Dhabi City, Al Ain City, and the Western Region as they have a large number of Emirati citizens working there and

the Emirati shoppers in the three malls (Marina Mall in Abu Dhabi City, Al Jimi Mall in Al Ain City, and City Mall in the Western Region). And asked to give their opinions on the e-Government services as citizens (G2C).

Participation was voluntary and a consent form was signed by the respondents before proceeding with the survey (i.e. tacit approval). Participants were directed to the participant information sheet and they acknowledged that they had read and understood it by clicking on the survey button to proceed.

Permission was obtained from the authorities to access all the Emirati employees from the Department of Municipal Affairs. A copy of the permission letter is attached in the appendix. An Email with a link to the online survey was sent to the Abu Dhabi citizens working in the DMA and the Emirate's three Municipalities from their HR sections. This email also included a participant information sheet. Thus, the participants would be informed about the project and tacit consent would be indicated by their willingness to complete the survey. Citizens who are not working in DMA were approached in the three Malls mentioned above. Only the Emirati shoppers in the three malls (Marina Mall in Abu Dhabi City, Al Jimi Mall in Al Ain City, and City Mall in the Western Region) were approached and asked to complete the online survey using iPads, which were provided to them.

As the potential participants were directed to a web-based online survey, participants were able to complete the survey at any time and place, convenient to them as long as they had Internet access. Some of the participants were asked to fill the survey at their offices and others were asked to fill it at the malls, using the iPad that were provided by the researcher to make participation easier. The researcher obtained an initial consent from participants before directing them to the web-based online survey.

The type of survey opted for above is the most appropriate as the data is collected anonymously and there is no identifiable data that could be linked to the participants.

In addition, participation is voluntary and any participant can withdraw from the study at any time while filling the survey.

6.11 Data Analysis

Kritzer (1996) defines interpretation as '... the process of ascertaining the meaning(s) and implication(s) of a set of materials.' Interpretation of the results will be presented in Chapters 7 and 8. The following steps will be used for data analysis:

6.12 Descriptive Analysis

Descriptive analysis is the study that described the results throw range of sours (Creswell , 2014). In this study, these descriptive statistics will demonstrate the respondents' data in terms of e-Government use and demographic profiles. Therefore, descriptive statistics were presented before advanced analysis was adopted, such as a regression test, factor analysis and Structure Equation Modeling (SEM).

A review of the literature revealed that Internet experience, levels of education, gender and age were factors that had a critical influence on whether the individuals would use e-Government services in Abu Dhabi. This study has further evaluated the characteristics of respondents to investigate whether the demographic variables could influence the adoption of e-Government in Abu Dhabi.

6.13 Factor Analyses

First, an exploratory factor analysis was conducted to see if the items load as set by the theory. In order to verify the construct validity, a factor analysis would be conducted based on Principal Component Analysis (PCA) with the Varimax rotation method, and making sure that all of the items' factor load is above 0.40, which is the minimum recommended value in IS research (Straub et al., 2004; Dwivedi et al., 2008). Bryman (2008) commented that the factor analysis is "employed in relation to multiple-indicator measures to determine whether groups of indicators tend to bunch together to form a distinct cluster, referred to as factors".

The factor analysis test can be either Exploratory (EFA) or Confirmatory (CFA). The aim of EFA is to determine the nature of the constructs that have an influence on a set of responses, whilst the question of whether a specific set of constructs influence responses in a predictable manner, is examined by CFA (DeCoster 1998). In this study, EFA was used to split the multiple items measured to reveal the factors affecting the citizen's adoption of the e-Government services. Factor analysis will examine the reliability of the entire survey, including those items corresponding to the new two trust factors added to the UTAUT. EFA is based on the survey correlation matrix among all the items. The construct validity of the data would be confirmed by the level of loadings of groups of items on each factor.

EFA was chosen due to its ability to examine underlying patterns, determe groups of items that correlate with each other, classify groups of factors. CFA will be used to again test each factor's reliability independently and extract the factor scores which would be used to represent the constructs value for further analysis (DeCoster 1998).

6.14 Reliability Test

The research instrument was tested for its reliability and construct validity, before presenting the findings. Cronbach's coefficient alpha values were used to examine the internal consistency of the measure (Hinton et al., 2004; Field 2009).

6.15 Regression Analysis and Structural equation model (SEM)

A regression analysis and SEM were performed to investigate the various relationships posited by the researcher namely:

1. *Behavioural Intention* as dependent variable on six independent constructs *Performance Expec*tancy, *Effort Expectancy, Social Influence, Facilitating Conditions,* e-*Government Trust and Internet Trust,*
2. *Perceived use of e-Government* as a dependent variable on both *Behavioural Intention* and *facilitating conditions*.

6.16 Ethical Considerations

No ethical concerns arise from this research as all data were collected anonymously and responses cannot be traced to any identifiable individual participant. The collected data have been stored in a secured area as per UOWD's requirements. In addition, the participants were informed that their contributions would be dealt with confidentially and not transferred to any third party without their consent. Moreover, the respondents were informed that their participation is voluntary.

6.17 Conclusion

This chapter is concerned with the research methodology that was adopted. It also looked at the different philosophical approaches to conducting research and positioned the study within the positivist paradigm. The advantages and disadvantages of the quantitative approach were discussed. The survey-based approach was discussed and its appropriateness for the current study was demonstrated. The research design elements that include the sample, the measures, and the analysis were outlined. The manner in which the study results would be interpreted was also demonstrated.

The chapter presents an overview of the method of data collection from the use of a survey-based quantitative approach. Special emphasis is placed on ethical considerations and research integrity. The sampling technique, sample size, response rate, and the validity and reliability are addressed and will be assessed in the next chapter.

Chapter 7: Results and Findings

The previous chapter described the survey questionnaire instrument used to collect quantitative data to test the research model developed in this thesis. The survey was distributed online using **Qualtrics.com** survey tools and 638 participants (completed survey). The total number of correct responses for the survey should be at least 400, the researcher intended to collect 700 to provide a room for erroneous responses in a bigger sample. The total number of all responses was over 638 and the researcher checked each answer in detail to remove the erroneous ones. While doing this check, all data were consolidated.

This chapter includes the following eight stages of analysis:

1) A descriptive analysis of the survey comprising 35 items and demographic data related to gender, age, education and income.
2) Details on survey reliability: The Cronbach alpha of each items' group is reported. The survey's 28 items correlation matrix is examined to establish whether it is suited for factor analysis.
3) Exploratory Factor Analysis is conducted as a pre-test to investigate whether the data support the seven latent variables constructs of the theoretical model.
4) Confirmatory factor analysis is performed where seven latent variables constructs are extracted from the survey. Six of these constructs are used as explanatory variables for the dependent variable construct *Behavioural intention.*
5) Correlation and multiple regression analyses are conducted to examine the relationship between *Behavioural intention* and various potential predictors (PE, EE, SI, FC, TGOV, and TNET). Based on the results of the multiple regression analysis of the dependent variable on the six independent variables, six of the research hypotheses (H1 to H4; H6 & H7) are

established. Potential multi-collinearity between the independent variables is investigated through bivariate correlation and a VIF test. In case of severe multi-collinearity, simple regression was used where the *Behavioural intention* was regressed on each of the independent variables separately. Further, this stage of analysis rank which exploratory variables best explain *behavioural intention*.

6) Further Structural equation model (SEM), a powerful technique which has become a technique of choice, is explored to support the results of stages 4 and 5. SEM integrates in one single empirical model both, data reduction for extrapolating hidden latent variables and path analysis (an extension multiple-regression that includes both endogenous and exogenous variables.

7) The effect of *behavioural intention* and *facilitating conditions* on e-*Government use* is assessed through conducting a multiple regression. This test allows the researcher to test the hypothesis (H5 & H8)

8) The last stage includes tests of possible moderation of gender, age, education and experience potentially affecting the level of dependency *Behavioural intention* on the six explanatory variables.

7.1. Descriptive statistic

Table 7.1 provides the demographic characteristics of the respondents. The Six demographic variables are: i) Age, ii) Gender, iii) Education level, iv) Location of the residential, v) Income levels, and vi) Computer experience.

Table 7.1 Demographic statistics

Variable	Levels	Frequency	Percent
Age	**16-25 years**	**73**	**11.4%**
	26-35 years	**358**	**56.1%**
	36-45 years	**168**	**26.3%**
	Above 45 years	**39**	**6.1%**
Gender	**Male**	**316**	**49.5%**
	Female	**322**	**50.5%**
Educational Level	**High School or less**	**101**	**15.8%**

	Diploma	**85**	**13.3%**
	Bachelor degree	**295**	**46.2%**
	Postgraduate degree	**157**	**24.6%**
Have you ever used any e-Government services?	**Yes / No**	**516 / 122**	**80.9%/19.1%**
Where do you live?	**Abu Dhabi**	**214**	**33.5%**
	Al Ain	**342**	**53.6%**
	Al Gharbia	**82**	**12.9%**
Approximately, your monthly income?	**Less than 10,000 AED**	**30**	**4.7%**
	10,001 to 15,000 AED	**27**	**4.2%**
	15,001 to 30,000 AED	**184**	**28.8%**
	More than 30000 AED	**397**	**62.2%**
How long have you been using Computers? (Experience)	**Less than 1 year**	**5**	**0.8%**
	1-3 years	**11**	**1.7%**
	3-5 years	**22**	**3.4%**
	More than 5 years	**600**	**94.0%**

7.1.1 Gender

The number of female respondents is comparable to the number of male respondents; 49.5% are males and 50.5 % are female.

7.1.2 Age

Most of the respondents are in the age group of 26-35 years old, comprising 358 respondents (56.1%), followed by 36-45 years old group with 26.2%, where 11.4% of the respondents were 16-25 years old and only 6.1 % of the respondents were older than 45 years. This sampling distribution reflects the population distribution.

7.1.3 Education

In terms of education, the majority of respondents (46.2%) hold a bachelor degree, 24.6% have a postgraduate degree, 13.3% have diploma and 15.8% have a high school level or less.

7.1.4 Computer Use

The majority of the respondents have a university degree. This explains the fact that more than 94% of them have used the computer for a long period, whereas 94% have more than 5 years of computer experience and only 0.8% of the respondents had no formal experience.

7.1.5 Location

Sampling targeted local Emiratis from the three main cities of Abu Dhabi emirate, namely Al Ain, Abu Dhabi city and Al Gharbia. 53.6% of the participants are from Al Ain city, 33.5% are from Abu Dhabi city and 12.9% from Al Gharbia.

7.1.6 Income

Distribution of the respondents by income is categorized into four groups: 4.7% with income less than 10,000 AED (One USD equal to 3.68 AED), 4.2% has income in the range 10,000 to 15,000 AED, 28.8% with income in the range15,000-30,000 AED and 62.2% with income more than 30,000 AED.

7.1.7 e-Government use

80.9% of the respondents have used e-Government services while 19.1% have not used it. The high usage of e-Government services is explained by the fact that the majority of the respondents have a university degree.

7.2 Survey Reliability and Internal Consistency

7.2.1 Survey Reliability: Cronbach's Alpha

Prior to conducting the factor analysis, a reliability test was carried out to insure internal consistency of the seven constructs (latent variables). Cronbach-alpha was used as a measure of the internal consistency of each of the seven latent variables constructed from the survey. Cronbach's alpha values higher than 0.7 are considered as reliable (Field, 2009). Reliability results are shown in table 7.2 and confirm the consistency of the survey in general as all Cronbach’s Alpha values are greater than 0.7. Thus the survey questionnaire is highly reliable. Since all the survey 28 items are positively formulated, thus, it did not need to do any reverse of the items’ scores.

Table 7.2 Reliability levels of the seven constructs extracted from 28 survey's items

Constructs	# of Items	Cronbach's Alpha
Performance expectancy	4	.873
Effort expectancy	4	.882
Social influence	4	.781
Facilitating conditions	4	.787
Trust in E-Government services (TGov)	5	.910
Trust in Internet (TNET)	4	.915
Behavioural intention	3	.927

7.2.2 Survey Correlation Matrix

The exploratory Factor analysis is based on the correlation coefficient matrix of the 28 survey's items: four items to measure the *performance expectancy scale*, four items to measure the *effort expectancy*, four items to measure the *social influence*, four items to measure the *facilitating conditions*, five items to measure *e-Government trust* and four items to measure *Internet trust*. The dependent variable of *behavioural intention* is measured through 3 items. In this case, if all the survey items are perfectly correlated then the survey would represent a single factor. Asymmetrically, if all the correlations between the items are close to zero; that is the correlation matrix is the identity and implying that each item in the survey would represent a factor. As presented in appendix 3, all the survey inter-item correlations exceed 0.3, which indicates that the survey correlation matrix is well suited for factor analysis as a data reduction technique (Hair et al. 2010).

7.2.3 Sampling Adequacy: KMO, Bartlett's Test and Anti-Image Correlation Matrix

The Kaiser-Meyer-Olkin (KMO) index is a measure of sampling adequacy, where a high KMO index (≈1) indicates that the factors of the items could be applicable, whereas a low KMO index (≈0) indicates that the process of grouping the items into factors is irrelevant. However, a KMO index greater than 0.6 was deemed acceptable by Pett, et al.(2003).

The Bartlett based on a Chi-square test assesses the sphericity by testing the null hypothesis of whether the correlation matrix is an identity matrix. So, rejecting the null hypothesis indicates that the factor model is appropriate.

A further diagnostic of the sampling adequacy is needed to look along with the diagonal elements of the anti-correlation matrix, which are also considered as measures of sampling adequacy. The aforementioned authors have given an interpretation of their findings in a way similar to the KMO index, which indicated that the FA should not be performed when anti-image correlation is less than 0.5 (due to the lack of sufficient correlation with other variables).

The Survey sample adequacy results are presented in table 7.3. The survey's KMO is 0.932, well above the recommended value 0.7. Barlett's test of sphericity is highly significant (χ^2(df=300)=11817.27, p=0.000) indicating that there is considerable common variance between the survey items. The anti-correlation matrix is given in the appendix 4 and shows that its diagonal elements are above than 0.5 (Field, 2009). Based on the diagnostic of the above three tests, the researcher confirms that the collected data passed the assumptions; therefore, it is possible to proceed to the factor analysis.

Table 7.3: KMO and Bartlett's test of the survey

Kaiser-Meyer-Olkin Measure of Sampling	0.932 >0.7
Bartlett's Test of Sphericity χ^2(df=300)	11817.26
Sig.	0.000 (significant)

7.3 Exploratory Factor Analysis

The theoretical model hypothesized that the survey should have seven uncorrelated factors (latent variables). In order to test such a hypothesis, the researcher has proceeded to conduct an exploratory factor analysis of the survey items. Factor

naming and interpretabilities of the latent variables are set by the theoretical model constructs. Item loadings on each factor resulting from the exploratory factor analysis are presented in Table 7.4, indicating that seven distinct factors were in fact underlying the conducted survey and confirm again that these factors were internally consistent. It should be noted that the item's loading to the latent constructs which are less than 0.4 were suppressed from the output. The variances between the 28 items explained by each factor are given in column 2 of Table 7.5 revealing that the seven factors solution together explains 74.5% of the variation among these survey items.

The individual items' communalities (sum of the squares of the loading on each factor) demonstrate how well the model is working for each individual item. An item's communality can be viewed as a regression R^2 and expresses the percentage of the item's variance as explained by the all the retained factors. As revealed by Table 7.4, the communalities of all items are all close to 1 supporting further the overall assessment of the performance of the model.

Table 7.4 Exploratory Factor loadings and communalities based on principal **components** analysis with **Varimax rotation** for 28 items from the research survey (N = 635)

Factor Item	TGov	TNet	EE	PE	FC	BI	SI	Communality
PE1				0.73				.702
PE2				0.65				.769
PE3				0.67				.765
PE4			0.41	0.59				.730
EE1			0.69					.692
EE2			0.75					.749
EE3			0.78					.806
EE4			0.78					.751
SI1							0.87	.893
SI2							0.87	.901
SI3	0.54			0.4				.703
SI4	0.43			0.57				.714
FC1					0.7			.721
FC2					0.7			.746
FC3	0.43				0.6			.686
FC4	0.48				0.4			.534
TGOV1	0.81							.761
TGOV2	0.84							.799
TGOV3	0.77							.776
TGOV4	0.76							.748
TGOV5	0.64							.686
TNET1		0.81						.784
TNET2		0.76						.766
TNET3		0.81						.822
TNET4		0.84						.827
BI1						0.62		.856
BI2						0.68		.855
BI3						0.67		.876

As shown in Table 7.4 each group of items load significantly to only one single factor. Except for three items are significantly cross-loading: Items "SI3 & SI4" which are supposed to load only to *social influence* have cross-loadings with the *Government trust* and *performance expectancy*. Item "FC4" which is supposed to load only to *facilitating conditions* has a more significant cross-loading with *a trust in e-Government use*.

After removing the three cross loading variables, the researcher has re-run the exploratory analysis with the remaining 25 items. This led to an improvement in the

variances explained by each factor (column 3 of Table 7.5) and an improvement in the total variance explained by all factors to 77.87%, with no cross loading items and with a better clear factor structure as supported by the theoretical model.

Table 7.5: Exploratory Factor Analysis: Survey variance as explained by the seven factors

Factor / label them PLS	variance in % (28 items)	Variance in % (25 items)
1	42.997	44.293
2	8.936	9.791
3	5.998	6.233
4	4.982	5.250
5	4.666	4.875
6	3.912	4.180
7	3.036	3.247
Total Variance	**74.53 %**	**77.87%**

7.4 Confirmatory Factor Analysis: Factor Scores Extraction

The exploratory factor analysis conducted earlier has confirmed the validity of the theoretical model in terms of the latent factor structure of the survey, and shows that the collected data reflects the theoretical model's seven-factor structure.

Though factor scores may be determined by simply averaging raw scores of all item's loading on the factor, this method is not desirable as it does not take into account each item's weight load (Hair et al. 2010).

Confirmatory factor analysis (CFA) is conducted to extract each of the seven factors' scores taking into account items' loading. At each run, only the group of items contributing to a given factor is included in the extraction. The three cross loading items were not assigned to any factor. Bartlett's approach provided as an option by CFA is used in computing the factor scores.

The seven factors' computed scores were used to answer the research questions, mainly their ability in predicting the *behaviour intention* and *use of e-Government services* in subsequent analyses. The descriptive statistics of the extracted constructs are presented in Table 7.6.

Table 7.6 Descriptive statistics for the seven scale factors

Constructs	No-items	*Mean(SD)*	Skewness	Kurtosis	Cronbach Alpha
Performance expectancy(PE)	4	0(1)	-1.122	2.244	.873
Effort expectancy	4	0(1)	-.805	1.641	.882
Social influence	2	0(1)	-.423	-.215	.887
Facilitating conditions	3	0(1)	-.673	.940	.766
Trust in e-Government services(TGOV)	5	0(1)	-.798	.671	.910
Trust in Internet (TNET)	4	0(1)	-.526	.210	.915
Behavioral intention (DV)	*3*	0(1)	-.644	.973	.926

7.5 Multiple Regression: Testing the model hypotheses H1 to H4; H6 & H7

This stage involves testing the six hypotheses, H1 to H4, H6 & H7 related to the research questions as shown in figure 1: Multiple regression analysis is conducted to examine the relationship between the dependent variable *Behavioural intention* and the six predictor variables:

$$\boldsymbol{BI_i = \beta_0 + \beta_1 * PE_i + \beta_2 * EE_i + \beta_3 * SI_i + \beta_4 * FC_i + \beta_5 * TGov_i + \beta_6 * TNet_i + \varepsilon_i}$$

BI (DV): *Behavioural intention;* ***PE***: *Performance expectancy;* ***EE***: *Effort expectancy;* ***SI***: *Social Influence*; ***FC***: *Facilitating conditions*; ***T-Gov:*** *Trust in e-Government services;* ***T-Net***: *Trust in Internet*

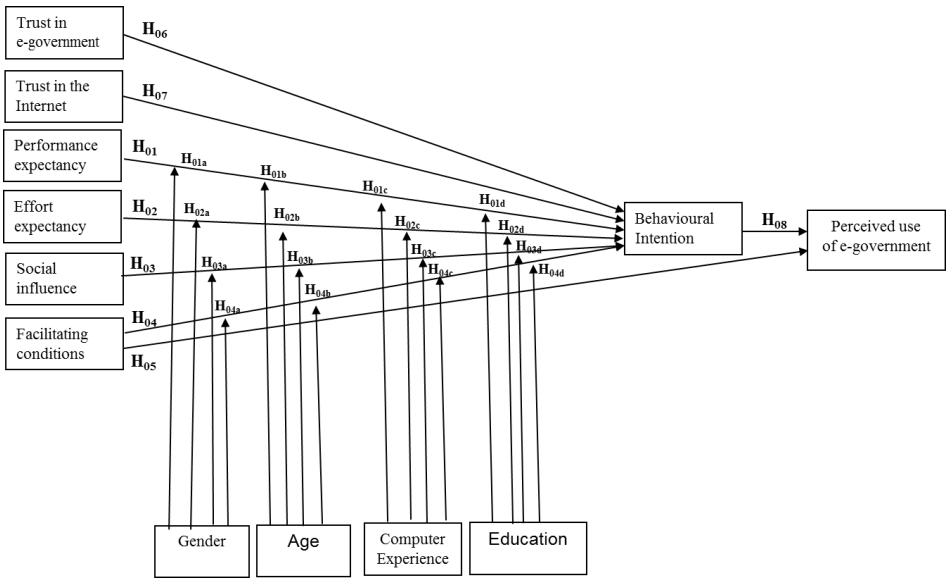


Figure 7.1 Research Model

7.5.1 Correlation results

Prior to conducting multiple regression, bivariate correlations between the variables are obtained. The correlations displayed in **Table 7.7** between the six constructors and the dependent variable, *behavioural intention*, are all positive and significant, ranging from 0.501 (*Social Influence*) to 0.561 (*e-Government trust*). The last column of table 7.7 displays the percentage of variation in *behavioural intention* explained by each predictor using simple regression.

Table 7.7: Correlation between the variables, **correlation is significant at the 0.01 level (2-tailed). N=638

Variable	**BI (DV)**	**MPE**	**EE**	**SI**	**FC**	**TG**	**R^2**
MPE	.610**	1					0.3
EE	.561**	.641**	1				0.3
SI	.502**	.521**	.481**	1			0.1
FC	.581**	.470**	.558**	.520**	1		0.3
TGOV	.573**	.457**	.458**	.526**	.523**	1	0.3
TNET	.637**	.426**	.423**	.452**	.496**	.591**	0.4

7.5.2 Multiple Regression results

Since none of the potential six predictors is zero-correlated with *behavioural intention*, multiple regression, of the dependent variable on all the six predictors is conducted. The results presented in table 7.8 reveal that the overall model accounts for 60.1% of the variance in *Behavioural intention.* The full model is significant *F (6, 635) =158.23, p < .001* and all variables contribute significantly to the multiple regression (at p = 0.05) except the variable *Social Influence* (*SI)* does not relate significantly to the dependent variable when controlling for the other five predictors. Since the variance inflation factor (VIF) of SI (=1.387) is much less than the critical value 10 and none of the correlation between the independent variables is above 0.6; it is unlikely that the analysis produced misleading results due to multi colllinearity. When the *Social influence*, β = .022, *p* = .502 was removed and another regression analysis is conducted, the adjusted R^2 increased and together the remaining five predictors still shared 60% of the explained variance.

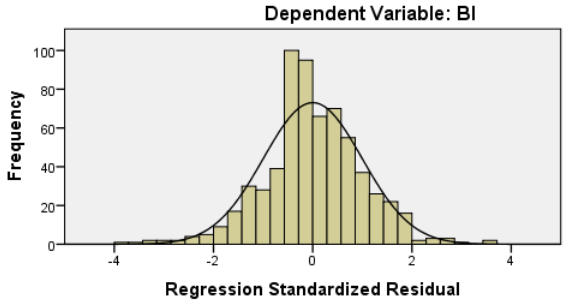
As shown in Table 7.8, the rankings of individual predictor variables' contributions to the dependent variable revealed that both *Performance expectancy* and Trust in Internet are the dominant predictors that best explain behavioural intention with 54 % of the variance.

Table 7.8 Multiple regression: *Behavioural intention* on the 6 predictors; R^2= .601; F(6,635)= 158.23, p=0.000

Predictor	B Standardized Coefficients	Sig	VIF	Six-Factor CFA Structure estimate
PE	.269	.000	1.909	.27
EE	.088	.015	2.054	0.09
SI	**.015**	**.607**	**1.387**	**.02**
FC	.182	.000	1.628	.18
TGOV	.137	.000	1.745	.14
TNET	.315	.000	1.710	.31
constant		1		

7.5.3 Evaluating the Fit of the Multiple Regression

Regression is based on a set of assumptions: The relationship between the dependent and each of the independent variables should be linear (or that the expected value of the error terms is equal to zero); the error terms are normally distributed and errors have equal variances regardless of the values of the independent variables (homoscedastic assumption). The histograms and the p-plot ashown in figure 7.2 show quite clearly that the model passes the normality assumption.



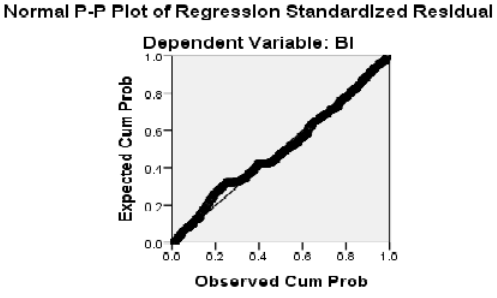


Figure 7.2 Normality diagnostic of the residuals

The third assumption of error equal variance is examined by producing scatter plots of the residuals versus the regression model predictions and versus each predictor. The plots above do not show any clear dependence of the residual variance on the values of these variables, confirming that there was no violation of the equal variance of the residuals.

7.5.4 Ordinal Regression

Given that, the dependent variable is an ordinal variable (constructed from the likert-scale based survey), linear regression may not be the most suitable model for this analysis. In order to check the validity of the linear regression results, a non-parametric ordinal regression was conducted. The results are presented in table 7.9 and reveal a high concordance with the linear regression results.

Table 7.9 Ordinal regression results

Variable	Estimate	Wald	Sig.
PE	.713	27.855	.000
EE	.352	7.421	.006
SI	.133	1.175	.278
FC	.474	14.470	.000
TGOV	.345	7.368	.007
TNET	1.228	86.275	.000

Dependent variable BI

7.6 Structural Equation Modeling:

Furthermore, in order to support the quantitative analysis conducted by regression, the researcher conducted Structural Equation Modeling (SEM) using the Analysis of Moment structures (AMOS) statistical package in SPSS. SEM combines both Factor Analysis and Path Analysis. As depicted in figure 7.3, the SEM path diagram represents prior hypotheses about the factor structure. Each of the 25 items depicted by a rectangle loads to only one factor. The single arrow is set from the construct to the item (reflective factor SEM model). For each latent variable, depicted by a circle, one loading was fixed to 1 to give the latent factor an interpretable scale. An

unobserved measurement error depicted by a circle is associated to each item. As the constructs may be correlated, two headed arrows are added between each of the construct latent variables. Path arrows between the predictor variables and the dependent variable were also drawn.

7.6.1 Results of the Structural Equation Modeling

Factor loadings of the items, (co) variances between the latent variables and the relationship between the 6 predictor latent variables and *behavioural intention* are estimated and presented in figure 7.3. The standard factor loadings displayed by the figure are all higher than 0.7, demonstrating that the indicators (survey items) representing their corresponding constructs are consistent and supports the results presented in Table 7.4.

The SEM standardized estimates of the dependence of *behavioural intention* on the predictors are also displayed in figure 7.3 and presented in Table 7.10. A maximum likelihood procedure was used in SEM for parameter estimates. The results reveal that the predictor ***SI*** is not significant at the 5% level ($-1.96 < CR = -.195 < 1.96$; $p_{value}=.845$). This finding supports the results obtained by the standard regression in section 7.5. However, the predictor ***EE*** is shown to be not significant contrary to the results obtained by the standard regression ($-1.96<CR =.529 <1.96$; $p_{value}=.597$).

Overall, the SEM path analysis results are in agreement with the multiple regression findings: the four predictors PE, T-Net, FC, and T-Gov explain the dependent variable significantly at the 0.01 level. Both of these two statistical approaches find that *Performance expectancy (PE)* and *internet trust(TNET)* rank best in explaining *behavioural intention*.

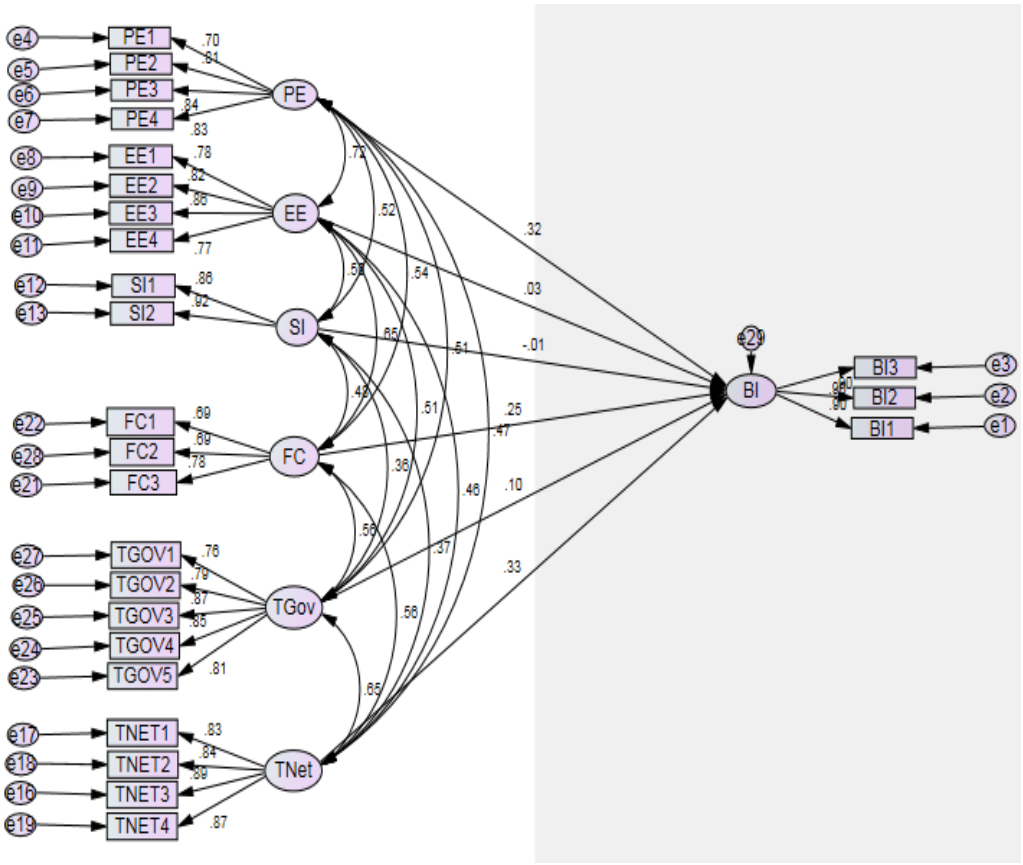


Figure 7.3. SEM Results**:** Factor loadings, latent variable co-variances and standardized path estimates

Table 7.10 SEM Results: Path estimates

Path			Standardized Coeff. estimate	S.E.	C.R.	p_{value}
BI	<---	PE	.32	.067	6.317	***
BI	<---	EE	.03	.051	.529	.597
BI	<---	SI	-.005	.027	-.195	.845
BI	<---	FC	.25	.060	4.735	***
BI	<---	T-Gov	.10	.035	2.427	.015
BI	<---	T-Net	.33	.035	7.775	***

7.6.2 SEM model fit evaluation

Critical ratios (C.R.) reported in table 7.9 are interpreted the same way at t-values in standard regression and for large samples, values in the range (-1.96 +1.96) indicate a two-sided 5% significance. SEM provides various indices to test for the appropriateness of the SEM model. Though $\chi^2(254, N=638)= 968.3$, p=000 indicated a poor fit of the model, for large samples, the model is often rejected even if the

model actually describes the data well (Bentler ,1990). According to the reference, the chi-square statistic, though being reported as a test for model fit, is sensitive to the degree freedom of the model and it is highly affected by the sample size.

The confirmatory model indicates a reliable 7-factor dimension as it accounts for 78.8% of the variation. although the collected data showed some deviation from multivariate normality which is an assumption of SEM, according to the findings of Chou et al. (1991), Fan and Wang (1998), and Hu et al. (1992), a maximum likelihood may still perform well under a mild deviation from this assumption. It is well known that large sample sizes and ML can overcome some non-normality deviation. Table 7.11 summarizes the fit indices of our SEM and their corresponding critical accepted values.

Table 7.11: SEM Fit Statistics

Fit indices	**Threshed Value**	**Authors**	**Results Obtained**	**Conclusion**
Goodness-of-fit-index (GFI)	>0.9	Chau (1997)	0.852	Acceptable
Adjusted goodness-of-fit-index (AGFI)	>0.8	Chau (1997)	0.813	Acceptable
Comparative fit index (CFI)	>0.9	Bentler (1990)	0.930	Acceptable
Root mean square error of approximation (RMSEA)	<0.08	Byrne (2001)	0.069	Acceptable
Normed fit index (NFI)	>0.9	Bentler & Bonett (1980)	0.889	Acceptable

The model fit statistics of my SEM model reported in table 7.11 are consistent with those suggested by Gefen et al. (2000). The developed model gives a GFI value of 0.852 comparable to the suggested value. The AGFI value is 0.813, which is above the suggested cut-off value (0.80). Because of the many constructs added to the concerned model, a comparative fit index (CFI) is also recommended (Byrne 2001; Hair et al. 2010). The CFI of this model is 0.930, which is above the suggested cut-off value (0.80) (Hooper et al. 2008). The normed fit index (NFI) also provides an

acceptable fit with a value of 0.889 (Hooper et al. 2008). The root mean square error of approximation (RMSEA) is 0.069, which indicates a good fit (Hooper et al. 2008). Therefore, all fit indices recommended support that the developed structural model fits well with the data.

7.6.3 Testing SEM full model

For the purpose of cross validation between the regression model and SEM, the Full SEM model comprising the Confirmatory Factor Analysis and the two paths' analysis corresponding to the two independent variables (BI and E-gov use) is conducted.

The Full model estimated coefficients appear along the paths and reported in the table below with their significance. The Full SEM results are in concordance with Regression results except for the effect of the Effort Expectancy (EE) on Behaviour Intention (BI) where SEM confirms its non-significance contrary to what the regression model confirms.

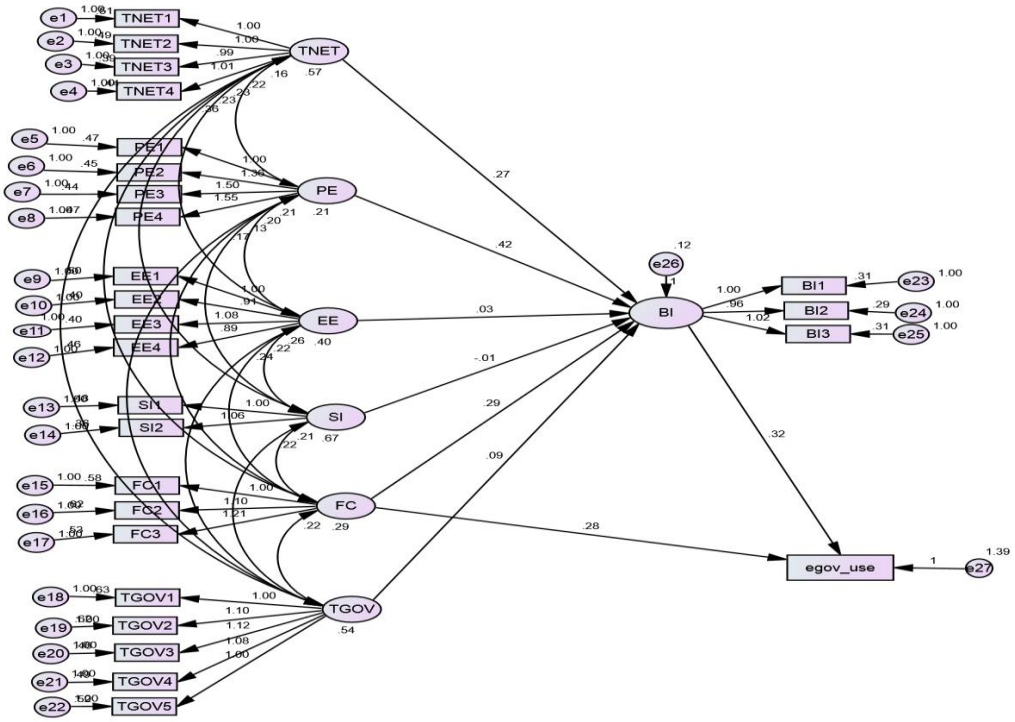


Figure 7.4. Full model SEM Results

Table 7.12: Full model SEM Fit Statistics

			Estimate	S.E.	C.R.	P
BI	<---	PE	.422	.067	6.314	.000
BI	**<---**	**EE**	**.028**	**.052**	**.534**	**.594**
BI	**<---**	**SI**	**-.005**	**.027**	**-.194**	**.846**
BI	<---	FC	.285	.060	4.715	.000
BI	<---	TGOV	.086	.035	2.422	.015
BI	<---	TNET	.269	.035	7.775	.000
egov_use	<---	BI	.318	.120	2.646	.008
egov_use	**<---**	**FC**	**.279**	**.148**	**1.890**	**.059**

The Table below presents the various SEM model fit indices (GFI, AGFI, CFI, RMSEA and NFI) with their theoretical cut-offs. The 5 statistics values indicate that the SEM fit is fair (Hooper et al. 2008)

Table 7.13: SEM full model Fit Statistics

Fit indices	Threshed Value	Authors	Results Obtained	Conclusion
Goodness-of-fit-index (GFI)	>0.9	Chau (1997)	0.887	Acceptable
Adjusted goodness-of-fit-index (AGFI)	>0.8	Chau (1997)	0.857	Acceptable
Comparative fit index (CFI)	>0.9	Bentler (1990)	0.938	Acceptable
Root mean square error of approximation (RMSEA)	<0.08	Byrne (2001)	0.064	Acceptable
Normed fit index (NFI)	>0.9	Bentler & Bonett (1980)	0.917	Acceptable

7.7 Testing hypothesis H5 and H8: *use of e-Government Services*

The two theoretical hypotheses H5 and H8 relate to the dependence of *perceived use of e-Government services* on *Behaviour Intention* and *Facilitating-condition* respectively. A standard multiple regression was applied. The results reported in table 7.12 indicate that the predictor variable *Behaviour Intention* is highly significant (p=0.00) whereas *Facilitating-condition* does not significantly (p=0.056) explain the dependent variable *use of e-Government services* at α=0.05 (although it does at the 10% level). Although the two-variable model explains only about 6% of the variation in the dependent variable, *Behaviour Intention* is still significant but the model cannot be used as a predictive model.

Table 7.14 Multiple Regression Results R^2= 0.06; F(2, 638)=20.42; p=0.0
DV: *use of e-Government services*

Predictor	B Standardized Coefficients	Sig
BI	.227	.000
FC	.108	.059
Constant		1

7.8 Testing Potential Moderators: Gender, Age group, Experience, and Education

In this section, possible moderations of the categorical variables, gender, age, experience level and education on the relationship of each of the IV's (PE, EE, FC, and SI) with the DV (BI) are investigated. A categorical variable is confirmed to be a moderator if the relationship between the dependent variable and a given IV changes significantly depending on the level of the moderator. For each IV and for each potential moderator, two regressions are conducted: The first regression includes the DV on one of the IV's (simple slopes). In the second regression, both the moderator and an interaction term (IV * moderator) are added to the regression to control for the moderator. If both the interaction term and the R-square change between the two regressions are found to be significant, then the categorical variable is confirmed as a moderator. In order to avoid voluminous output from the moderation analysis, the researcher mainly reports in table 7.13 on the significant R-square change between the two regressions and the significance of the interaction term.

Table 7.15: Moderation Tests: Gender, Age and Experience of DV(BI) on IV (PE, EE, FC and SI)

IV	Model	R^2	R^2 Change	Sig. Change	P_{value} of the interaction term	Moderation confirm (Y/N)
PE	PE (Constant), PE	.372	.372			
	(Constant), PE, Gender, Gender * PE	.380	.008	.020*	**.181**	
	Predictors: (Constant), PE, Age, Age * PE	.383	.011	.004**	**.013***	Confirmed
	Predictors: (Constant), PE, Experience, Exp * PE	.376	.004	.160	**.113**	
	Predictors: (Constant), PE, Educ, Educ * PE	.375	.003	.25	**.068**	
EE	Predictors: (Constant), EE	0.315				
	Predictors: (Constant), EE, Gender, Gender * EE	0.341	0.026	0**	0.003*	Confirmed
	Predictors: (Constant), EE, Age, Age * EE	.317	.002	.353	.563	
	Predictors: (Constant), EE, Experience, Exp * EE	.318	.003	.260	.282	
	Predictors: (Constant), EE, Educ., Educ * EE	.315	0.000	.9	.999	
FC	Predictors: (Constant), FC	.316				
	Predictors: (Constant), FC, Gender, Gender * FC	.327	.011	.005**	.086	
	Predictors: (Constant), FC, Age, Age * FC	.321	.006	.075	.062	
	Predictors: (Constant), FC, Experience, Exp * FC	.326	.010	.009**	.019*	Confirmed
	Predictors: (Constant), FC, Educ, Educ * FC	.318	.002	.4	.846	
SI	Predictors: (Constant), SI	.161				
	Predictors: (Constant), SI, Gender, Gender * SI	.172	.012	.012*	.769	
	Predictors: (Constant), SI, Age, Age * SI	.166	.005	.151	.128	
	Predictors: (Constant), SI, Experience, Exp *SI	.163	.002	.485	.229	
	Predictors: (Constant), SI, Educ, Educ *SI	.163	.002	.485	.229	

c. Dependent variable: BI , ** significance at 0.01 and * significance at 0.05

Columns 4 and 5 report both the R-square change and its corresponding significance. Based on both the R^2 change significance and the p_{-value} (column 6) of the interaction term. The researcher has confirmed whether the moderation holds as reported in the last column of the Table 7.15.

The three confirmed moderations reported in table 7.15 were further probed by testing the conditional effects of each moderator's levels on the corresponding

relationship. The tables below report the effect of the independent variable on behavioral Intention (BI).

Table 7.15 (a) DV: Behavioral Intention(BI) on IV: Effort Expectancy(EE)

Gender	Coefficient	R^2
Male (N=316)	.488	.288
Female (N=322)	.688	.377

The above table reveals that female has higher effect of EE on BI than male.

Table 7.15 (b) DV:Behavioral Intention(BI) on IV: Performance Expectancy (PE)

Age Group	Coefficient	R^2
16-25 years (73)	.684	.483
26-35 years (358)	.622	.372
36-45 years (168)	.769	.509
Above 45 years	.312	.186

Among the age groups, it can be seen as presented in the table 7.15(b) that the older age group has a low effect of Performance on BI.

Table 7.14 (c) DV: Behavioral Intention(BI) on IV: Facilitating Conditions (FC)

Experience	Coefficient	R^2
Less than 5 years(N=38)	.272	.16
More than 5 years (N=600)	.609	.34

It is clear as presented in table 7.15(c) that the group with more experience has a higher effect of facilitating condition on BI. Overall, none of the levels has reversed the relationship of the construct on BI.

7.9 Conclusion

This chapter details the results and findings of the quantitative analysis. The collected data is analysed to determine the main factors that would have various influences on the adoption of e-Government from citizens' perspectives in the context of Abu Dhabi's e-Government initiative.

Multi-regression analysis tests were carried out for hypotheses H1 to H4; H6 & H7 (i.e., concerning performance expectancy, effort expectancy, social influence, facilitating conditions, Internet Trust, and e-Government Trust) and the dependent variable of *behavioural intention*. A second multi-regression analysis test was carried out for hypotheses H5 and H8 (i.e., *behavioural intention* and *facilitating conditions*) against the dependent variable of *e-Government use*. The moderators (i.e., gender, age, experience, and education) were tested to reveal the moderating roles these play on the independent and dependent variables.

Chapter 8: Discussion

8.1 Introduction

The main aim of this study was to investigate the factors that affect the adoption of e-Government by citizens within the context of Abu Dhabi. The study posed two main research questions that guided the study, namely:

1. What are the main factors that affect e-Government services usage by the citizens of Abu Dhabi?
    a. To what extent can e-Government trust and Internet trust increase e-Government adoption?
    b. Can gender, age, education, and experience of potential users moderate the relationship between the constructs suggested by the modified UTAUT model and e-Government adoption?
2. How effective is the modified UTAUT model as a tool for evaluating the usage of e-Government services by Abu Dhabi citizens?

In addition, 24 hypotheses related to the research questions were developed using a modified and updated (based on the needs of this study) version of the Unified Theory of Acceptance and Use of Technology (UTAUT). Eight of the hypotheses concern the direct effects between the dependent and independent variables and sixteen hypotheses concern the moderating effects between the articulated variables. This chapter discusses the findings of the statistical analyses (Regression and SEM) in relation to the research questions and associated hypotheses.

8.2. Discussion of the Hypotheses

The framework suggested in this study has as its theoretical basis the UTAUT theory. The UTAUT incorporates two main dependent variables, namely, **i**) the behavioural intention to use e-Government services, and **ii**) the *perceived use* of e-Government services. The independent variables considered in this research are performance expectancy, effort expectancy, social influence, facilitating conditions

(based on the UTAUT framework), as well as e-Government trust and Internet trust (incorporated from: Lean et al. (2009) and Belanger & Carter (2008)). In addition, behavioural intention is used as an explanatory variable for actual adoption.

The various hypotheses defined and discussed below are grouped according to the relevant variables.

8.2.1 Performance Expectancy

This hypothesis states that:

H1: *Performance expectancy will have a positive influence on behavioural intention to use e-Government services.*

The validity of the hypothesis reflects its degree of agreement with the definition of performance expectancy, which reflects how far individuals believe that the use of a system will help them to improve the performance of their task. Therefore, it entails five sub-variables, *namely* performance expectancy, extrinsic motivation, job-fit, relative advantage and outcome expectations (Venkatesh et al., 2003).

The variable, on which this hypothesis is based, was included in the questionnaire by incorporating four inquiries covering the quality and effectiveness of the current e-Government services in terms of citizens' interest and satisfaction. The statistical analysis of this hypothesis-related question revealed a positive and significant result with (β=.269, $p < .05$), indicating that on average, respondents had positive attitudes to e-Government's usefulness, speed, accessibility and impact on productivity. Consequently, performance expectancy is considered in this study to be one of the strongest predictors of intention. This result indicates that the available bundle of e-government services makes citizens confident that their productivity, in terms of the benefits gained, will be higher if they use those online services.

Thus, users with a favorable performance expectancy are more likely to be interested in the adoption of various e-Government services and benefits. This might be

because end users believe that the adoption of e-Government services would provide a better communication channel with the Government and will provide them with more effective access to the services provided by the government. Other researchers uncovered similar results albeit in different national settings. These include studies in developed nations such as the United Kingdom (Hariri, 2014), Spain (Arenas et al., 2015); but also developing countries, such as Saudi Arabia (Alsaif, 2013) and Jordan (Aldajani, 2011). Therefore, this finding is consistent with those produced by Davis (1989), Venkatesh and Davis (2000), Venkatesh et al. (2003), Alsaif (2013), Alanazi (2013), and Hariri (2014). Results therefore support the proposed hypothesis and confirm that performance expectancy is an influential factor on the intention to use e-Government services. This could be a result of the fact that e-Government services provide a wide range of options and benefits to citizens, which can in turn significantly reduce the cost and time that they have to spend in relation to carrying those activities out in the traditional manner (Alanazi, 2013).

8.2.2 Effort Expectancy

Effort expectancy is defined in the literature as the degree of ease associated with the use of the system; and more specifically, it refers to the perceived ease of use and complexity related to the e-government services (Venkatesh et al., 2003). This hypothesis was covered in the questionnaire by four questions that considered how citizens perceived the ease of use of the e-services provided (i.e. how much effort they thought is needed in order to complete a transaction over the e-government services), thus assessing whether the e-services were designed in a simple way and were not too complex to use.

This hypothesis states that:

H2: *Effort expectancy will have positive influence on behavioural intention to use e-Government services***.**

The statistical analysis of the related questions to this hypothesis revealed a positive and significant result (β=.088, p <.05), showing that the less the perceived effort that potential users believe they need to exert, the more likely it is that they will consider using e-Government services. This finding is similar to that of other studies such as Venkatesh et al. (2003), Alsaif (2013), Alanazi (2013), and Hariri (2014) but again in a different context.

Venkatesh et al. (2003) have shown that effort expectancy plays a key role in facilitating acceptance of technology. This result can be explained by the increased rate of citizens that are using computers over the recent years as well as the internet to receive a variety of other services (Al-Gahtani et al., 2007). As effort expectancy in this study was found to be positive; it would therefore be expected that the group of citizens that are more likely to use the provided bundle of e-Government services are those that believe that their skills allow them to use those services with ease.

8.2.3 Social Influence

Social influence is defined in the literature as "The degree to which the use of a certain system (e-Government services) is influenced by peers". In creating this definition, Venkatesh et al. (2003) integrated into the social influence construct a number of related factors that have been used in a number of prior studies. In the context of this study, the author hypothesised that social influence would have a positive influence on the behavioural intention to use e-Government services.

The hypothesis states:

H3: *Social influence will have a positive influence on behavioural intention to use e- Government services*.

This hypothesis was tested by using two questions that covered the influence that peers and important connections might have on users as well as the extent to which government promotes the usage of e-services. The statistical analysis of the questions related to this hypothesis nevertheless revealed a non-significant relationship (β=.015, p >.05).

This can indicate two elements: First, that citizens are not particularly influenced in terms of their intent to use public e-services by whether their peers also use these services. Second, that the adoption of e-government services in society is not at a high enough level that will allow for information, regarding the benefits as well as the low level of risks involved in using it, to be diffused from adopter to potential adopter (Mansfield, 1963; Bourke and Roper, 2014). Finally, it could also be a result of the technology being too simple for the spread of information regarding the benefits and potential risks to have an effect. Indeed, in this regard Ganotakis & Lindsay(2016) found that the effect of external information is stronger for more complex rather than for more simple versions of an IT.

Along those lines, Chau and Hu (2002) found that subjective norms had no significant effect on behavioural intention. Venkatesh et al. (2003) found that none of the social influence constructs studied were significant when use is voluntary, only becoming significant when the use of the technology or innovation is mandated.

Finally, similar results were found by many researchers, in different national settings, when examining the adoption of e-Government services in both developed, such as the United Kingdom (Hariri, 2014), South Korea (Kim et al., 2016); and developing or newly industrialised countries, such as Oman (Tabsh, 2012) and Taiwan (Yueh et al. 2015). This finding is also consistent with those of Venkatesh et al. (2003), Kim et al. (2016), Alsharif 2013, Hariri (2014), Tabsh (2012), and Al-Sobhi (2011). This confirms that social pressures are not important for the adoption of such technology regardless of the cultural setting. It is more likely therefore to be

related to the level of sophistication related to this technology (Ganotakis & Lindsay, 2016).

8.2.4 Facilitating Conditions

Facilitating conditions are defined as the degree to which an individual believes that he/she has the necessary technical knowledge and resources that are needed in order to support usage of e-Government systems (Venkatesh et al. 2003). Venkatesh et al. (2003) have incorporated into this definition of facilitating conditions the concepts of three constructs used in previous models, namely, perceived behavioural control, facilitating conditions, and compatibility. In the present study, the author hypothesized that facilitating conditions will have a positive effect on the intention and actual usage of e-government services.

The facilitating conditions hypothesis was tested through three questions, which focused on whether respondents felt they had access to the resources, knowledge, and support to enable them to use e-Government services, as well as whether the e-services available to them were compatible with other technologies that they used. There are two hypotheses relating to facilitating conditions, namely,

H4: *Facilitating conditions will have a positive influence on behavioural intention to use e-Government services*.

The statistical analysis of the questions relevant to hypothesis H_4 revealed a significant positive result (β=.182, $p < .05$), which indicates that respondents show a positive attitude towards using e-Government services assuming that they possess the relevant facilitating conditions that would enable them to do so. The result generated is consistent with that of Alsharif (2013), who revealed that the potential facilitating conditions have a significant impact on predicting behaviour intention.

Similar findings were reported by Attuquayefio, & Addo in Ghana (2014) and in Oman by Tabsh (2012).

H5: *Facilitating conditions will have a positive influence on perceived use of e-Government services*.

The statistical analysis of the questions related to hypothesis H5 revealed an insignificant result with (β=.108, $p > .05$). That is to say that facilitating conditions do not positively influence *perceived use* of e-Government services. This finding contradicts previous research using the standard UTAUT model (Venkatesh et al., 2003; Alsharif, 2013) who observed a strong relationship between the facilitating conditions and *perceived use*. The result also contradicts those studies that found that the prior usage of similar technologies, an activity that will enhance a potential adopter's experiential human capital and skills and hence an aspect of facilitating conditions, will increase the likelihood of adopting the current technology (Hollenstein & Woerter, 2008).

In this study, the fact that facilitating conditions increase the likelihood of intention but not actual usage could be a result of potential respondents overestimating their available skills and/or having negative experiences when using similar technologies in the past (Venkatesh and Zhang 2010). Although potential adopters with those characteristics might still want to use e-Government services because they believe that their skills and prior experience can allow them to do so easily, when they actually have to make the decision of whether to adopt it or not, they might feel constrained from previous adverse experiences and a lack of necessary skills.

8.2.5 Trust Constructs

A considerable number of research studies (e.g., Gefen et al., 2003; Holsapple & Sasidharan, 2005; Pavlou 2003; Pavlou & Fygenson 2006; van Slyke et al., 2004) reveal that many citizens remain reluctant to adopt e-Government services due to

personal concerns about trust, privacy and security. Therefore trust and confidence plays important role in successful adoption of e-Government services (Al-Khouri, 2012). Rotter (1967) in Carter & Weerakkody, 2008 defined trust as "An expectancy that the promise of an individual or group can be relied upon". Trust in e-Government requires having trust in two separate components: **i**) trust in the delivery of government services, (Wang & Emurian, 2005) and **ii**) trust in the Internet (Carter & Belanger 2005; Pavlou 2003).

In the context of this study, the author hypothesized that both trust in the e-government and trust in the Internet will have corresponding positive influences on behavioural intention. The first relevant hypothesis is stated as:

H6: *Trust in the e-government will have a positive influence on behavioural intention.*

e-Government trust conditions were tested in the questionnaire through five questions that looked at the government's ability to meet citizen needs, ability to carry out online transactions, and whether citizens believed they could trust e-Government services. The statistical analysis of the questions relevant to hypothesis H_6 revealed a significant positive result (β=.137, $p < .05$), which means that on average respondents have a positive attitude, trusting e-Government services.

This indicates that trust in the administrative capabilities of government personnel regarding the secure access, implementation and management of the online system, is important for the perception of online systems. Thus, this hypothesis suggests that the trust of the citizens in e-Government agencies will significantly affect their intention to use their e-services (Alsaif 2013).

This finding adds significant value to research within this context, as existing studies have rarely (if at all) incorporated e-Government trust as a construct in the area of e-government adoption. Findings show quite convincingly that citizens' trust in the

effective delivery of online services by the government will increase their interest in adopting such services.

The second hypothesis related to trust states:

H7: *Trust in the Internet will have a positive influence on behavioural intention*.

A number of researchers in the area of IT adoption have argued that the intention and then at least theoretically the actual usage of those systems is largely influenced by Internet trust (Belanger & Carter, 2008; Carter & Belanger, 2005). Citizen's beliefs regarding the efficiency of the Internet as a secured medium to make their various transactions safely can increase their trust of related systems. Along those lines the hypothesis presented in this study similarly suggests that the citizens' trust of the Internet should positively affect not only their intention to use e-Government services but also their actual usage. At least in the case of intent to use, a number of studies (Belanger & Carter, 2008; Carter & Belanger, 2005; Alsaif 2013; Abu Nadi 2012) support these findings, and suggest that intention to use e-government systems is strongly determined by Internet trust including Mekawie in Egypt (2013), Alanazi in Saudi Arabia (2013), and Abu Nadi in Saudi Arabia (2012).

Internet Trust conditions were tested in the questionnaire through four questions that looked at citizens' attitudes to legal and technological safeguards, encryption and Internet robustness. The statistical analysis of the questions relevant to hypothesis $\mathbf{H_7}$ revealed a positive and significant result (β=.315, $p < .05$), where most of the respondents had a positive attitude towards their experience in trusting the Internet generally, as well as the legal and technological safeguards in Abu Dhabi in particular. Al-Ghaith et al. (2010) investigated the factors that can potentially influence the adoption of e-Government services provided and found that privacy was among the critical factors in determining such adoption.

The fact that Internet trust appears to be an important factor even for government related services (given that at a government level security can be assumed to be the

tightest), is quite interesting in itself. This is in addition to the fact that the level of online transactions in general at a worldwide and regional level have increased over recent years. This result could be a consequence of the latter, in relation to the rest of the (especially developed) world's diffusion and usage of IT related services. Although some groups (for example younger) tend to be exposed to those technologies and use them at a higher rate than others, there still appears to be a certain group of people (for example older) that believe that using the Internet is not as secure as carrying out transactions face to face.

8.2.6 Behavioural Intention

Behavioural intention is the individual's readiness to perform a specific action or behaviour (Davis, 1989). In general, the stronger the intention to perform a certain behaviour, the more likely it is that such performance will take place (Ajzen, 1991). In the context of this study, consistent with previous studies, it is expected that the intention to use an e-Government service will positively influence its use. This is hypothesised as:

H8: *Behavioural intention to use e-Government services will have a positive influence on the perceived use of e-Government.*

There were three questions looking at citizens' intentions to use e-Government services in the present, as well as in the future. The statistical analysis related to the questions regarding hypothesis H_8 revealed a significant and positive result (β=.227, $p < .05$). This result shows that, on average, respondents that intend to use e-Government services are also more likely to adopt them. The relationship between behaviour intention and actual adoption is important to investigate empirically because intention is not always highly correlated with actual adoption and

investigating only intention and not actual adoption can be a source of self-reporting bias (Ganotakis and Love, 2010). Nevertheless, in this study and within the context of e-government adoption, we found that intention to use is likely to lead to actual usage of the technology. This is in line with Fishbein and Ajzen (1975) who found that human attitudes and intentions towards using a system influence actual usage, something that is also confirmed by TPB and TRA.

8.2.7 Moderators

Based on the above discussion of results the possibility that the direct effect that a number of variables have on perceived but also actual adoption can be moderated by additional factors. In light of this, it has been argued that human factors play a vital role in the process of accepting and adopting technology. Many studies have investigated the human-technology interaction (HTI) in order to uncover the factors that moderate the impact of other variables. In this study, some moderating variables (*gender, age, education,* and *experience level)* were tested to see their effect on the relationship of each of the independent variables (*Performance expectancy, Effort expectancy, Social influence, and Facilitating conditions*) as well as the dependent variables (*Behaviour Intention and Use behaviour).*

8.2.7.1 Gender

The influence of gender on the adoption of e-Government services has attracted intense investigation. Existing findings indicate a considerable difference between male and female, with female users suggested on average to be less likely to adopt e-Government services compared to male users (Yueh et al. 2015).

In this thesis, a number of hypotheses were proposed relating to the role that ***Gender*** plays as a moderator between the various independent variables and behavioural intention:

H1a: *Gender differences positively moderates the relationship between Performance Expectancy and Behavioural Intention.*

This hypothesis was not supported, despite suggestionss from the literature that male users are perhaps influenced by the potential gained benefits to a greater degree than women, which would in turn enhance their intention to use e-Government services (Al Awadhi & Morris, 2008). It appears that in terms of gender, performance expectancy (with a focus upon the accomplishment of tasks), does not affect male and female users differently, a finding that is in contradiction with that of Venkatesh et al., (2003). This suggests that there might be no difference in the level of task orientation between male and female potential users (Alsharif 2013).

H2a: *Gender differences positively moderates the relationship between effect of Effort Expectancy and Behavioural Intention*

The findings of this thesis support the notion that gender is important for moderating the effect of effort expectancy on the intention to use e-government ($\mathbf{R^2}$=.341, p=0.013, p <.05).

This result overall suggests that there might actually be a greater tendency for women to be influenced by ease of habit (habitual factors) in comparison to men. (Alsharif 2013).

H3a: *Gender differences positively moderates the relationship between Social Influence and Behavioural Intention*

This hypothesis was not supported, a result that contradicts arguments derived especially from psychology research. In more detail these arguments suggested that there are differences when it comes to the decision making process of men and

women (Bem and Allen, 1974) and especially in the way that external information is processed when it comes to the value that men and women assign to socially constructed information and related cognitive structures (Venkatesh and Morris, 2000). Our findings show that within the context of e-government adoption such gender differences do not apply.

H4a: *Gender differences positively moderates the relationship between Facilitating Conditions and behavioural intention*

This hypothesis was also not supported. Overall, only $\mathbf{H_{2a}}$ revealed significant results with ($\mathbf{R^2}$=.341, p=0.013, p <.05). This finding could still indicate that gender differences could potentially influence technology adoption in regards to e-government services (Sun and Zhang, 2006) but definitely not to the extent initially thought in the literature. In addition, it differs significantly from Venkatesh and Morris' research (2000), which revealed three different points from a gender perspective in evaluating IT adoption, including the finding that men's usage decisions were strongly influenced by the perception of usefulness, while women's were strongly influenced by ease of use and subjective norm perceptions.

This indicated that gender plays a moderator role in the relationship between facilitating conditions and behavioural intention. It has to be emphasized, however, that the overall results contradict the presumption that men more to use e-Government services than women do.

8.2.7.2 **Age**

Four hypotheses were put forward to explore the role that ***Age*** plays as a moderator between the independent variables suggested by the theoretical model and behavioural intention.

The statistical analysis of the questions relevant to the age-related hypotheses H_{2b}, H_{3b}, H_{4b} show non-significant (P >.05) findings, although H**1b** was supported with (R^2=.383, p=0.011, p <.05).

H1b: *Age positively moderates the relationship between performance expectancy and behavioural intention.*

This hypothesis was supported with significant results of (R^2=.383, p=0.011, p <.05). This, can be linked to the suggestion that older individuals are set in their way of doing things and therefore tend to be risk averse. This finding shows that older individuals need to be convinced of the benefits of E-Government and be able to see clear performance outcomes before attempting to use an online system.

H2b: *Age positively moderates the relationship between effect of effort expectancy and behavioural intention.*

This hypothesis was not supported, something that contradicts findings that older individuals pay more attention to the effort they need to exert when using a new system. It is generally suggested that older individuals have to exert (or believe they have to exert) a higher level of effort in order to complete an IT related task (Alsharif, 2013) and therefore they might have a strong perception that the benefits gained do not outweigh the effort that they have to put in. An explanation for the non-significance of this variable might be that older people have more time on their hands given that they are most likely retired and therefore the amount of time they have to allocate to learn a new system might not be a constraint at the level that was initially thought by the literature. Additionally, this could be a result of older individuals that are interested in using those services being more keen to actually receive assistance regarding the usage of the new technology (Alsharif, 2013). This would reduce the moderating effect between age and effort.

H3b: *Age positively moderates the relationship between social influence and behavioural intention*

This hypothesis was not supported. One reason might be that the social network of older people, and therefore one of the main sources of information regarding the usage of technologies (Hollenstein & Woerter, 2008), consists of citizens of a similar age group that are also statistically less likely to use and therefore diffuse information regarding the benefits of using a certain technology.

H4b: *Age positively moderates the relationship between facilitating conditions and behavioural intention*

Finally, this hypothesis was also not supported. One reason for this might be that although older individuals might feel that their extensive experience that is accumulated from many years in the workforce can assist them in using certain technology, the same skills can make them overconfident and unwilling to receive additional information or advice from other sources (Ganotakis, 2012). Hence, when the time comes to decide whether to adopt a technology or not, they will choose not to as it is harder to implement than they initially thought.

8.2.7.3 **Computer Experience**

In terms of computer experience, in the context of this study, the hypotheses that Computer Experience plays a key role as a moderator between independent variables and behavioural intention are framed as follows:

H1c: *Experience positively moderates the relationship between performance expectancy and behavioural intention.*

H2c: *Experience positively moderates the relationship between effect of Effort Expectancy and Behavioural Intention.*

Results showed that none of the aforementioned hypotheses were supported and that the effect of effort expectancy and performance expectancy do not change depending on the level of computer experience that an individual possesses. These findings contradict the findings of Venkatesh and Zhang (2010), who showed that the effect of effort expectancy on intention behaviour varied depending on Internet experience (Alsaif, 2013; Rodrigues et al., 2016). It has to be emphasized that these results (as well as those of previous hypotheses) are not contradictory to what was expected, but they show that these interactions do not matter as were initially suggested by the literature.

H3c: *Experience positively moderates the relationship between Social Influence and Behavioural Intention*.

H4c*: Experience positively moderates the relationship between facilitating conditions and behavioural intention.*

The statistical analysis of the related questions to the experience-related hypotheses **H1c**, **H2c**, **H3c** show non-significant results. However, hypothesis **H4c** was supported as results revealed a significant relationship when the facilitating conditions factor was moderated by experience ($\mathbf{R^2}$=.326, p=0.019, p <.05). This finding is in line with previous studies (e.g. Davis, 1989; Venkatesh and Davis in 2000) which consider computer experience as a possible moderator for working, for example, with technology (one of the facilitating conditions). This result therefore shows that prior computer experience, can amplify the effect of facilitating conditions because as the tenure of using computers increases so does the perception but also the actual level of the necessary level of skills that individuals need to have in order for their confidence and therefore intention of using the technology to also increase (Thong, 1999).

8.2.7.4 **Education**

The four hypotheses that were put forward to explore the role that that *Education level* plays as a moderator between independent variables and behavioural intention are the following:

H1d: *Education level positively moderated the relationship between performance expectancy and behavioural intention.*

H2d: *Education level positively moderated the relationship between effect of effort expectancy and behavioural intention.*

H3d: *Education level positively moderated the relationship between social influence and behavioural intention*

H4d: *Education level positively moderated the relationship between facilitating conditions and behavioural intention*

It is surprising that education did not moderate any of the independent variables especially as higher levels of education in general are linked with greater open mindedness, the ability to deal with more complex scenarios and having a greater capacity to assimilate external information (Ganotakis, 2012). This could be a result of not being able to account for the specific discipline of the education or it may simply be the case that education might not matter for the usage of relatively simple technologies as it is the usage of e-Government services. The direct effect of educational levels (4 levels) on *behaviour intention* was investigated using one way-ANOVA. The test revealed no significant effect (p=0.362).

Table 8.1: Summary of the proposed hypotheses

H#	Hypothesis		**Result**
H1	*Performance expectancy will have a positive influence on behavioural intention to use e-Government services*		Supported
	H1a	*Gender differences positively moderates the relationship between Performance Expectancy and Behavioural Intention.*	Not Supported
	H1b	*Age positively moderates the relationship between performance expectancy and behavioural intention.*	Supported
	H1c	*Experience positively moderates the relationship between performance expectancy and behavioural intention.*	Not Supported
	H1d	*Education level positively moderated the relationship between performance expectancy and behavioural intention.*	Not Supported
H2	*Effort expectancy will have positive influence on behavioural intention to use e-Government services.*		Supported
	H2a	*Gender differences positively moderates the relationship between effect of Effort Expectancy and Behavioural Intention.*	Supported
	H2b	*Age positively moderates the relationship between effect of effort expectancy and behavioural intention.*	Not Supported
	H2c	*Experience positively moderates the relationship between effect of Effort Expectancy and Behavioural Intention.*	Not Supported
	H2d	*Education level positively moderated the relationship between effect of effort expectancy*	Not Supported

		and behavioural intention.	
H3	*Social influence will have a positive influence on behavioural intention to use e- Government services.*		Not Supported
	H3a	*Gender differences positively moderates the relationship between Social Influence and Behavioural Intention*	Not Supported
	H3b	*Age positively moderates the relationship between social influence and behavioural intention*	Not Supported
	H3c	*Experience positively moderates the relationship between Social Influence and Behavioural Intention.*	Not Supported
	H3d	*Education level positively moderated the relationship between social influence and behavioural intention*	Not Supported
H4	*Facilitating conditions will have a positive influence on behavioural intention to use e-Government services.*		Supported
	H4a	*Gender differences positively moderates the relationship between Facilitating Conditions and behavioural intention*	Not Supported
	H4b	*Age positively moderates the relationship between facilitating conditions and behavioural intention*	Not Supported
	H4c	*Experience positively moderates the relationship between facilitating conditions and behavioural intention.*	Supported
	H4d	*Education level positively moderated the relationship between facilitating conditions and behavioural intention*	Not Supported
H5	*Facilitating conditions will have a positive influence on*		Not

	perceived use of e-Government services.	Supported
H6	*Trust in the government will have a positive influence on behavioural intention.*	Supported
H7	*Trust in the Internet will have a positive influence on behavioural intention*.	Supported
H8	*Behavioural intention to use e-Government services will have a positive influence on the perceived use of e-Government.*	Supported

8.3 Conclusion

This Chapter discussed and interpreted the findings of the data analysis, compared these results with those of other research studies in this field, and included data analyses outcomes. Overall, the generated results were found to be in agreement with the findings of reputable authors (e.g., Ajzen, 1991; Sun & Zhang, 2006; Venkatesh et al., 2003, etc.). The research found that internet trust and performance expectancy are some of the strongest predictors of intention to use e-Government services. Similarly, effort expectancy, facilitating conditions, and trust had a positive influence on behavioural intention. However, social influence did not.

CHAPTER 9: Conclusion and Recommendation

9.1. Introduction

Chapter Eight highlighted the main findings of this questionnaire-based survey, which largely answered the proposed research questions, namely "What are the key factors that affect Abu Dhabi Emirate citizens' adoption of e-Government services?" and "How effective is the modified UTAUT model as a tool for evaluating Abu Dhabi citizens' adoption of e-Government services?" It likewise presented a quantitative analysis of the performance of the Abu Dhabi e-Government as a primary provider of e-public service within the Abu Dhabi Emirate.

The statistical analysis focused on analyzing the underlying assumptions of the research model; that is, if citizens continue to use e-Government services, there will be a demand for the provision of customer-oriented integrated data and online transaction e-services from Government. This closing chapter gives an overview of the present study and its contributions to the e-Government field and the literature. It also discusses the limitations of this inquiry and possible future research on the topic.

9.2. Overview of the Research

E-Government has been developed from the pool of ICT applications in the public administration domain. It aims at providing comprehensive, timely public services even to remote citizens through online access. Such public e-services have been facilitated through the adoption, use and management of mass data and user transactions received by the e-Government control centre.

In this thesis, the researcher argues that the realization of e-Government benefits depends largely and critically on citizens' satisfaction with their experience and

continuing use of e-Government services. Despite the rapid growth in e-Government practice and research, the challenges raised by problems related to the infrequent use of e-Government services due to ubiquitous ICT illiteracy among citizens in developing countries among others, has not been systematically studied in the e-Government research literature.

The adoption of e-Government services by developing countries (such as the UAE) is considered critical in the quest to provide a wide range of socioeconomic benefits for citizens. Unfortunately, most of the ICT applied in the e-Government sector has been developed in advanced countries to meet their socio-cultural and economic needs. Governments in developing countries need to customize Western e-Government tools to cope with their own citizens' actual needs. Unfortunately, there is no functional model to ensure the successful adoption of e-Government in these developing countries (Al-Shehry et al., 2006).

To fill this gap, this empirical survey research, grounded on the UTAUT model developed by Venkatesh et al. (2003), aims at developing a better theoretical explanation for the behavioural basis of acceptance and use of e-Government public services. This research has modified the original UTAUT model for the continued use of online public services by citizens, extending it theoretically by incorporating the concepts of both trust in e-Government (as supplier) and the Internet (as a medium).

To test this model, a questionnaire containing 41 questions was sent to 638 respondents to assess their intention to use e-Government services as well as their perceived usage of e-Government services.

The results recorded statistically strong and significant evidence for highly positive relationships between, for instance, performance expectancy, facilitating conditions, trust in the Internet and e-Government, and intention to use e-Government services. A statistical significant linkage was not, however, found between social influence and intention to use e-Government services.

The findings from the quantitative analysis of the collected data overall significantly validate the conceptual model proposed here, within the context of the Abu Dhabi Emirate. This model was based primarily on the modified UTAUT model with the additional inclusion of such independent variables as trust in e-Government (as provider) and trust in the Internet (secured medium), as presented and analyzed in Chapter seven. The key independent variables (predictors) concerned the behaviour associated with intention to use, and the behaviour of adopting the e-Government e-public services, as discussed in Chapter Eight.

9.3. Dissertation Review

This section provides a brief overview of the nine chapters that constitute the body of this dissertation.

Chapter one is a preface that gives an introductory account of the main issues of this research study, highlighting its topical theme, purpose, objectives, research questions and hypotheses, the constructs of the proposed model and a description of the variables involved. Furthermore, it sets out the potential theoretical contributions and clearly identifies the main attributes and keywords that guided the search and retrieval of scholarly resources related to the topical theme of this study.

Chapter two considers the evolutionary history of the initiative, specifically the administrative support and technological implementation and adoption of the e-Government programmer of the Abu Dhabi Emirate. This chapter also presents a description of the physical geography and demographic features of the country. Moreover, the challenges that were experienced by the Abu Dhabi e-Government project are discussed to account for their success or failure. The chapter documents the continued efforts of the Abu Dhabi Executive Council to deal with these challenges as they emerged. The technological infrastructure for launching the project is also described, including the preparation of the web portal design, selection of the public services that could be run and accessed electronically, and the survey of citizens' intention to adopt the e-Government services.

Chapter three is based on a systematic review of the literature. The retrieval of the scholarly literature is described, including the definitions and current types of e-Government, together with the relationships they might have with such entities as peer e-Government (G2G), business (G2B), and e-Government targeting citizens (G2C). The chapter discusses the actual needs and expectations of the citizens regarding the capacity of e-Government to provide the packages of public services that various segments of the community could best use. The key factors (e.g., trust) that could pave the way for the success of the e-Government implementation and adoption are also identified and discussed.

Chapter four presents the key theories and models that have dealt with acceptance of technology and the adoption of a technological paradigm. The chapter reviews a number of theories and models such as the Technology Acceptance Model (TAM), the Theory of Planned Behaviour (TPB), the Theory of Reasoned Action (TRA), the

Diffusion of Innovation Theory (DOI), the Unified Theory of Acceptance and Use of Technology (UTAUT), the Model of PC Utilization (MPCU), and the Motivated Model (MM). The chapter also discusses the tests of validity for each theory and the model chosen for investigating e-Government adoption.

Chapter five presents the proposed research questions and related hypotheses that directed the investigation of the effects of the ten independent variables including those used in existing within the literature models (such as performance expectancy, effort expectancy, social influence, facilitating conditions, and related moderators), along with those theoretically incorporated in this study and suggested by the researcher (such as Trust in the Internet and Trust in e-Government). Those were either directly and/or indirectly linked with two dependent variables (behavioural intention, and e-Government use). The UTAUT model was found to be the most suitable one for investigating the adoption of an e-Government paradigm and a modified version that was used to apply the proposed model for the Abu Dhabi Emirate e-Government project is discussed.

Chapter six is concerned with the research methodology that was adopted. It gives a background to the research's philosophical basis. The chapter presents an overview of the method of data collection, its sampling technique, sample size, response rate, and reports validity and reliability tests carried out. It also introduces the quantitative analytical approach (i.e. Regression and SEM). Special emphasis is placed on ethical considerations and research integrity.

Chapter seven provides the results and findings that were generated from the quantitative analysis of the collected data. Multi-regression analysis tests were carried out for hypotheses H1 to H4; H6 & H7 (i.e., concerning performance

expectancy, effort expectancy, social influence, facilitating conditions, and Trust in Internet and Trust in e-Government) against the dependent variable of behavioural intention. Another multi-regression analysis test was carried out for hypotheses H5 and H8 (i.e., behavioural intention and facilitating conditions) against the dependent variable of e-Government use. The moderators (i.e., gender, age, education, and experience) were tested to reveal how they moderate the effect of independent on the dependent variables.

Chapter eight discusses and interprets the findings of the data analysis, and compares these results with those of other research studies in this field. Overall, some generated results were found to be in agreement with the findings of reputable authors (e.g., Ajzen, 1991; Sun & Zhang, 2006; Venkatesh et al., 2003, etc.) whereas some interesting differences were also uncovered and appropriate justifications were provided.

Chapter nine provides relevant recommendations to remedy the drawbacks of the existing implemented e-Government model. It also suggests further research studies to sustain the use of e-Government-based public services by a wide spectrum of the community.

A clear research scope, research aims, reliable literature, the pursuit of an appropriate research method and approach to data assisted the researcher to complete this research successfully.

9.4. Practical Contributions

The various applications of the UTAUT model as discussed in the related literature have motivated the researcher to adopt this model in the present work. Given its

nature, the adoption and modification of UTAUT is highly desirable because the theory helps to explain the contemporary phenomenon of e-Government adoption, while it focuses on the factors that might encourage specifically the Emirati citizens of the Abu Dhabi Emirate to use the bundle of public e-services provided through e-Government. Therefore, the researcher argues:

- *First*, the present study focuses on expanding the body of knowledge about e-Government in Abu Dhabi. As E-Government implementation is relatively new to the Abu Dhabi Emirate, this research could guide the Abu Dhabi's e-Government planners to consider the factors that help in achieving successful e-Government adoption for different groups of citizens (i.e. depending on age, gender, education). This could maximize the e-Government returns on ICT infrastructure investments and provide efficient services.

- *Second*, the evidence resulting from the research should advance the understanding of e-Government adoption among Abu Dhabi's citizens and is intended to guide policymakers in particular and academics in general, to better execute and replicate respectively a model of e-Governance which is academically informed and based on public acceptance.

- *Third*, the research is the first of its kind in this context and it is hoped that it will contribute in filling the current gap in the literature on the evolving field of e-Government and e-Government adoption in Abu Dhabi. As far as the author is aware, there are hardly any studies publicly available that discuss factors that influence citizens in Abu Dhabi to adopt e-Government services.

9.5. Theoretical Contributions

The UTAUT model provides a framework that explains why people use e-Government services (Slade et al., 2015). As noted above, the model is widely used in exploratory studies concerning public adoption attitudes. Thus, the major theoretical contribution of the study, which modifies the UTAUT to suit a new

context, is this new version of the model. This modified UTAUT model was formulated to fit the context of the e-Government initiative proposed by the Abu Dhabi Emirate. The study adopts eight main hypotheses and 10 moderating hypotheses as introduced by Venkatesh et al.(2003).

These hypotheses have been incorporated into the study in order to examine the modified UTAUT model in the current context. The UTAUT model is well suited to address most of the identified gaps because they are influenced by people's socio-demographic characteristics. It has eight constructs (performance expectancy, social influence, facilitating conditions, behavioural intention, adoption behaviour, gender, age, and education) that influence people's adoption practices. This thesis contributes by expanding the UTAUT model by including Government trust and Internet trust as both those concepts of trust are considered to be key components of any improvement in public management (Horsburgh et al., 2011). Furthermore, as the UTAUT models suggests the researcher also considered the moderating role of variables, such as gender, age, and experience while further contributing by theoretically incorporating how education could also moderate the relationship between performance expectancy, social influence and facilitating conditions which could have potentially help to fill existing theoretical gaps in theory on e-Government adoption. Although education was not found to moderate the relationship between the aforementioned concepts and intention to adopt, this might simply mean that more meticulous constructs capturing education should be considered and that future researchers should include and theorize on more detailed/specific aspects of education (i.e. discipline) and examine the effect that this might have on intention to adopt.

The study also conducted a test on the generalizability of the modified UTAUT model at both the organizational and citizen level (i.e., in e-Government use). In the past, studies that used the UTAUT have investigated the phenomenon in organizational contexts where performance expectancy was the main driver of

intentions and behaviours connected with technology use. However, the nature of citizens' acceptance of technology in the e-|Government context is still largely unexplored. Hence, this study takes note of the theoretical literature relating to e-Government, and addresses such questions as how effective it is to modify the UTAUT model to evaluate citizens' adoption of e-Government services. The original constructs contained in the UTAUT model have been amended to better fit the e-Government sector in the Abu Dhabi context. The present study thus provides an extension of the UTAUT model to developing countries such as the UAE.

9.6. Research Limitations

The prime limitation in carrying out this research was the issue of reaching the desired sample for the questionnaire-based survey. The lack of literature on e-Government in Abu Dhabi and the Gulf region was also a challenge in terms of having a rational comparative discussion. It was equally difficult to compare this research with other similar studies from the same region. Most available studies consider a demand perspective that examines e-Government services with a focus on citizens (G2C) but from a different perspective and by using different models. Nevertheless at the same time this characteristically exhibit the uniqueness of this study within this part of the world.

Three other limitations in this research are as follows:

1) Research population: The population in this research was based on Emirati people only. It is important therefore to emphasize that results of this study can be generalized and any policy recommendations can be applied only to Emirati citizens. This will help the Government to see why this population is not using e-Government services and what will encourage them to do so.

2) Methodology: This research used only quantitative methodology, but a qualitative arm to this research could create further insights into the findings, in relation to the moderating factors in particular.
3) Geography: The study covered only the Abu Dhabi Emirate and its three main cities, Abu Dhabi, Al Ain, and Al Garbia because of the time and difficulty of covering other Emirates in the UAE.

9.7. Future Research

This study has aimed to find appropriate factors for improving the acceptance and use of the current e-Government services provided by the Abu Dhabi Emirate. The researcher suggests that further related studies should be undertaken in future to examine adoption of services used by expatriates. This may help to identify new and factors of a different type that might affect the adoption, diffusion, and use of e-services other than the services mentioned in this study.

This research has examined the adoption of e-Government services among organizations within Abu Dhabi. Future research could use the conceptual model developed in this study to examine the citizens' perspective of adoption and use of e-Government services in the context of other Emirates.

The study answered the research questions as expected, but it also raises additional ones, which may be further studied. These include whether attitudes towards the usage of other services can affect the probability of using e-government services and vice versa and especially for the case of extending the study to include expatriates, the impact of culture on e-Government adoption could also be examined.

The results from the moderation test using regression provide insights which can be further investigated; for example, the finding indicating differences between male

and female respondents on the impact of performance expectancy on intention. Further studies could be conducted to find why this difference exists and how it affects the use of e-Government services.

9.8. Practical Recommendations

The research findings give rise to a number of practical recommendations. The Government needs to pay more attention to e-Government service and strategic plan management. By creating positive impressions relating to the benefits derived from the usage of e-Government services (performance expectancy), the ease of their use (effort expectancy), and their trustworthiness (e-Government and Internet trust), Governments can positively influence the intention to use e-Government services, and ultimately their actual and continued use.

There is a certain expectation of efficiency and ease in accessing Government services when an e-Government system is in operation. This kind of expectation can be directly associated with better access to information, excellent delivery of e-services, efficient management by the state and enhanced interaction between the citizens and the Government. The Government needs to make sure that government entity responsible for the delivery of e-government services will adapt the way these services are provided by making sure that they cover the requirements of the citizens. The citizens will not benefit from the services unless they use them and gain the benefits that they expect to receive. Though the Government can employ any number of mechanisms, it cannot guarantee that the citizens will use them unless the expectations of efficiency and ease are addressed.

In Abu Dhabi, the Government should employ important constructs to persuade citizens to adopt e-Government services, related to enhancing Internet trust (TNET), reducing the level of effort expected to be exerted by users (PE), the second most

influential factor, improve facilitating conditions (FC) as well as Government trust (TGOV). These factors were found to affect citizens' intention to use e-Government services in Abu Dhabi.

As this research noted, the Abu Dhabi Government needs to consider factors which have been shown to be influential to citizens in the use of e-Government services. The study proposes the following recommendations to be considered for better adoption of e-Government in Abu Dhabi:

9.8.1 Recommendations related to Internet Trust (TNET)

- The results of the study showed that privacy and security are important factors and therefore the Government must give full attention to these conditions of the Government platform by making sure that services are secure and providing confidentiality for anyone who accesses the e-Government services. In this regard, it is also useful to provide multiple options for payment via the Internet to suit the preferences of all parties.
- Citizens trust web access as the link between them and the Government; hence, continued support to the e-Government systems is needed to make sure that they maintain people's faith in working with the Government on the Internet and also to build confidence in those citizens who do not altogether trust the web as a source of public services.
- Methods such as authentication can be implemented by using national ID cards, methods for encryption. Innovations and research using the Internet have produced numerous approaches and authentication techniques which can be used to reinforce trust in the web.
- Security methods and Internet safety supported by awareness campaigns should be put in place to help citizens realize that their confidentiality and privacy on the web are guaranteed. Efforts to publicise E-privacy would enhance the measures of protection, both technically and non-technically,

which in turn could strengthen the citizens' perception of e-Government services as trustworthy.

- The Government must be sensitive to their citizens' concern for privacy and should find suitable means of communication to ease their concerns. Additionally, usage strategies, which may be multiple, must be utilized to reduce the citizens' security concerns. If the government wants people to develop the required confidence and trust, they have to take into account the issues arising and introduce appropriate measures.

9.8.2 Recommendations related to performance expectancy (PE):

- It may be valuable for administrative departments to provide various benefits such as free delivery, less waiting time, freedom from fees, or less documentation to motivate citizens to use e-Government services. These make services more accessible, convenient, and prompter than the traditional methods.
- E-Government services, how to access them and their significant benefits need to be publicized to their users. A campaign should be implemented that promotes and draws attention to the benefits and advantages of e-Government. E-Government services could be promoted and advertised through current media, including the new generation of social media such as Facebook and Twitter along newspapers, radio, and TV.
- Abu Dhabi administration could launch campaigns illustrating the benefits of using E-Government. They should formulate a national plan throughout all Abu Dhabi departments which increases the use of e-Government by all citizens.
- Government department communications should also be interactive. The Abu Dhabi Government should make a point of providing e-Government portals which can actively lead to the adoption of e-Government services.

9.8.3 Recommendations related to Facilitating Conditions (FC):

- A high degree of overall satisfaction with the Emirati Government would follow more investment by the Abu Dhabi policy makers and planners in IT infrastructure, to improve the portals and availability of the Government's Internet services.
- Through educating people in the use of online services and increasing their awareness of the advantages and benefits available thereby, Governments can help and educate by providing training sessions their citizens to cope with new technologies like the media to access mobile text messages, newspapers, TV, and Government websites.

9.8.4 Recommendations related to e-Government Trust (TGOV)

- Regulations and laws should be enacted to cover the legal issues arising from e-Government transactions over the Internet. This would ensure that all citizens have the tools to protect their rights.
- The needs of the citizen should be the priority for the country's authorities and the policy makers. They should then seek to increase the number of citizens used e-Government services by providing awareness for e-government services.
- Existing laws should be modified to cope with technological security and new e-services. Smart cards, encryption and other security solutions should be incorporated to make e-Government services trustworthy and thus increase their use.
- The public image of the Abu Dhabi Government departments can be enhanced by improving their practices, processes and organizational culture.
- Again citizens should be invited in information sessions designed to strengthen their trust in using e-services through raising the levels of confidence and Government encouragement.

9.8.5 Recommendations related to Effort Expectancy (EE):

- For the sake of efficient and effective online services, e-Government services should be developed through collaboration with other Government and non-Government authorities. Integration, collaboration and information sharing between Government departments, can provide economies of scale making them interoperable and also encouraging interaction with stakeholders.
- All citizens should be provided with accessible, transparent and user-friendly e-Government services. Greater awareness of these services should help citizens to use efficient e-Government services safely.
- The language and instructions for browsing should be easy to understand; it should be a bi-lingual interface (Arabic and English). The e-Government services must be user-friendly to increase citizens' acceptance.
- Complexity should be avoided and simplicity should be sought in the design of e-Government services. The Abu Dhabi Government should follow this precept to make e-Government services enjoyable for the users.

9.8.6 Social Influence (SI) recommendations:

- Although social influence was not found to have a significant impact on intention to adopt, Emirati Government employees can enhance the usage of those services by serving as role models, something that can diffuse information about the benefits of usage more effectively. In addition, upper management can provide staff awards for those who enhance public trust and the transparency of transactions. Government officials can ultimately promote and indirectly advertise the value of e-Government services.

9.9 Conclusion

The findings of this study about the factors which affect the citizens' intention to use and their *perceived use* of e-Government services in the Abu Dhabi Emirate are largely consistent with findings in similar studies. This overall validates the use of the modified UTAUT model in this kind of analysis. As mentioned earlier interesting deviations from the model were also found and those were justified and appropriately explained by using relevant literature.

The research found that internet trust and performance expectancy are some of the strongest predictors of intention to use e-Government services. Similarly, effort expectancy, facilitating conditions and trust had a positive influence on behavioural intention. However, social influence did not. **Gender** as a moderating factor was found to impact the relationships between effort expectancy and behavioural intention whereas the other moderating factors (age, experience, and education) did not affect the relationship. **Age** as moderating factor has impact between performance expectancy and behavioural intention whereas the other moderating factors (gender, experience, and education) did not affect the relationship. Finally, **Experience** impacts the relationship between facilitating conditions and behavioural intention whereas the other moderating factors (gender, age, and education) did not affect the relationship.

Gender, age, experience, and education did not affect the relationship between social influence and behavioural intention. Finally, it was found that behavioural intention to use e-Government services has a significant influence on the actual use of e-Government sites. Using these insights, Governments should be better able to

strengthen citizens' intention to use e-Government services, and subsequently their actual use of these services. Further research is required to expand the demographic and geographic scope of this study to determine whether the results are replicable and generalizable. Additional research is also required to better unpack the influence of moderating factors, such as gender, age, and experience.

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Appendix 1

UOWD

Survey استطلاع

تقبل مواطني إمارة أبو ظبي للحكومة الإلكترونية
Abu Dhabi e-Government: Citizens' Adoption

PURPOSE OF RESEARCH

The purpose of this research is to identify the key factors that influence citizens' adoption of e-Government in Abu Dhabi emirate. Information collected as part of the study is expected to identify factors that affect Abu Dhabi citizens' adoption of e-Government services.

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METHOD AND DEMANDS ON PARTICIPANTS

If you choose to be included, you will be asked to spare up to 10 minutes of your time for completing the questionnaires. This questionnaire will require you to state your opinion on e-Government services in Abu Dhabi emirate.By completing and submitting the survey, you are consenting to participate in the research.

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS

Apart from the 10 minutes of your time, we can foresee no risks for you in participating in the survey. Your involvement in the study is voluntary and you may withdraw from the study at any time and you may withdraw any data that have been provided to that point. Refusal to participate in the study will not affect your relationship with the University of Wollongong in Dubai, UAE. However, you will not be able to withdraw your data, should you wish to withdraw your participation in the study after you have completed the survey.

الغرض من الدراسة

الغرض من هذا البحث هو دراسة تقبل المواطنين لاستخدام الخدمات الإلكترونية التي تقدمها حكومة أبوظبي وتحديد العوامل المؤثرة على تقبل واستخدام الخدمات الإلكترونية. ستوضح المعلومات المقدمة لنا من خلال هذا الاستبيان العوامل التي تؤثر في تقبل المواطنين لاستخدام الخدمات الإلكترونية التي تقدمها حكومة أبوظبي.

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طريقة البحث والمطلوب من المشاركين

سيستغرق منك استكمال هذا الاستبيان حوالي 10دقائقمن وقتك.و المطلوب منك هو أن تحددرأيك فيالخدمات الحكوميةالإلكترونية في إمارة أبوظبي.وسيعد قبولك للإجابة عن الاستبيان موافقة منكعلى المشاركة في هذا البحث.

المخاطر والمتاعب المحتملة

فيما عدا الدقائق التي ستخصصها من وقتك للإجابة عن أسئلة الاستبيان، فإنه لا توجد أي متاعب أو مخاطر تترتب على مشاركتك في هذا الاستبيان. إن مشاركتكفيهذه الدراسة تطوعيةويمكنك أنتنسحب منالدراسةفي أي وقت تشاء قبل استكمال الاستبيان وتسليم الإجابات، أما بعد تسليم الإجابات فإنه من غير المسموح لك سحبها. وفي حال قررت عدم المشاركةفي هذه الدراسة فإن علاقتكمع جامعةولونغونغ فيدبي، الإمارات العربية المتحدة لن تتأثر بأي شكل من الأشكال.

ETHICS REVIEW AND COMPLAINTS

This study has been reviewed by the Human Research Ethics Committee (Social Science, Humanities and Behavioural Science) of the University of Wollongong, Australia. If you are not happy with the way this research has been conducted, you can contact the Ethics Officer at the University on (+612) 4221 3386 or email rso-ethics@uow.edu.au.

المراجعة الأخلاقية والشكاوى

تمت مراجعةهذه الدراسةمن قبل لجنةأخلاقياتالبحوثالإنسانية(العلوم الاجتماعية والعلوم الإنسانيةوالعلوم السلوكية) من جامعة ولونغونغ بأستراليا. وإذا لم تكنراضيا عنالطريقة التيأجريتبها هذه الدراسة،يمكن الاتصالبموظفالأخلاقياتفي الجامعةعلى الرقم (+612) 4221 3386 أو البريد الإلكتروني rso-ethics@uow.edu.au.

Definitions

تعريف المصطلحات

E-Government: "A seamless service delivery to citizens or Governments' efforts to provide citizens with the information and services they need by using a range of technological solutions." Burn and Robins, (2003)

الحكومة الإلكترونية: جهود حكومية لتقديم الخدمات للمواطنين والمقيمين من خلال تزويدهم بالمعلومات أو الخدمات التي يحتاجون إليها باستخدام مجموعة من الحلول التكنولوجية.

E-Government services : involves the usage of the technological solutions in order to apply for Abu Dhabi Governmental services such as paying the traffic fines which provide by Abu Dhabi police, or paying the water and electricity bills which is provide by Abu Dhabi distribution company or Al Ain distribution company, or requesting land management services which provided by the DMA or the three municipalities or other Governmental services that could be provided by any departments in Abu Dhabi reign these services could be requested from any place in anytime, day or night.

خدمات الحكومة الإلكترونية: هي استخدام الحلول التكنولوجية من أجل الحصولعلىالخدمات الحكومية في إمارة أبوظبي مثلدفعالمخالفات المرورية المقدمة من المرور، أو دفع فواتير المياهوالكهرباء المقدمة من شركة أبوظبي للتوزيع أو شركة العين للتوزيع، أو طلب خدماتإدارة الأراضي المقدمة من البلديات أو دائرة الشؤون البلدية أو أي خدماتحكومية أخرى يتم تقديمها من خلال الدوائر التابعة لإمارة أبوظبي ويمكن الوصول إليها في أي وقت،ليلا أو نهاراً ومن أي مكان.

شكرا لك على مشاركتك في هذا الاستبيان

Thank you for your participation in this study

يرجى التأكد من أنك أجبت عن جميع الأسئلة

Please ensure you answer all questions

يرجىتحديد الاختيارالمناسب عندالإجابة عن الأسئلة التالية:

Please select the appropriate box when answering the background information questions.

Part (A) : Demographic Information

المعلومات الديموغرافية :الجزء (أ)

1. Are you UAE citizen?

a) Yes
b) No (if No, please don't continue this questionnaire, many thanks)

1. هل أنت من مواطني دولة الإمارات العربية المتحدة؟

a) نعم
b) لا (إذا كانت إجابتك ب لا فالرجاء عدم إكمال الاستبيان ونشكرك على المشاركة)

2.Gender:

a) Male
b) Female

2. الجنس:

a) ذكر
b) أنثى

3. Age

a) 16-25 years
b) 26-35 years
c) 36-45 years
d) Above 45 years

3. **الفئة العمرية:**

a) 16-25 سنة
b) 26-35 سنة
c) 36-45 سنة
d) أكبر من 45 سنة

4. Educational Level

a) High School or less
b) Diploma
c) Bachelor degree
d) Postgraduate degree

5. Approximately, your gross monthly income

a) Less than 10,000 AED
b) 10,001 to 15,000 AED
c) 15,001 to 30,000 AED
d) More than 30000 AED

6. Employment

a) Private Employee
b) Government or Simi Government Employee
c) Student
d) Other

7. How long have you been using Computers?

a) Less than 1 year
b) 1-3 years
c) 3-5 years
d) More than 5 years

8. Where do you live?

a) Abu Dhabi
b) Al Ain
c) Al Gharbia

9. Have you ever used any e-Government services?

a) Yes
b) No

10. If your answer is yes, how often do you use e-Government services?

a) Less than once a month
b) At least once a month
c) At least once a week
d) More than once a week

11. If your answer is no, please specify why?

4. المستوى التعليمي:

a) ثانوية عامة أو أقل
b) دبلوم
c) جامعي
d) فوق الجامعي

5. الدخل الشهري:

a) أقل من 10,000 درهم
b) من 10,001 إلى 15,000 درهم
c) من 15,001 إلى 30,000 درهم
d) أكثر من 30,000 درهم

6. جهة العمل:

a) خاص
b) حكومي أو شبة حكومي
c) طالب
d) أخرى

7. منذ متى وأنت تستخدم الكمبيوتر؟

a) أقل من سنة
b) من سنة إلى ثلاث سنوات
c) من ثلاث إلى خمس سنوات
d) أكثر من خمس سنوات

8. مكان الإقامة:

a) أبو ظبي
b) العين
c) الغربية

9. هل استخدمت من قبل خدمة من خدمات الحكومة الإلكترونية؟

a) نعم
b) لا

10. إذا كانت إجابتك بنعم، كم مره تستخدم خدمات الحكومة الإلكترونية؟

a) أقل من مرة في الشهر
b) مرة في الشهر على الأقل
c) مرة كل أسبوع على الأقل
d) أكثر من مرة في الأسبوع

11. إذا كانت إجابتك بلا، الرجاء ذكر السبب؟

Part (B) :Questions related to e-Government services

جزء (ب) الأسئلة المتعلقة بخدمات الحكومة الإلكترونية المقدمة من حكومة أبوظبي الإلكترونية.

الرجاء اختيارالرقم المناسب لمستوى الاتفاقأوالاختلافمع البياناتالتالية علىمقياس من 1 إلى5،حيث1=لا أوافق مطلقاً، 2= لا أوافق، 3=محايد (لا نختلفولاننفق)، 4=أوافق، و5 =أوافق بشدة.

Please select the appropriate number to indicate the level of your agreement or disagreement with the following statements on a scale of 1 to 5, where 1 = Strongly disagree, 2 = disagree, 3 = neutral (neither disagree nor agree), 4 = agree, and 5 = Strongly agree.

5 **Strongly agree** أوافق بشدة	4 **Agree** أوافق	3 **Neutral** محايد	2**Disagree** لا أوافق	1 **Strongly disagree** لا أوافق مطلقاً	أسئلة عن **الأداءالمتوقع** Questions related to **Performance expectancy**	#
					أرى أن خدمات الحكومة الإلكترونيةمفيدة للحصول علىالخدمات الحكومية. I would find e-Government services useful to get Government services.	1
					استخدام خدمات الحكومة الإلكترونية تمكنني من الحصول على الخدمات الحكومية بسرعة أكبر. Using e-Government services enables me to get Government services more quickly.	2
					استخدام خدمات الحكومة الإلكترونية يزيد من إنتاجيتي الإجمالية. Using E-Government services would increase my overall productivity.	3
					إذا استخدمت خدمات الحكومة الإلكترونية، سوف تزيد قدرتي في الحصول على الخدمات. If I use e-Government services, I will increase my ability to get services.	4

5 **Strongly agree** أوافق بشدة	4 **Agree** أوافق	3 **Neutral** محايد	2**Disagree** لا أوافق	1 **Strongly disagree** لا أوافق مطلقاً	أسئلة عن **الجهدالمتوقع** Questions related to **Effort expectancy**	#
					استخدامخدمات الحكومة الإلكترونية سيكون واضحاًومفهوماً. My interaction with e-Government services would be clear and understandable.	5

					سيكون من السهلبالنسبة ليأن أصبحماهرأفياستخدام خدماتالحكومة الإلكترونية. It would be easy for me to become skilful in using e-Government services.	6
					سأجدخدمات الحكومة الإلكترونيةسهلة الاستخدام. I would find e-Government services easy to use.	7
					تعلماستخدام خدماتالحكومة الإلكترونيةسهلبالنسبة لي. Learning to operate e-Government services is easy for me.	8

5 **Strongly agree** أوافق بشدة	4 **Agree** أوافق	3 **Neutral** محايد	2**Disagree** لا أوافق	1 **Strongly disagree** لا أوافق مطلقاً	أسئلة عن **التأثير الاجتماعي** Questions related to **Social influence**	#
					الأشخاص الذين يؤثرون علي يرون أنني يجب أناستخدم خدماتالحكومة الإلكترونية. People who influence my behaviour think that I should use e-Government services.	9
					الأشخاص المهمون بالنسبة لي يرون أنني يجب أناستخدم خدماتالحكومة الإلكترونية. People who are important to me think that I should use e-Government services.	10
					الإدارة العليافي الدوائر الحكومةتشجع الناس علىاستخدامخدماتالحكومة الإلكترونية. The senior management at the Government encourage people to use e-Government services.	11
					بشكل عام، فإن الحكومة دعمتاستخدام خدماتالحكومة الإلكترونية. In general, the Government has supported the use of e-Government services.	12

5 **Strongly agree** أوافق بشدة	4 **Agree** أوافق	3 **Neutral** محايد	2**Disagree** لا أوافق	1 **Strongly disagree** لا أوافق مطلقاً	أسئلة عن الظروف التي **تسهل استخدام**خدماتالحكومة الإلكترونية Questions related to **Facilitating conditions**	#
					لدي الموارد اللازمة لاستخدام خدماتالحكومة الإلكترونية. I have the resources necessary to use e-Government services.	13
					لدي المعرفة اللازمة لاستخدام خدماتالحكومة الإلكترونية. I have the knowledge necessary	14

					to use e-Government services.	
					خدماتالحكومة الإلكترونية متوافقة مع التقنيات الإلكترونية الأخرى التي استخدمها. E-Government services are compatible with other technologies I use.	15
					يمكنني الحصول على المساعدة من الآخرين عندما أواجه صعوبة في استخدام خدماتالحكومة الإلكترونية. I can get help from others when I have difficulties using e-Government services.	16
5 **Strongly agree** أوافق بشدة	4 **Agree** أوافق	3 **Neutral** محايد	2**Disagree** لا أوافق	1 **Strongly disagree** لا أوافق مطلقاً	أسئلة عن **الثقة** في خدمات الحكومة الإلكترونية Questions related to **Trust in E-Government** services(TGOV)	#
					الدوائر الحكومية لديها المهارات والخبرات اللازمة لتنفيذ المعاملات الإلكترونية بالطريقة المناسبة. The Government departments have the skills and expertise to perform online transactions in an expected manner.	17
					الدوائر الحكومية لديها القدرة على تلبية معظم احتياجات المواطن المتعلقة بالخدمات الإلكترونية. The Government departments have the ability to meet most citizen needs about e-services.	18
					يمكن الوثوق في قدرة برامج الخدمات الإلكترونية الخاصة بالدوائر الحكومية على تنفيذ المعاملات الإلكترونية بأمانة. The Government departments portals can be trusted to carry out online transactions faithfully.	19
					أنا على ثقة أن الدوائر الحكومية ستراعي مصلحتي عند استخدامي لخدمات الحكومة الإلكترونية I trust the Government departments to keep my best interests in mind.	20
					أرى أنه يمكنني الوثوق في خدمات الحكومة الإلكترونية. I think I can trust the e-Government services.	21

5 **Strongly agree** أوافق بشدة	4 **Agree** أوافق	3 **Neutral** محايد	2**Disagree** لا أوافق	1 **Strongly disagree** لا أوافق مطلقاً	أسئلة عن **الثقة في الإنترنت** Questions related to **Trust in Internet** (TNET)	#
					تحتوي شبكة الإنترنت على ضمانات كافية تجعلني أشعر بالراحة عند استخدام خدمات الحكومة الإلكترونية. The Internet has enough safeguards to make me feel comfortable to use e-Government services.	22
					أشعر بالاطمئنان إلى أن الهياكل القانونية والتكنولوجية تضمن حمايتي من المشاكل الموجودة على شبكة الإنترنت. I feel assured that legal and technological structures adequately protect me from problems on the Internet.	23
					أنا على ثقة من أن التشفير وغيره من أوجه التقدم التكنولوجي جعل شبكة الإنترنت آمنة بالنسبة لي لكي أستخدم خدمات الحكومة الإلكترونية. I feel confident that encryption and other technological advances on the Internet make it safe for me to use e-Government services.	24
					بصفة عامة، فإن شبكة الإنترنت قوية وآمنة لاستخدام خدمات الحكومة الإلكترونية. In general, the Internet is a robust and safe to use e-Government services.	25

5 **Strongly agree** أوافق بشدة	4 **Agree** أوافق	3 **Neutral** محايد	2**Disagree** لا أوافق	1 **Strongly disagree** لا أوافق مطلقاً	أسئلة عن **التوجه المستقبلي** لاستخدام الخدمات الحكومة الإلكترونية Questions related to **Behavioural intention** to use e-Government services	#
					أنوي الاستمرار في استخدام خدمات الحكومة الإلكترونية للحصول على الخدمات الحكومية في المستقبل I intend to continue using e-Government services to get Government services in the future	26
					سأحاول دائما استخدام خدمات الحكومة الإلكترونية للحصول على الخدمات الحكومية I will always try to use e-Government services to get Government services	27
					أخطط لاستخدام خدمات الحكومة الإلكترونية للحصول على الخدمات الحكومية في كثير من الأحيان I plan to continue to use e-Government services to get Government services frequently .	28

أسئلة عن خدمات الحكومة الإلكترونيةالذكية Questions related to **smart** e-Government services	#

29؟ هل سمعت عن خدمات الحكومية الإلكترونية الذكية
Do you know about mobile Government services?

a) نعم
   Yes
b) لا
   No

30؟ إذا كانت الإجابة بنعم، فما هي توقعاتك من الخدمات الحكومية الذكية
If your answer is yes, what do you expect from it?

الاقتراحات والتعليقات

يرجى استخدام المساحة أدناه لتدوين أي تعليق أو ملاحظة لك على الاستبيان، أو لتقديم أي مقترحات تراها مناسبة لتطوير الدراسة وإثرائها.

Participant Comments and Suggestions

I hope that this survey sparks strong interest in you to share your professional expertise in enriching the questionnaire contents. I appreciate very much your participation in putting your constructive observations, or reminding any missing role to be added, or your suggestion for making the questionnaire more functional and analytic.

Appendix 2

Section A: The demographic profile of the participants of the survey

A1 : Descriptive Statistics

Table II.A1 Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
Age	638	1	4	1449	2.27	.029	.741
Gender	638	1	2	960	1.50	.020	.500
Educational Level	638	1	4	1784	2.80	.039	.986
Using e-Government services	638	1	2	760	1.19	.016	.394
Income	638	1	4	2224	3.49	.031	.786
Experience	638	1	4	2493	3.91	.016	.407

A2 : Demographic Frequency Table

Table II.A2.1 Age

Valid	Frequency	Percent	Cumulative Percent
16-25 years	73	11.4	11.4
26-35 years	358	56.1	67.6
36-45 years	168	26.3	93.9
Above 45 years	39	6.1	100.0
Total	638	100.0	

Table II.A2.2 Gender

Valid	Frequency	Percent	Cumulative Percent
Male	316	49.5	49.5
Female	322	50.5	100.0
Total	638	100.0	

Table II.A2.3 Educational Level

Valid	Frequency	Percent	Cumulative Percent
High School or less	101	15.8	15.8
Diploma	85	13.3	29.2
Bachelor degree	295	46.2	75.4
Postgraduate degree	157	24.6	100.0
Total	638	100.0	

Table II.A2.3 Have you ever used any e-government services?

Valid	Frequency	Percent	Cumulative Percent
Yes	516	80.9	80.9
No	122	19.1	100.0
Total	638	100.0	

Table II.A2.4 Approximately, your gross monthly income

Valid	Frequency	Percent	Cumulative Percent
Less than 10,000 AED	30	4.7	4.7
10,001 to 15,000 AED	27	4.2	8.9
15,001 to 30,000 AED	184	28.8	37.8
More than 30000 AED	397	62.2	100.0

Total	638	100.0	

Table II.A2.5 Experience

Valid	Frequency	Percent	Cumulative Percent
Less than 1 year	5	.8	.8
1-3 years	11	1.7	2.5
3-5 years	22	3.4	6.0
More than 5 years	600	94.0	100.0
Total	638	100.0	

A3: Demographic Bar Chart

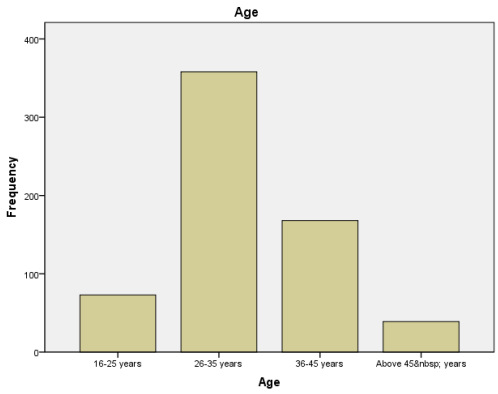

Figure A3.1 Age

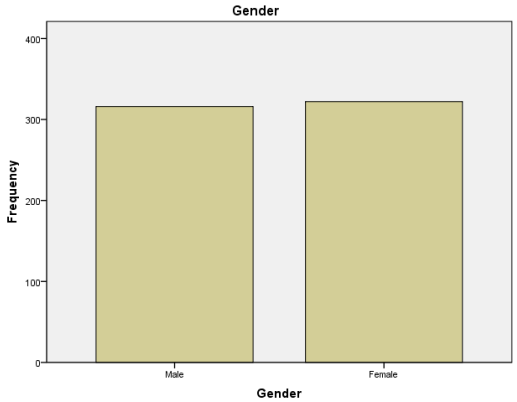

Figure A3.2 Gender

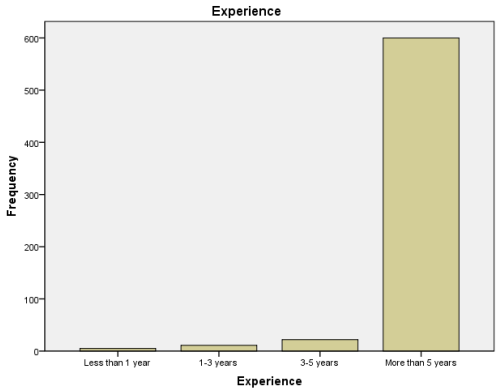

Figure A3.3 Experience

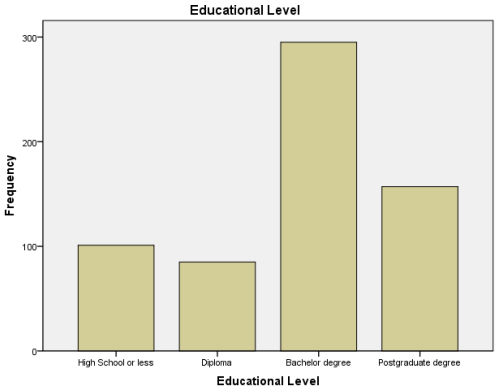

Figure A3.4 Education Level

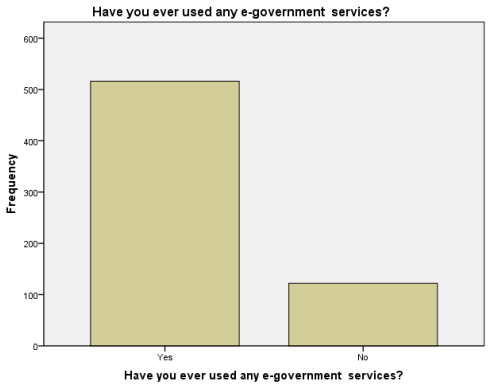

Figure A3.5 Using E-Government Services

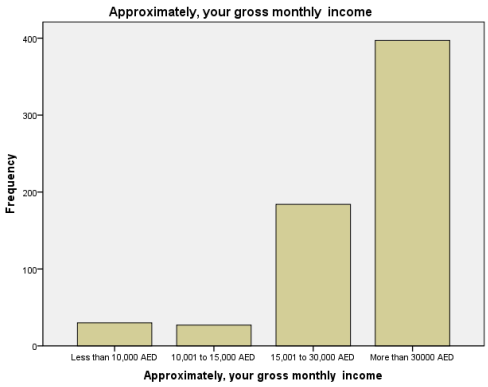

Figure A3.6 Income

Section B: Reliability Statistics

Table II.B1 Reliability Statistics
Performance expectancy

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.873	.874	4

Table II.B2 Reliability Statistics
Effort expectancy

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.882	.883	4

Table II.B3 Reliability Statistics
Social influence

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.781	.781	4

Table II.B4 Reliability Statistics
Facilitating conditions

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.787	.789	4

Table II.B5 Reliability Statistics

Trust E-Government

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.910	.910	5

Table II.B6 Reliability Statistics

Trust in Internet (TNET)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.915	.915	4

Table II.B7 Reliability Statistics

Behavioral intention

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.926	.927	3

Table II.B8 Reliability Statistics

Social influence(2)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.887	.887	2

Table II.B9 Reliability Statistics

Facilitating conditions (2)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.766	.767	3

Section C: Correlations , Multiple Regression and ANOVA Test (H1 to H4; H6 & H7)

Table II.C1 Correlations

Correlations							
	BI	PE	EE	SI	FC	TGOV	TNET
BI	1.000	.610	.561	.401	.562	.573	.637
PE	.610	1.000	.641	.454	.445	.457	.426
EE	.561	.641	1.000	.450	.539	.458	.423
SI	.401	.454	.450	1.000	.396	.324	.341
FC	.562	.445	.539	.396	1.000	.450	.461
TGOV	.573	.457	.458	.324	.450	1.000	.591
TNET	.637	.426	.423	.341	.461	.591	1.000

Table II.C2 Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	TNET, SI, FC, PE, TGOV, EE[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: BI

Table II.C3 Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.775[a]	.601	.597	.63487330	.601	158.232	6

a. Predictors: (Constant), TNET, SI, FC, PE, TGOV, EE

b. Dependent Variable: BI

Table II.C4 ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	382.667	6	63.778	158.232	.000[a]
	Residual	254.333	631	.403		
	Total	637.000	637			

a. Predictors: (Constant), TNET, SI, FC, PE, TGOV, EE

b. Dependent Variable: BI

Table II.C5 Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-3.045E-16	.025		.000	1.000		
PE	.269	.035	.269	7.742	.000	.524	1.909
EE	.088	.036	.088	2.437	.015	.487	2.054
SI	.015	.030	.015	.514	.607	.721	1.387
FC	.182	.032	.182	5.672	.000	.614	1.628
TGOV	.137	.033	.137	4.125	.000	.573	1.745
TNET	.315	.033	.315	9.567	.000	.585	1.710

a. Dependent Variable: BI

Section D: Correlations , Multiple Regression and ANOVA Test (H5 to H8)

Table II. D1 Correlations (H5 to H8)

Correlations			
	egov_use	BI	FC
egov_use	1.000	.235	.192
BI	.235	1.000	.562
FC	.192	.562	1.000

Table II. D2 Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	FC, BI[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: egov_use

Table II. D3 Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.246[a]	.060	.057	1.188	.060	20.422	2

a. Predictors: (Constant), FC, BI

b. Dependent Variable: egov_use

Table II. D4 ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	57.621	2	28.810	20.422	.000[a]
	Residual	895.848	635	1.411		
	Total	953.469	637			

a. Predictors: (Constant), FC, BI

b. Dependent Variable: egov_use

Table II. D5 Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	2.556	.047		54.364	.000		
BI	.227	.057	.185	3.987	.000	.684	1.462
FC	.108	.057	.088	1.891	.059	.684	1.462

a. Dependent Variable: e-gov_use

Appendix 3

Section A: Correlation Matrix 28 items

Correlations[a]

	PE1	PE2	PE3	PE4	EE1	EE2	EE3	EE4	SI1	SI2	SI3
PE1	1	.628**	.582**	.533**	.404**	.454**	.387**	.420**	.306**	.290**	.290**
PE2	.628**	1	.671**	.654**	.522**	.504**	.483**	.404**	.358**	.387**	.304**
PE3	.582**	.671**	1	.735**	.475**	.496**	.481**	.442**	.360**	.394**	.328**
PE4	.533**	.654**	.735**	1	.530**	.543**	.525**	.438**	.400**	.432**	.318**
EE1	.404**	.522**	.475**	.530**	1	.638**	.681**	.562**	.354**	.398**	.308**
EE2	.454**	.504**	.496**	.543**	.638**	1	.701**	.651**	.376**	.377**	.289**
EE3	.387**	.483**	.481**	.525**	.681**	.701**	1	.693**	.367**	.401**	.303**
EE4	.420**	.404**	.442**	.438**	.562**	.651**	.693**	1	.343**	.324**	.186**
SI1	.306**	.358**	.360**	.400**	.354**	.376**	.367**	.343**	1	.797**	.370**
SI2	.290**	.387**	.394**	.432**	.398**	.377**	.401**	.324**	.797**	1	.425**
SI3	.290**	.304**	.328**	.318**	.308**	.289**	.303**	.186**	.370**	.425**	1
SI4	.386**	.314**	.346**	.308**	.309**	.299**	.272**	.217**	.265**	.320**	.649**
FC1	.325**	.295**	.307**	.344**	.328**	.328**	.343**	.371**	.301**	.317**	.284**
FC2	.319**	.194**	.272**	.283**	.376**	.367**	.394**	.476**	.283**	.283**	.226**
FC3	.320**	.364**	.368**	.370**	.442**	.373**	.466**	.339**	.312**	.362**	.448**
FC4	.231**	.333**	.336**	.351**	.398**	.341**	.406**	.271**	.294**	.319**	.397**
TGOV1	.267**	.326**	.314**	.291**	.315**	.312**	.319**	.224**	.240**	.228**	.468**
TGOV2	.259**	.323**	.298**	.292**	.329**	.311**	.349**	.226**	.240**	.249**	.496**
TGOV3	.302**	.356**	.364**	.331**	.392**	.334**	.344**	.297**	.262**	.272**	.467**
TGOV4	.294**	.362**	.353**	.360**	.404**	.337**	.382**	.303**	.257**	.312**	.503**
TGOV5	.388**	.440**	.385**	.378**	.434**	.386**	.418**	.348**	.278**	.301**	.457**
TNET1	.315**	.271**	.310**	.281**	.404**	.296**	.329**	.323**	.287**	.275**	.332**
TNET2	.292**	.339**	.338**	.346**	.398**	.326**	.329**	.284**	.310**	.313**	.380**
TNET3	.323**	.306**	.387**	.352**	.357**	.332**	.328**	.322**	.289**	.292**	.372**
TNET4	.335**	.293**	.355**	.340**	.316**	.292**	.290**	.286**	.263**	.283**	.330**
BI1	.450**	.502**	.495**	.503**	.496**	.463**	.484**	.432**	.317**	.377**	.377**
BI2	.443**	.490**	.504**	.503**	.465**	.457**	.461**	.422**	.317**	.383**	.333**
BI3	.432**	.501**	.492**	.502**	.440**	.443**	.458**	.392**	.334**	.401**	.383**

**. Correlation is significant at the 0.01 level (2-tailed).

a. Listwise N=638

Correlations[a]

	SI4	FC1	FC2	FC3	FC4	TGOV 1	TGOV 2	TGOV 3	TGOV 4	TGOV 5	TNET 1
PE1	.386**	.325**	.319**	.320**	.231**	.267**	.259**	.302**	.294**	.388**	.315**
PE2	.314**	.295**	.194**	.364**	.333**	.326**	.323**	.356**	.362**	.440**	.271**
PE3	.346**	.307**	.272**	.368**	.336**	.314**	.298**	.364**	.353**	.385**	.310**
PE4	.308**	.344**	.283**	.370**	.351**	.291**	.292**	.331**	.360**	.378**	.281**
EE1	.309**	.328**	.376**	.442**	.398**	.315**	.329**	.392**	.404**	.434**	.404**
EE2	.299**	.328**	.367**	.373**	.341**	.312**	.311**	.334**	.337**	.386**	.296**
EE3	.272**	.343**	.394**	.466**	.406**	.319**	.349**	.344**	.382**	.418**	.329**
EE4	.217**	.371**	.476**	.339**	.271**	.224**	.226**	.297**	.303**	.348**	.323**
SI1	.265**	.301**	.283**	.312**	.294**	.240**	.240**	.262**	.257**	.278**	.287**
SI2	.320**	.317**	.283**	.362**	.319**	.228**	.249**	.272**	.312**	.301**	.275**
SI3	.649**	.284**	.226**	.448**	.397**	.468**	.496**	.467**	.503**	.457**	.332**
SI4	1	.304**	.199**	.409**	.331**	.395**	.432**	.411**	.421**	.439**	.294**
FC1	.304**	1	.530**	.521**	.351**	.239**	.215**	.279**	.265**	.286**	.307**
FC2	.199**	.530**	1	.517**	.380**	.241**	.202**	.245**	.223**	.296**	.323**
FC3	.409**	.521**	.517**	1	.602**	.468**	.491**	.463**	.427**	.455**	.387**
FC4	.331**	.351**	.380**	.602**	1	.472**	.488**	.426**	.432**	.391**	.344**
TGOV1	.395**	.239**	.241**	.468**	.472**	1	.812**	.650**	.594**	.528**	.373**
TGOV2	.432**	.215**	.202**	.491**	.488**	.812**	1	.699**	.628**	.553**	.413**
TGOV3	.411**	.279**	.245**	.463**	.426**	.650**	.699**	1	.747**	.710**	.502**
TGOV4	.421**	.265**	.223**	.427**	.432**	.594**	.628**	.747**	1	.772**	.445**
TGOV5	.439**	.286**	.296**	.455**	.391**	.528**	.553**	.710**	.772**	1	.485**
TNET1	.294**	.307**	.323**	.387**	.344**	.373**	.413**	.502**	.445**	.485**	1
TNET2	.341**	.330**	.318**	.448**	.414**	.386**	.439**	.509**	.490**	.538**	.723**
TNET3	.367**	.278**	.318**	.395**	.382**	.404**	.424**	.492**	.476**	.530**	.706**
TNET4	.325**	.298**	.322**	.362**	.318**	.363**	.394**	.460**	.443**	.488**	.720**
BI1	.429**	.436**	.395**	.485**	.387**	.398**	.419**	.498**	.513**	.557**	.538**
BI2	.342**	.397**	.407**	.464**	.388**	.403**	.396**	.459**	.478**	.506**	.503**
BI3	.403**	.426**	.388**	.502**	.410**	.393**	.404**	.447**	.490**	.531**	.486**

**. Correlation is significant at the 0.01 level (2-tailed).

a. Listwise N=638

Correlations[a]

	TNET2	TNET3	TNET4	BI1	BI2	BI3
PE1	.292**	.323**	.335**	.450**	.443**	.432**
PE2	.339**	.306**	.293**	.502**	.490**	.501**
PE3	.338**	.387**	.355**	.495**	.504**	.492**
PE4	.346**	.352**	.340**	.503**	.503**	.502**
EE1	.398**	.357**	.316**	.496**	.465**	.440**
EE2	.326**	.332**	.292**	.463**	.457**	.443**
EE3	.329**	.328**	.290**	.484**	.461**	.458**
EE4	.284**	.322**	.286**	.432**	.422**	.392**
SI1	.310**	.289**	.263**	.317**	.317**	.334**
SI2	.313**	.292**	.283**	.377**	.383**	.401**
SI3	.380**	.372**	.330**	.377**	.333**	.383**
SI4	.341**	.367**	.325**	.429**	.342**	.403**
FC1	.330**	.278**	.298**	.436**	.397**	.426**
FC2	.318**	.318**	.322**	.395**	.407**	.388**
FC3	.448**	.395**	.362**	.485**	.464**	.502**
FC4	.414**	.382**	.318**	.387**	.388**	.410**
TGOV1	.386**	.404**	.363**	.398**	.403**	.393**
TGOV2	.439**	.424**	.394**	.419**	.396**	.404**
TGOV3	.509**	.492**	.460**	.498**	.459**	.447**
TGOV4	.490**	.476**	.443**	.513**	.478**	.490**
TGOV5	.538**	.530**	.488**	.557**	.506**	.531**
TNET1	.723**	.706**	.720**	.538**	.503**	.486**
TNET2	1	.734**	.702**	.542**	.538**	.555**
TNET3	.734**	1	.795**	.558**	.563**	.551**
TNET4	.702**	.795**	1	.515**	.522**	.499**
BI1	.542**	.558**	.515**	1	.803**	.805**
BI2	.538**	.563**	.522**	.803**	1	.817**
BI3	.555**	.551**	.499**	.805**	.817**	1

**. Correlation is significant at the 0.01 level (2-tailed).

a. Listwise N=638

Appendix 4

Section A: Anti-correlation matrix

Anti-image Matrices

		SI2	FC1	FC2	FC3	TGOV1	TGOV2	TGOV3	TGOV4	TGOV5
Anti-image Covariance	PE1	.029	-.025-	-.054-	.009	.005	-.007-	.013	.016	-.038-
	PE2	-.011-	-.006-	.085	-.012-	-.015-	-.002-	.006	.022	-.042-
	PE3	-.015-	.016	.006	-.014-	-.012-	.016	-.028-	.003	.018
	PE4	-.009-	-.030-	.005	.010	.008	-.003-	.009	-.019-	.016
	EE1	-.026-	.022	-.032-	-.028-	.004	.014	-.015-	-.016-	.000
	EE2	.005	-.002-	-1.378E-5	.023	-.019-	-.003-	-.004-	.016	-.003-
	EE3	-.016-	.016	.012	-.061-	.010	-.027-	.031	-.007-	-.018-
	EE4	.023	-.035-	-.108-	.053	.018	.011	-.017-	-.010-	.005
	SI1	-.244-	-.014-	-.015-	.017	-.022-	.003	-.009-	.025	-.007-
	SI2	.320	-.009-	.001	-.029-	.024	-.005-	.010	-.033-	.013
	FC1	-.009-	.582	-.147-	-.134-	-.008-	.033	-.016-	-.011-	.027
	FC2	.001	-.147-	.525	-.135-	-.028-	.029	.015	.032	-.026-
	FC3	-.029-	-.134-	-.135-	.459	-.021-	-.053-	-.017-	.015	-.013-
	TGOV1	.024	-.008-	-.028-	-.021-	.311	-.179-	-.029-	-.027-	.000
	TGOV2	-.005-	.033	.029	-.053-	-.179-	.270	-.069-	-.026-	.014
	TGOV3	.010	-.016-	.015	-.017-	-.029-	-.069-	.303	-.088-	-.073-
	TGOV4	-.033-	-.011-	.032	.015	-.027-	-.026-	-.088-	.297	-.140-
	TGOV5	.013	.027	-.026-	-.013-	.000	.014	-.073-	-.140-	.310
	TNET1	.014	-.008-	.003	.008	.001	-.005-	-.034-	.011	.009
	TNET2	.009	-.018-	.002	-.034-	.025	-.016-	-.007-	-.007-	-.021-
	TNET3	.009	.032	.004	-.005-	-.016-	.004	.003	.004	-.022-

	TNET4	-.019-	-.014-	-.024-	.018	.004	-.007-	.002	-.005-	-.005-
	BI1	-.002-	-.037-	.002	.003	.015	-.006-	-.014-	-.004-	-.018-
	BI2	-.013-	.015	-.031-	.009	-.020-	.012	-.006-	-.005-	.016
	BI3	-.014-	-.020-	.001	-.029-	.002	-.004-	.023	-.010-	-.015-
Anti-image Correlation	PE1	.072	-.047-	-.106-	.019	.012	-.020-	.034	.041	-.096-
	PE2	-.032-	-.013-	.192	-.030-	-.043-	-.007-	.019	.066	-.123-
	PE3	-.045-	.036	.013	-.035-	-.035-	.052	-.084-	.010	.054
	PE4	-.028-	-.065-	.011	.025	.024	-.009-	.028	-.058-	.048
	EE1	-.072-	.045	-.069-	-.065-	.010	.044	-.042-	-.045-	-.001-
	EE2	.014	-.005-	-3.048E-5	.054	-.053-	-.009-	-.012-	.049	-.010-
	EE3	-.049-	.037	.028	-.158-	.030	-.091-	.097	-.024-	-.055-
	EE4	.066	-.074-	-.235-	.124	.050	.034	-.048-	-.029-	.014
	SI1	-.741-	-.032-	-.035-	.044	-.067-	.009	-.029-	.078	-.021-
	SI2	.842[a]	-.021-	.003	-.074-	.077	-.016-	.033	-.107-	.041
	FC1	-.021-	.937[a]	-.266-	-.258-	-.018-	.083	-.037-	-.027-	.063
	FC2	.003	-.266-	.907[a]	-.276-	-.068-	.078	.037	.081	-.065-
	FC3	-.074-	-.258-	-.276-	.945[a]	-.056-	-.152-	-.045-	.041	-.035-
	TGOV1	.077	-.018-	-.068-	-.056-	.898[a]	-.618-	-.095-	-.087-	.001
	TGOV2	-.016-	.083	.078	-.152-	-.618-	.892[a]	-.243-	-.092-	.050
	TGOV3	.033	-.037-	.037	-.045-	-.095-	-.243-	.951[a]	-.293-	-.237-
	TGOV4	-.107-	-.027-	.081	.041	-.087-	-.092-	-.293-	.932[a]	-.460-
	TGOV5	.041	.063	-.065-	-.035-	.001	.050	-.237-	-.460-	.941[a]
	TNET1	.043	-.019-	.006	.019	.004	-.018-	-.105-	.034	.027
	TNET2	.027	-.041-	.004	-.089-	.078	-.054-	-.023-	-.022-	-.065-
	TNET3	.031	.081	.011	-.014-	-.054-	.014	.011	.012	-.077-
	TNET4	-.062-	-.035-	-.061-	.050	.014	-.023-	.007	-.016-	-.018-
	BI1	-.006-	-.096-	.004	.008	.052	-.024-	-.051-	-.015-	-.064-
	BI2	-.044-	.040	-.083-	.028	-.072-	.044	-.023-	-.019-	.057

	BI3	-.051-	-.052-	.002	-.087-	.007	-.014-	.083	-.037-	-.056-

a. Measures of Sampling Adequacy(MSA)

Anti-image Matrices

		TNET1	TNET2	TNET3	TNET4	BI1	BI2	BI3
Anti-image Covariance	PE1	-.032-	.037	.009	-.025-	-.007-	-.008-	.002
	PE2	.027	-.027-	.027	.004	-.012-	-.005-	-.018-
	PE3	.002	.019	-.030-	-.001-	.001	-.012-	-.002-
	PE4	.032	-.008-	.003	-.020-	-.007-	-.006-	-.009-
	EE1	-.056-	-.021-	.007	.031	-.019-	-.006-	.028
	EE2	.030	-.010-	-.008-	7.226E-5	.000	-.006-	-.007-
	EE3	-.005-	.014	.008	.002	-.006-	.003	-.007-
	EE4	-.019-	.023	-.016-	.008	-.003-	-.009-	.011
	SI1	-.022-	-.018-	-.011-	.020	.010	.014	.004
	SI2	.014	.009	.009	-.019-	-.002-	-.013-	-.014-
	FC1	-.008-	-.018-	.032	-.014-	-.037-	.015	-.020-
	FC2	.003	.002	.004	-.024-	.002	-.031-	.001
	FC3	.008	-.034-	-.005-	.018	.003	.009	-.029-
	TGOV1	.001	.025	-.016-	.004	.015	-.020-	.002
	TGOV2	-.005-	-.016-	.004	-.007-	-.006-	.012	-.004-
	TGOV3	-.034-	-.007-	.003	.002	-.014-	-.006-	.023
	TGOV4	.011	-.007-	.004	-.005-	-.004-	-.005-	-.010-
	TGOV5	.009	-.021-	-.022-	-.005-	-.018-	.016	-.015-
	TNET1	.340	-.103-	-.041-	-.089-	-.035-	.002	.011
	TNET2	-.103-	.327	-.076-	-.045-	.013	-.003-	-.030-
	TNET3	-.041-	-.076-	.275	-.133-	-.007-	-.015-	-.012-
	TNET4	-.089-	-.045-	-.133-	.299	.003	-.013-	.009
	BI1	-.035-	.013	-.007-	.003	.255	-.088-	-.089-
	BI2	.002	-.003-	-.015-	-.013-	-.088-	.255	-.106-
	BI3	.011	-.030-	-.012-	.009	-.089-	-.106-	.247
Anti-image Correlation	PE1	-.078-	.091	.024	-.065-	-.020-	-.021-	.005
	PE2	.075	-.077-	.084	.012	-.038-	-.017-	-.059-
	PE3	.007	.054	-.096-	-.003-	.005	-.040-	-.008-
	PE4	.092	-.025-	.011	-.059-	-.024-	-.019-	-.030-
	EE1	-.150-	-.059-	.020	.088	-.059-	-.017-	.089
	EE2	.083	-.029-	-.024-	.000	.001	-.018-	-.022-
	EE3	-.015-	.043	.026	.006	-.022-	.009	-.026-
	EE4	-.051-	.063	-.049-	.023	-.011-	-.028-	.034

	SI1	-.065-	-.053-	-.037-	.064	.035	.048	.014
	SI2	.043	.027	.031	-.062-	-.006-	-.044-	-.051-
	FC1	-.019-	-.041-	.081	-.035-	-.096-	.040	-.052-
	FC2	.006	.004	.011	-.061-	.004	-.083-	.002
	FC3	.019	-.089-	-.014-	.050	.008	.028	-.087-
	TGOV1	.004	.078	-.054-	.014	.052	-.072-	.007
	TGOV2	-.018-	-.054-	.014	-.023-	-.024-	.044	-.014-
	TGOV3	-.105-	-.023-	.011	.007	-.051-	-.023-	.083
	TGOV4	.034	-.022-	.012	-.016-	-.015-	-.019-	-.037-
	TGOV5	.027	-.065-	-.077-	-.018-	-.064-	.057	-.056-
	TNET1	.943[a]	-.309-	-.135-	-.280-	-.120-	.007	.037
	TNET2	-.309-	.953[a]	-.255-	-.145-	.046	-.012-	-.105-
	TNET3	-.135-	-.255-	.937[a]	-.465-	-.028-	-.056-	-.047-
	TNET4	-.280-	-.145-	-.465-	.929[a]	.011	-.048-	.034
	BI1	-.120-	.046	-.028-	.011	.956[a]	-.343-	-.355-
	BI2	.007	-.012-	-.056-	-.048-	-.343-	.948[a]	-.422-
	BI3	.037	-.105-	-.047-	.034	-.355-	-.422-	.943[a]

a. Measures of Sampling Adequacy(MSA)