



CUSTOMERS ADOPTION OF E-GOVERNMENT SERVICES

BETHLEHEM FEYISA HAILU



SEEK WISDOM, ELEVATE YOUR INTELLECT AND SERVE HUMANITY !



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ADDIS ABABA UNIVERSITY

COLLEGE OF NATURAL SCIENCE

SCHOOL OF INFORMATION SCIENCE

CUSTOMERS ADOPTION OF E-GOVERNMENT SERVICES

A Thesis

*Submitted to School of Graduates at Addis Ababa University in Partial
Fulfillment of the Requirements for the Degree of Master of Science in
Information Science*

By

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Declaration

I, Bethlehem Feyisa Hailu, declare that this thesis, entitled: “**Customers Adoption of E-Government Services**”, submitted in partial fulfillment of the degree of Master of Science in Information Science, from School of Information Science of Addis Ababa University is my original work and the document hasn’t been submitted for the award of any other qualifications of any other university or academic institution.

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This thesis has been presented for examination with my approval, as an advisor, of its originality with the required level of an accepted standard.

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Approval of Examination

This thesis work entitled “**Customers’ Adoption of E-Government Services**” has been examined and approved for the award of the degree of Master of Science in Information Science from Addis Ababa University, College of Natural and Computational Sciences, School of Information Science.

Name and Signature of Members of the Examining Board

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Bethlehem Feyisa Hailu

Dedication

“I can do all things through Christ who strengthens me”. Philippians 4:13. I dedicated this thesis work to the **Almighty God!** And my **Parents.**

Abstract

E-government involves extensive use of ICT to deliver government information and services to citizens. In Ethiopia, online electronic government services have been launched and implemented for nearly a decade now. Yet, it has not reached the point where it is fully adopted and utilized by customers. Therefore, it is important to identify significant factors that could encourage customers to adopt e-government and its services. This research is the first of its kind to widely study the factors influencing the adoption of e-government services on the customers of three different Ethiopian government offices. The study employed a quantitative, cross-sectional survey and used printed questionnaire to collect data from study participants and total of 294 usable responses were returned. The proposed model for identifying influential factors on e-government adoption was tested using the structural equation modeling partial least square technique. The finding revealed performance expectancy, effort expectancy, awareness, website quality, and trust in the government are confirmed to influence customers' behavioral intention to use e-government services. Whereas, facilitating condition and behavioral intention determines customers' use behavior. However, the impact of social influence and trust in the internet constructs were not found to be significant. Accordingly, the study produced several recommendations the government of Ethiopian should consider to enhance customers' adoption of e-government services. The government should focus on improving the functionality of the national e-services portal into an efficient, easy to use, and available system that needs no personal visit. The government must make awareness campaign about e-government, its services and benefits associated with the use of these services. Government employees' ability to offer quality services should be improved through offering different workshops, seminars, and other self-development training programs to get the technical skills necessary to execute and secure e-government systems. Moreover, the government should work on the formulation of laws, rules, and regulations that can make customers feel safe and secure to use e-services and support the use of these services by enabling other technical, infrastructure, and technological support.

Keywords: e-government adoption, PLS-SEM, partial least square, structural equation modeling, UTAUT, unified theory of acceptance and use of technology

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List of Abbreviation and Acronyms

AVE	Average Variance Extracted
AW	Awareness
BI	Behavioral Intention
CSC	Community Service Centers
DOI	Diffusion of Innovations
EE	Effort Expectancy
FC	Facilitating Condition
FDRE	Federal Democratic Republic of Ethiopia
FTA	Federal Transport Authority
G2B	Government to Business
G2C	Government to Customers/Citizens
G2E	Government to Employees
G2G	Government to Government
GTP	Growth and Transformation Plan
LV	Latent Variable
MCIT	Ministry of Communication and Information Technology
MInT	Ministry of Innovation and Technology
OECD	Organization for Economic Cooperation and Development
PE	Performance Expectancy
PLS-SEM	Partial Least Square Structural Equation Modeling
SI	Social Influence
SPSS	Statistical Package for Social Sciences
TAM	Technology Acceptance Model
TGOV	Trust in the Government
TNET	Trust in the Internet
TPB	Theory of Planned Behavior
TRA	Theory of Reasonable Action
UN	United Nations
UTAUT	Unified Theory of Acceptance and Use of Technology
VIF	Variance Inflation Factor
WQ	Website Quality

Chapter One

I. Introduction

1.1 Background of the Study

Globally, the journey of making government organizations shift from the traditional, paper-based, and face to face interaction into modernized and digital way of the interaction through the implementation of e-government and its services have been practical for nearly three decades now. In this case, citizens particularly customers of government offices can access government services more effectively and efficiently by utilizing government electronic channels or e-government services.

The electronic government or in short form e-Gov refers to the application of all information and communication technologies (ICT) platforms and applications by the public sector to deliver government information and services to its citizens (UN, 2002).

Exploring customers' opinions regarding influential factors behind the adoption or refusal of online e-government services is considered as one of the most well-explored areas in information technology disciplines (Venkatesh et al., 2003). Whereas, Ahlemann (2011) added, human, technological, cultural, and other factors that could determine the acceptance, adoption, and success of information systems can also be addressed through information science studies.

In the e-government context, Warkentin et al. (2002), defined e-government adoption as the customers' intention to use e-government services to request information and services from different departments of the government. While, Kumar et al. (2007) indicated, the adoption of e-government is an individual's choice either to use or not to use e-government services.

E-government implementation is believed to benefit both developing and developed countries. In a developing country such as Ethiopia, e-government greatly benefits the government and citizens. By realizing this, the Ethiopian government established formerly the Ministry of communication and Information Technology (MCIT), currently the Ministry of Innovation and Technology (MInT) in 2010. The Ministry has undertaken several initiatives. However, the first official effort was made on November 22, 2012, by launching 49 e-service portals to enable 7 government ministries, agencies, and authorities to make customers access public services. A report by FDRE (2016) denotes, by the end of the first phase implementation of e-government which lasted for 5 years from 2010-2015, 125 informational electronic services and 152

transactional electronics services were developed for 34 government authorities, agencies and ministries of the country, by the end of 2018, the number of transactional services has increased to 160 (Tolla, 2018).

Researchers investigated several factors associated with the low-level response to e-government services. These problems can be categorized as technical, cultural, political, social, organizational, and/or economical (Alshehri & Drew, 2010; Colesca & Dobrica, 2008). Awareness about the services, computer literacy, digital divide, demographic factors, website design, language, and security issues are among the main inhibiting factors identified and investigated to influence customers' adoption of online government services (Carter & Belanger, 2003; ElKheshin, 2016; Mansoori, 2017; Talib, Imarah, Abdulameer, Zwain, & Al-hakim, 2013).

The introduction of new technology in an environment always faces several challenges. E-government utilization and implementation is relatively a new concept to Ethiopia that needs to be studied from different perspectives. Thus this study will find out the main factors on customers' adoption of e-government services through one of the e-government services, the Ethiopian national e-services portal from customers' perspective.

1.2 Statement of the Problem

One of the major inspirations for the Ethiopian government to implement e-government was to ensure better service delivery to its citizens (Haile, 2013). Yet, e-government systems are still in the early stages of implementation and face many issues related to customers' adoption. Shareef (2016) noticed many developing countries around the world are still suffering from the lack of customers' participation in the utilization of e-government. The issue is particularly noticeable in Ethiopia, where customers' intention to engage in e-government to interact with the government is very poor.

Scholar's depicted e-government is of vital importance for the government, citizens, and businesses. Alshehri & Drew (2010), indicated the most obvious benefits from e-government systems include customers get the ability to access online information and services without geographical and time limitations. Besides, customers save effort, money, and time by utilizing electronic government services (Al-shafi, 2010). However, realizing the benefits of e-government services requires customers' active participation in utilizing those services. To do so, factors influencing customers' intention to use electronic government services need to be studied

(Ahmad, Markkula, & Oivo, 2012; Kumar et al., 2007). Thus, this study aims to identify and examine factors influencing the adoption of e-government services through the Ethiopian national e-services portal by focusing on customers' perspectives.

Even though e-services have been launched and implemented for nearly a decade now, it has not reached the point where it is fully adopted and utilized by customers. As evidenced in Ethiopian electronic government strategic implementation plan II, e-gov (2016), the government noticed low-level usage of government web portals compared to other electronic services delivery channels. To get public information and services, customers in Ethiopia still prefer to visit government offices and use paper-based interaction to execute their transactions. As a result, instead of e-government services, traditional, face to face interaction between government and customers is still the dominant means of communication.

A global survey conducted by the UN (2018) used two measures to assess the development of e-government in member countries: the Electronic Government Development Index (EGDI) and E-Participation Index (EPI). In the EGDI index, Ethiopia scored 0.34 and ranked 151 while, in the E-participation index, scored 0.5 and ranked 101 out of 193 countries. These statistics show e-government is in its early stage of implementation and there is low-rate of response to already established electronic government services by customers. Yet, identifying factors that can motivate customers to utilize established online services in Ethiopia will be a valuable input for the government to take measures that can enhance the rate of adoption.

E-government projects require a large investment. For example, the budget for the first electronic government implementation plan e-gov (2013) was estimated to be approximately \$201.46M. With this large investment, if the intended groups or customers are not using it, the system will no longer be functional and leads to post-implementation failure. Developing countries could have used the money to solve poverty issues in society. Thus adoption becomes an important aspect for the successful implementation and continued use of e-government services. This study will try to answer how the Ethiopian government can deliver an effective and efficient online service that meets customers' expectations.

E-government is relatively new concept to Ethiopia; therefore, this study noticed lack of sufficient studies in the past that explored factors influencing e-government adoption and implementation. A master's thesis by Tadesse (2015), assessed the practices and challenges of e-government implementation at Ethiopian revenues and customs authority large taxpayers' office.

Lemma (2015) in his Ph.D. work designed a sustainability framework for one of the e-government projects, WoredaNet. Tsegaye (2018) researched public values of e-government on the customers of the federal supreme court. Haile (2013) worked on the opportunities and challenges of e-governance in Ethiopia. Worku (2016) focused on the role of e-government to enhance service quality and promote good governance. A study that has a similar context with the current study was conducted by Adefris (2018) on the adoption of e-government in the case of Ethiopian revenues and customs authority large taxpayers.

Looking at the studies above, one can notice several limitations. First, most of these studies focused on identifying challenges from an implementation perspective not from an adoption perspective. Second, Adefris (2018) study focused on the adoption of e-government. However, it was a case study and limited to online service provided by Ethiopian Revenue and Customs Authority large taxpayers' case. Moreover, this study fails to include trust as a major predictor of e-government. Studies including (Alomari, 2010; Carter & Weerakkody, 2008; ElKheshin, 2016; Mansoori, 2017) indicated, customers' trust in the provider and channel of delivery is a significant determinant of customers' intention to adopt e-government services.

Thus this study will identify factors influencing customers' adoption of e-government services through the Ethiopian national e-services portal which is designed to provide a common platform for online transactional services from government departments to citizens, non-citizens, businesses, and governmental and non-governmental organizations.

The current study argues that for e-government services to succeed and bring changes to how customers interact with different departments of the Ethiopian government, it greatly depends on customers' adoption of online services such as the national e-services portal. Thus, grounded in the unified theory of acceptance and use of technology (UTAUT) model and by integrating constructs from different studies in the e-government area this study will try to study factors influencing customers' adoption of e-government and its services in Ethiopia.

1.3 Research Questions

The study will try to address the following research questions:

1. Why are online e-government services less adopted by customers in Ethiopia?
2. How can the findings of this study assist the Ethiopian government to enhance customers' adoption of e-government in Ethiopia?

1.4. Objective of the Study

General Objective

The general objective of this study is to identify factors that could influence the adoption of e-government services in Ethiopia from the customer's perspective.

Specific Objectives

The following specific objectives follow from the general objective

1. To study the existing nature of e-government services and its progress made so far in Ethiopia;
2. To review related literature regarding factors influencing customer's adoption of e-government services;
3. To adopt and modify a conceptual model that represents the factors influencing the adoption of e-government services from the customers' perspective;
4. To examine the influence of performance expectancy, effort expectancy, social influence, facilitating condition, website design, awareness, trust in the internet and trust in government on behavioral intention and use of e-government services;
5. To forward useful insights on factors influencing customers adoption of e-government services in Ethiopia for government, practitioners, and academicians;
6. To draw conclusions and forward recommendations for future study.

1.5 Significance of the Study

The majority of studies on e-government are conducted in developed countries (Alawadhi & Morris, 2009; Rabaa, Zogheib, Alshatti, & Jamal, 2016). However, most recently researchers are actively investigating factors influencing customers' adoption of e-government services in developing countries too; these studies recommend the need for additional researches to deeply explore other factors.

In a developing country such as Ethiopia, where there is lack of research on e-government area, this study will benefit academicians and researchers on e-government to have a better understanding of the factors influencing customers' adoption of e-government services by employing the modified unified theory of acceptance and use of technology incorporating awareness, website quality, and two trust constructs.

Tolla (2018) indicated, on the implementation of e-government strategy plan II, the Ethiopian government is prioritizing the expansion of electronic services (e-services) into other ministries and agencies that have not been implemented before. Thus, this study is of great help to the government as it plans to identify the main factors in the adoption of e-government services based on customers' opinions and provide recommendations for the government to that could increase the likelihood of customers who make use of e-government and its services.

E-government projects need a large amount of money for implementation. A report by the World Development Report (2016), the UNDP budget allocated for e-government projects globally was \$216.45 million. In Ethiopia, the total budget for the e-government strategic implementation plan e-gov (2013), was estimated to be approximately \$201.46 million, thus, failures of these projects waste large amounts of money. This study will, therefore, provide several significant recommendations and suggestions for the Ethiopian government that will support the improvement in the delivery of e-services to encourage customers to adopt online government services.

1.6 Scope of the Study

Even if there are studies that cover e-government adoption from both the government and customers' side, this study investigates one of the most important stakeholders in e-government, which is customers' adoption of the Ethiopian national e-services portal.

The study model will be validated by respondents from customers of the Ministry of innovation and technology (MInT), the Federal transport authority (FTA), and the Ministry of water and irrigation. The capital city Addis Ababa is selected to be the location to conduct the study because Addis Ababa is home for lots of federal government offices and the city has all kinds of people from all over the country.

1.7 Organization of the Thesis

This thesis is organized into five chapters. **Chapter 1** presents the background of the study, statement of the problem, research questions with the objective, significance, and scope of the study. **Chapter 2** provides a critical review of the existing literature in e-government and e-service topics. The chapter also contains detailed information on e-government initiatives in Ethiopia and the progress made so far. Finally, a brief explanation of technology adoption theories and models with related works in the area are presented. **Chapter 3** presents the proposed research model along with a research method **Chapter 4** presents demographic analysis and structural model assessment result along with hypothesis testing. **Chapter 5**, the final chapter discusses the main finding of the study and presents some recommendations for the government of Ethiopian.

Chapter Two

II. Literature Review and Related Works

Introduction

This chapter intends to review the existing literature and to identify models that have been used in various e-government and e-services adoption studies. The chapter is organized as follows: the first section presents an overview of e-government, e-services, and benefits associated with the adoption of e-government services. Then, it provides detailed information on e-government initiatives in Ethiopia, and its progress made so far. Then, it discusses the most widely used technology adoption models used in various e-government works to find the most appropriate model for this study. Finally, the chapter concludes with a detailed review of related works with their limitation and justification for the need to conduct the current study.

2.1 Literature Review

2.1.1 Overview of E-Government

The emergence of e-government roots its background in the United States of America during the time of President Clinton and vice president Al Gore in 1991 (Kamensky, 1999)¹. While some argue its origin traced back to the year where internet technology was first invented (Oseni, Dingley, & Hart, 2015). President Clinton and his colleague predicted the potential of using internet technology to reform how the government works. Thus, they created an initiative by the name “National Partnership for Reinventing Government Clinton-Gore Administration's initiative”. Since its inception, the implementation and utilization of e-government have been growing widely for the past three decades. Ethiopia is one of those countries who recognized the potential of e-government in making reforms on how government works and facilitate sustainable economic development by enabling the citizen to use modern technologies such as online government services.

Warkentin et al. (2002) mentioned three features of e-government as the extensive use of ICT, the impersonal nature of the environment, and effortlessness that makes it different from traditional communication.

¹: <https://govinfo.library.unt.edu/npr/whoweare/history2.html> (Accessed on Jan 17, 2019).

2.1.2 Definitions of E-Government

E-government services are considered a paradigm shift over the traditional ways of interaction between customers, service requester, and service providers, different governmental entities. Haider & Shuwen (2015), named this new paradigm “Electronic government”, “e-government” or in short “e-Gov”. The term is also referred to as “digital government”, “online government” and sometimes “transformational government” (Akbar, 2017; Lemma, 2015).

The term e-government has been described by various researchers and organizations at different times and in various contexts. Misra (2006), claims e-government means different things to different people. Alateyah, Crowder, & Wills(2012), further strengthen this idea by implying defining e-government by focusing on a single perspective can be easy, however, it is challenging to provide a comprehensive definition that can satisfy everyone’s view. Some of the widely used e-government definitions include World Bank (2002) definition that states e-government is government-owned or operated systems of information and communications technologies (ICTs) that transform relations with citizens, the private sector and/or other government agencies to promote citizen empowerment, improve service delivery, strengthen accountability, increase transparency, or improve government efficiency.

Another international organization, United Nation (2002), refers to the term as the use of electronic channels such as the internet and the world wide web by the government to provide information and services to customers. The organization for economic cooperation and development (OECD) defines e-government as the application of ICT particularly the internet to achieve better government (OECD, 2003). E-government services are online public services delivered by a government or semi-government organization to citizens following the laws and regulations of a nation-state describing rights and duties (Dijk, Ebbers, & Wijngaert, 2015). On one of the earlier researchers by Carter & Bélanger(2005), e-government involves the use of ICTs to improve governments' efficiency during interaction with other public agencies, their employees, businesses, and citizens.

2.1.3 Benefits of E-Government

E-government adoption and utilization benefit both the implementer: the government and customers. The role of e-government is not only limited to the provision of online government services. Besides, e-government has a great role in achieving democratization and assist

countries' development (Oseni et al., 2015). E-government enables governmental bodies to be more accountable and transparent (Hien, 2014) and helps to build relationships and connections between different public organizations with their respective departments (Ebrahim & Irani, 2005).

Colesca & Dobrica(2008) mentioned the reasonsfor the adoption of e-government could be political, economic, social, and managerial. From a political point of view, e-government provides customers with public information and services to boost citizens participation in political and decision-making process, increases transparency, strengthens the accountability of the government, promotes openness of government, facilitates citizens engagement in the policy-making process, eliminate bureaucracy and helps to prevent corruption (Colesca & Dobrica, 2008; UN & OECD, 2003; Ndou, 2004). Economically, e-government enables the public or customers to access information and services 24/7, it reduces time, effort and costs, improves the quality of services government offices offer to their customers,leads to growth in revenues. The more citizens adopt e-government, the more operation, and management costs are reduced (Kumar et al., 2007; Oseni, Dingley, & Hart, 2013).

E-government improves customers' knowledge of internet and computer use, modernizes public services delivery which results in customer satisfaction. Moreover, e-government results in the creation of new businesses and work opportunities (Alateyah, Crowder, & Wills, 2012; Alshehri & Drew, 2010). Moreover, e-government plays a great role in organizational change, facilitates greater teamwork, and enhances knowledge management practices within the organization (OECD, 2003).

2.1.4 E-Government Delivery Models

According to (AlFawwaz et al., 2013; Alshehri & Drew, 2010; Carter & Belanger, 2003; Nusir & Bell, 2013), there are four types of e-government: Government to Citizen (G2C), Government to Business (G2B), Government to Employees (G2E) and Government to Government (G2G).

Government to citizens (G2C) is a type of e-government designed to facilitate interaction between citizens and the government, in which the current study is concerned with. G2C model enables citizens to get public services and information online. Some of the services offered by the Ethiopian government to citizens through the national e-services portal includes but not limited to, issuance of driving license, issuance of diplomatic ID card, issuance of ICT

competency certificate, registration for social security services, issuance of the trade registration certificate and others. Thenational open data portal and customers complaint portal are also good examples of government to citizens type of interaction where citizens/customers can access information and directly interact with the Ethiopian governemnt.

Government to Employees (G2E) this type of communication focuses on communication between governmental offices with their employees Carter & Belanger (2005).While, Government to Government (G2G) type of e-government involves interaction between different government institutions (Alshehri& Drew, 2010). In the Ethiopian context, WoredaNet can be a good example of this type of e-government.

Government to businesses (G2B) is called the government to business type of e-government. It allows government organizations to interact with private sectors and vice versa. This type of communication works by minimizing operational costs and time and collect better information about businesses (Nusir & Bell, 2013). A good example of this kind of communication can be the Ethiopian e-Procurement portal, which allows businesses to interact with the government.

2.1.5 Concept of E-Services

E-government is a wider concept and e-services are considered one of the domains of e-government (Ogurlu, 2014; Ndou, 2004). The adoption of e-servicesis one of the excessively discussed areas in the e-government domain. E-services are the type of service that is provided and consumed online and it represents two concepts aligned together, “electronic” and “services”. Sara (2013) noticed studies on e-services are growing to have similar implications with e-government studies in information science studies. According to (Scupola & Nicolajsen, 2014; Sara, 2013), there is no universally accepted definition of electronic services. Lindgren & Jansson (2017) use the term to refer to services that are mediated electronically.

Ruyter, Wetzels, & Kleijnen (2001) provides a similar but more comprehensive definition of the term e-services as an interactive, content-centered and internet-based customer service, driven by the customer and integrated with related organizational customer support processes and technologies to strengthen the customer-service provider relationship. While, Wang et al. (2005), outlined e-services as “information and services that are provided to the public through government websites”.

2.1.6 Challenges in Adoption and Implementation of E-Government

E-government adoption refers to customers' intention to use e-government and its services to receive information and request services from the government (Warkentin et al., 2002). Gilbert (2004), explained e-government adoption as “customers willingness to use e-government services”. while Kumar et al. (2007) indicated adoption is a multi-dimensional construct and defines it as a decision of the customer to either make or not make use of online public services. For this study, e-government service adoption is defined as the customers' intention to use the national e-service portal to receive information and request services from the Ethiopian government.

Even though e-government is a relatively newer concept, most countries around the world implemented several e-government initiatives motivated by its potential to make changes to how the government operates and communicates with its citizens. Like any new technology, adoption of e-government faces several challenges from both the implementer (government) and the users (customer's) side.

The majority of peoples in African countries are unable to benefit from e-government due to poor internet connectivity, high cost of access, and lack of necessary resources and skills by the users of these systems (UN, 2018). Also, Alhujran (2009) indicates developing countries face lots of challenges including the digital divide, lack of capable human capacity, financial constraints, low ICT infrastructure, and issues related to legislation and policy.

Even though much research not conducted in Ethiopian case, Mekuria(2009)thesis on the challenges and practices of e-government implementation in Ethiopian federal civil service organizations revealed that federal government offices face the same problems that have been noticed in other developing countries such as limited ICT penetration, limited enabling environment, lack of competent IT professionals and low website quality. Similarly, Belachew (2010) indicated financial constraints, qualified human capital resources, low level working culture, high resistance to change, weak private sector, low level of collaboration between private and public sectors are major barriers in the implementation of e-government in Ethiopia.

In Ethiopian e-government strategic implementation plan I, the government planned to make a national awareness campaign on advantages and benefits e-government and its systems for the citizens of the country and intended around 70% of its citizens to be aware of e-government.

However, as indicated in e-gov (2016), lack of public awareness about electronic government services was identified as one of the causes of low-level adoption in Ethiopia.

Zelege (2018), emphasized government web portals in Ethiopia violates web usability and accessibility guidelines by web content accessibility guidelines (WCAG) and world wide web consortium (W3C). The finding of his study also confirmed most government web portals content is not regularly updated, difficult to navigate through, and has a poor appearance.

2.2 E-Government in Ethiopia

According to FDRE (2016), during the implementation of growth and transformation plan I (GTP1) lasted from 2010-2015, 47 government institutions were enabled to have online services, 35 community service centers were established by Federal offices, 125 informational electronic services and 152 transactional electronics services have been developed for 34 government authorities, agencies and ministries in the country, 19 community radio stations, and 230 public information desks have been established during the plan period. In the e-government implementation strategy plan II, the government plans to prioritize the expansion of electronic services into different government departments (Tolla, 2018). Therefore, from the year 2015-2020, the government has plans for another 219 e-services across 13 ministries and 11 agencies.

2.2.1 Major E-Government Initiatives in Ethiopia

WoredaNet: WoredaNet is a government network infrastructure that links 700+ woredas (districts) in the country. Woreda is an Amharic word that stands for districts having an average of 100,000 people (Belachew, 2010). The infrastructure has a role in making the Ethiopian government accountable and transparent. Every district in the country uses WoredaNet to interact with the federal and regional governments using video conferencing, messaging, voice and internet connectivity, directory, email, and other services (Belachew, 2010; Haile, 2013; Negash & Lessa, 2011). For more than 700+ woredas are connected through 11 regional datacenters and one national data center.

SchoolNet: SchoolNet is another infrastructure that links about 756+ primary, middle and secondary schools found in different regions of the country. This infrastructure enables students to get a quality education with students sharing the same age as them and located on the other

side of the country, as it provides the same content for each school in the country (Belachew, 2010; Haile, 2013).

Ethiopian Educational & Research Network (EthERNet): currently, there are around 43 higher educational institutes located inside the country. EthERNet is an infrastructure that links these universities. Ethiopian Masters and Ph.D. students are attending courses and video-enabled training with other universities that are found outside Ethiopia.

The Ethiopian 888 Toll-free call center: call centers are one of the communication channels for e-government service delivery in Ethiopia. Ethiopian toll-free 888 call center currently serves around 200,000 customer calls monthly and is considered one of the most actively used channels of communication by customers. It is accessible in both fixed-line and mobile phones. The call center enables citizens to get information about regional offices and federal ministries, agencies, courts, other public institutions in the country; customers can get the information in three widely spoken languages in the country: Amharic, Afan Oromo, and Tigrigna.

Mobile Applications: mobile technologies are now accessible to most peoples in the world. Although when compared to developed countries, mobile coverage in developing countries is lower with 98.7 per 100 residents while it is 127.3 per 100 residents for developed nations. Developing country governments as well saw this as a great opportunity to interact with citizens. Currently, more than 34+ mobile applications are developed for Ethiopian ministries and government agencies. These applications are found in the Ethiopian government application store on Google Play Store and App Store. These applications are grouped into eleven categories, business which is the most downloaded category, health, sport, entertainment, good governance, education, transportation, travel, weather, news, and social.

Ethiopian National Portal www.ethiopia.gov.et is a one-stop-shop multi-lingual national government portal for online services that provide information, interactive and transactional services. This portal provides information and services which are created and maintained by various government organizations. Users of this kind of portal do not need to remember various ministries and agency's websites; instead, they might go to one point of access for all government services (Kumar et al., 2007).

Ethiopian Customer Compliant Portal www.ecompliant.gov.et is a new system that provides governmental institutions and citizens with a common platform to interact with each other regarding the state of public service provisions.

Electronic Government Procurement System www.eprocurement.gov.et is developed in compliance with the Ethiopian Government Procurement Legislative Framework and B2G and G2G best practices. The e-Procurement system provides the ministry with a platform to transact with suppliers as well as within its organizational departments.

The Ethiopian government has taken a step in making all public information's available to the community by introducing a new Ethiopian open data portal ethiopia.opendataforafrica.org. The open data portal has a big role in making the Ethiopian government transparent. Citizens have the right to easily access information, which has its positive effects.

One of the major provisions of e-government is e-services (Ogurlu, 2014). On November 22, 2012, the Ethiopian Ministry of Communication and Information Technology (MCIT) introduced 49 e-service portals developed. to enable seven governmental institutions to give online services to their customers, the number of e-services and e-service providers has been growing each year and reached 72+ online services and the service providers' number also increased from seven to fifteen ministries and agencies.

The Ethiopian National e-Service Portal found on www.e-services.gov.et is designed to provide a common platform and generic tools for online transactional services. Using the system, government organizations render electronic public services to citizens, non-citizens, businesses, and governmental and non-governmental organizations. Regional offices and federal institutions give effective information and services to citizens, business diplomats, and others. 34+ federal and regional government offices are using the Ethiopian e-services portal to provide 72+ services to the citizen and residents on the country.

2.2.3 Ethiopian E-Government Survey Report

The United Nations performs a regular assessment on e-government development in 193 member countries, every 2 years. In this assessment two indexes are used to measure the state of member country development in e-government using E-government development index (EGDI) and E-Participation Index (EPI). E-government development index (EGDI) consists of 3 basic measures on the country's ability in the provision of online services (OSI), telecommunication

infrastructure (TII), and human capacity (HCI). The result of the EGDI index assessment shows the relative performance of one country to other countries in the development of e-government implementation and utilization at a national level. E-Participation Index (EPI) is a supplementary index which shows the utilization of online services by member countries to enable access to information and services to the public or (“e-Participation”), interaction with stakeholders or (“e-Consultation”) and engagement in the decision-making process or (“e-decision making “).

In 2018, there are no African countries to make it into a very high e-government development index list. However, Ghana, Tunisia, South Africa, Seychelles, and Mauritius are African countries that are able to be included in the high e-government development index list. The majority of countries including Ethiopia are part of the middle e-government development index list and 15 countries belong to the low e-government development index.

Back in 2003 Ethiopia scored 0.128 in the EGDI index and ranked 166 while scored 0.035 in EPI and ranked 102. After 15 years, in 2018 the country scored 0.35 in EGDI, ranked 151 and 0.57 in EPI, ranked 101. Even if the statistics are not satisfactory yet, over the years the country is making progress in both measures. The following table shows the Ethiopian score in the United Nations e-government index from 2003 to 2018.

Table 1: Ethiopian E-Government Development Status

Year	EGDI score	Rank	EPI score	Rank
2003	0.12	166	0.03	102
2004	0.13	170	0.00	151
2005	0.13	171	0.00	151
2008	0.18	172	0.00	170
2010	0.20	172	0.04	135
2012	0.23	172	0.34	45
2014	0.25	157	0.25	122
2016	0.26	157	0.49	91
2018	0.34	151	0.57	101

2.3 Technology Adoption Models and Theories

This century is considered as the period of major technological innovations in Information communication technology, these include, computers, smartphone technologies, social media, etc. Due to these innovations, studies in information science have long been conducted on how these technologies can be accepted and utilized by the target users. Venkatesh (2003) discussed user acceptance of new technology is one of the well-researched areas in information science. Many theories and models have been proposed over the past decades to understand factors behind acceptance or rejection of any new technology by customers, including, but not limited to the diffusion of innovation (DOI), the theory of reasoned action (TRA), the theory of planned behavior (TPB), Technology Acceptance Model (TAM) and unified theory of acceptance and use of technology (UTAUT).

2.3.1 Diffusion of Innovation

The diffusion of innovation model is one of the earliest models of its kind. Rogers(2003) explained diffusion as “the process by which an innovation (technology) is communicated through certain channels over time among the members of a social system”. Rate of diffusion is a central point in the diffusion of innovation theory; he explained, the rate of diffusion is the relative speed where the society requires to makes use of the innovation or technology. From the definition above, one can notice, diffusion of innovation is made up of four elements, the technology or innovation, the communication channel, the time, and the society (Rogers, 2003).

An innovation might be an idea, practice, or project that an individual views as new. The second component, communication channel refers to the communication between message sources, or in other words, it refers to the communication between message source to the message receiver. The source and receiver in this case could be an individual or an organization. An innovation then can be communicated through mass media such as TV, radios, newspaper, magazines, etc. and through interpersonal communication that involves interaction between individuals. Time in the diffusion of innovation indicates, the period the society need to learn and use the innovation. The time needed to learn an innovation could be long or short. The last component is the social system, it is commutative of different units that are connected to solve a problem.

According to Rogers, the rate of adoption of any innovation or technology can be affected by five factors, relative advantage, compatibility, complexity, trialability, and observability.

1. *Relative advantage* refers to the degree to which technology in our case e-government services are perceived as better and efficient when compared to the traditional means of interaction. Rogers indicated the rate of adoption is strongly predicted by relative advantage.
2. *Compatibility* shows e-government services could have a high adoption rate when it goes along with adopters' past experiences and values.
3. *Complexity* indicates how e-government services are perceived to be difficult to use by the member of the society.
4. *Trialability* shows e-government systems have been tried by the society and found to be beneficial. Thus an innovation that has been tried before has a higher chance to be adopted.
5. *Observability* indicates e-government services can be adopted if the result is visible to others.

Rogers's model of diffusion consists of a five-step decision model including Knowledge, persuasion, decision, implementation, and confirmation. The knowledge step occurs when the individual has awareness of the existence of an innovation (e-government services) and get some understanding of how to use it. In the persuasion stages, as the individual becomes aware of the innovation he/she decides whether to use or not to use it. In the decision stage, an individual get engaged in some activities that lead to using the technology thus gets an opportunity to either adopt or reject that technology. In the implementation phase, the individual decides to make use of an innovation or technology. Finally, it comes to the innovation that comes to the stage where it is adopted or rejected (Rogers, 1983).

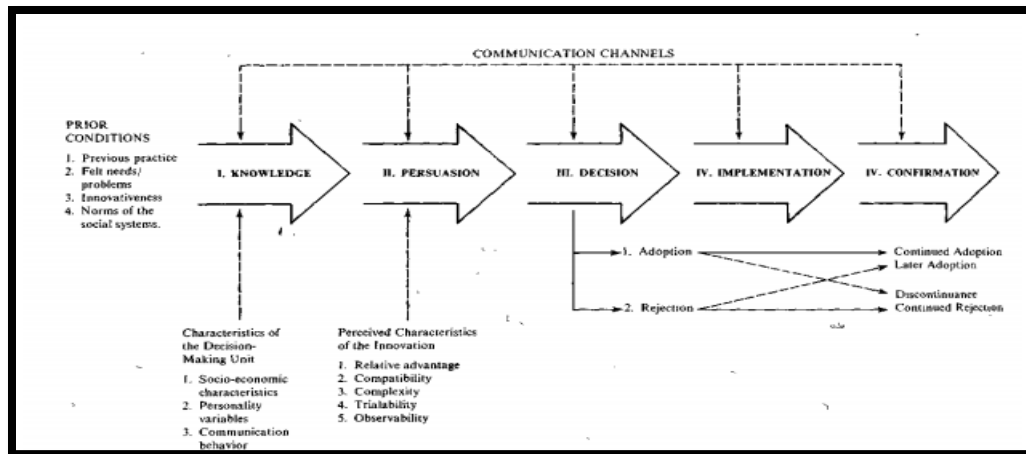


Figure 1: Diffusion of Innovation Theory (DOI)

Adopted from (Rogers, 1983)

2.3.2 The Theory of Planned Behaviour

The theory of planned behavior (TPB) is the extension of the earlier model theory of reasoned action (TRA) (Fishbein & Icek, 1975). According to (Ajzen, 1991), the theory was developed to understand, predict, and change human and social behavior. TPB has been used by a variety of fields to predict individuals' intentions to engage in a task. The model was first developed as a theory of reasoned action in 1975. But, the newer model, TPB was designed due to some limitations of the previous TRA model. The new variable (perceived behavioral control) was added because of TRA's inability to deal with behaviors in which peoples do not have control over.

In total, TPB consists of five variables attitude towards the behavior, subjective norm, perceived behavioral control, intention, and actual behavior. According to this model, actual behavior is a product of perceived behavioral control and intention. The intention variable in TPB captures the concept of how an individual is willing to try out and perform some behavior. Thus, if the individual has a strong intention towards the behavior, there will be a higher chance or possibility for that specific behavior to occur. TPB added the variable perceived behavioral control, the construct indicates the individuals' perception of ease or difficulty to perform a behavior. Attitude towards behavior indicates the individuals' assessment of the behavior either favorable or unfavorable. The influence of society on the individual to either to perform or not to perform the behavior is contained in subjective norm construct.

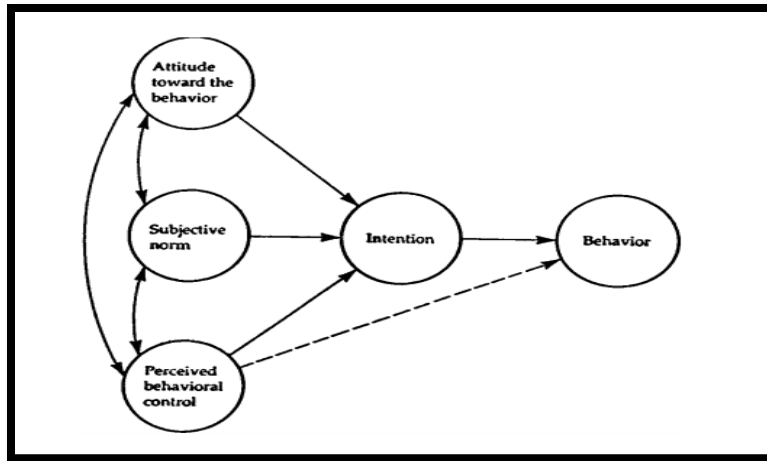


Figure 2: The Theory of Planned Behaviour (TPB)

Adopted from (Ajzen, 1991, p. 182)

2.3.3 Technology Acceptance Model

The technology acceptance model was developed originally by (Davis, 1989). TAM is one of the most popular research models to explain the acceptance use and of an information system and technology by individual users. The original TAM model consists of two most important constructs: perceived ease of use and perceived usefulness that influences an individual's behavioral intention. The concept of perceived usefulness focuses on individuals' perception of using that particular system that could enhance their job performance. Whereas, perceived ease of use is associated with how easy or effortless the system is to be used by customers. In his result Davis (1989) showed perceived usefulness has a greater correlation with an individual's use behavior. Several modifications have been made on the original model, which includes work by (Taylor & Todd, 1995), (Venkatesh & Davis, 2000) and several others. TAM validation continues to be part of masters and Ph.D. thesis either using the original model or by using the modified version of TAM.

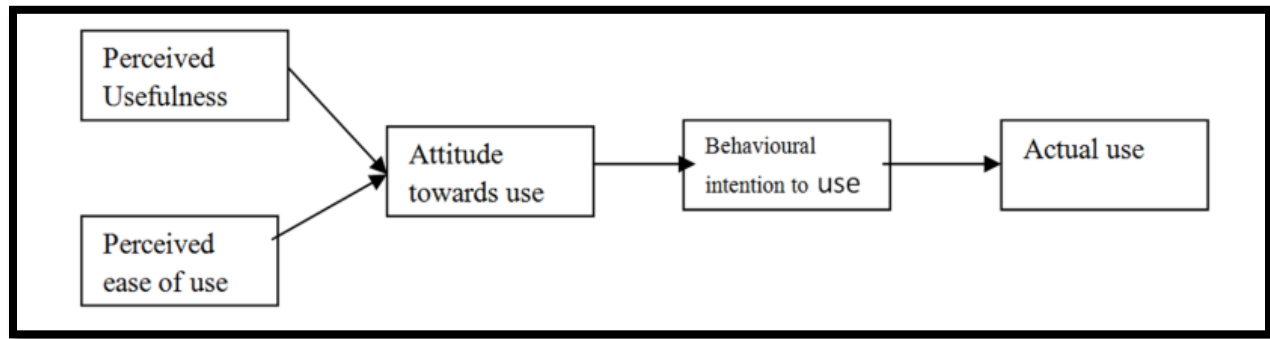


Figure 3: The Original Technology Acceptance Model(TAM)

Adopted from (Adeyinka, 2015)

2.3.4 The Unified Theory of Acceptance and Use of Technology

The unified theory of acceptance and use of technology model is the result of the integration of previously used models. Venkatesh et al., (2003) and his colleagues reviewed eight previously developed models and combine the main features of each model to come up with a unified model that has more power in explaining individuals' intention to adopt new technology than any of the previous models. The model was first developed in 2003 by integrating;

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

This model consists of 4 determinants of behavioral intention, performance expectancy, effort expectancy, social influence and facilitating condition, 2 determinants of usage, behavioral intention, and facilitating condition. As well as four demographic variables or moderator variables: gender, age, experience, and voluntariness. This model found to explain around 70% variance in an individual's behavioral intention and 53% of the variance in user behavior.

1. 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 the job”. This construct is found to be the strongest predictor of customers’ intention towards using new technology.
2. Effort expectancy is defined as “the degree of ease associated with the use of the system”. In (Venkatesh et al., 2003) result, Effort expectancy variable was found to be significant in both voluntary and mandatory contexts. However, the result remained true for only the first phase of training and becomes insignificant over time.
3. Social influence is defined as “the degree to which an individual perceives that important others believe he or she should use the system”. Social influence is perceived as peoples who are close to the customer, such as family, friends or work colleagues influence on the customer to adopt e-government services. Social influence construct in (Venkatesh et al., 2003) study indicated social influence was not significant in voluntary contexts. But becomes significant in mandatory context.
4. Facilitating condition is defined as “the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system”. In this model facilitating condition has two direct links with behavioral intention and usage behavior. All these relations are moderated by gender, age, experience, and voluntariness.

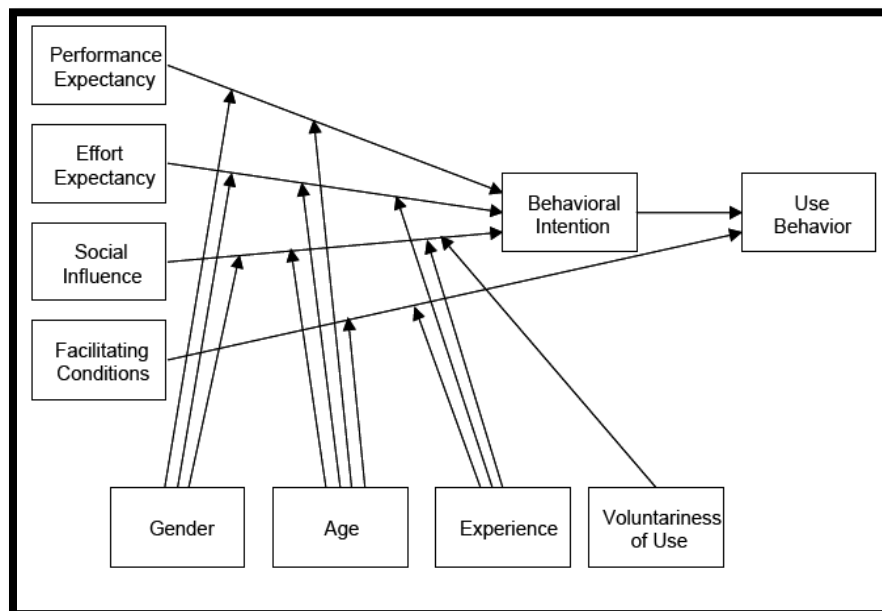


Figure 4: The Unified Technology of Acceptance and Use of Technology Model (UTAUT)

Adopted from (Venkatesh et al., 2003)

Its extension UTAUT 2 was developed later in 2012. The first model UTAUT was studied to examine the use of IT in an organizational context. However, UTAUT 2 model examines the use of information technology from consumers perspective. The new model added three constructs price value, hedonic motivation, and habit. In consumer technology, the hedonic motivation construct in UTAUT2 indicates pleasure or excitement an individual gets by using the technology. The second construct price is also an important construct to be added to UTAUT 2. the cost associated with the use of technology has a strong impact on customers behavior. Habit, in UTAUT, is modeled to have an influence on both dependent constructs behavioral intention and use behavior. It is an important construct that is added to UTAUT 2. The construct habits refer to an automatic decision where the individual performs some behavior as a result of learning (Venkatesh et al., 2012).

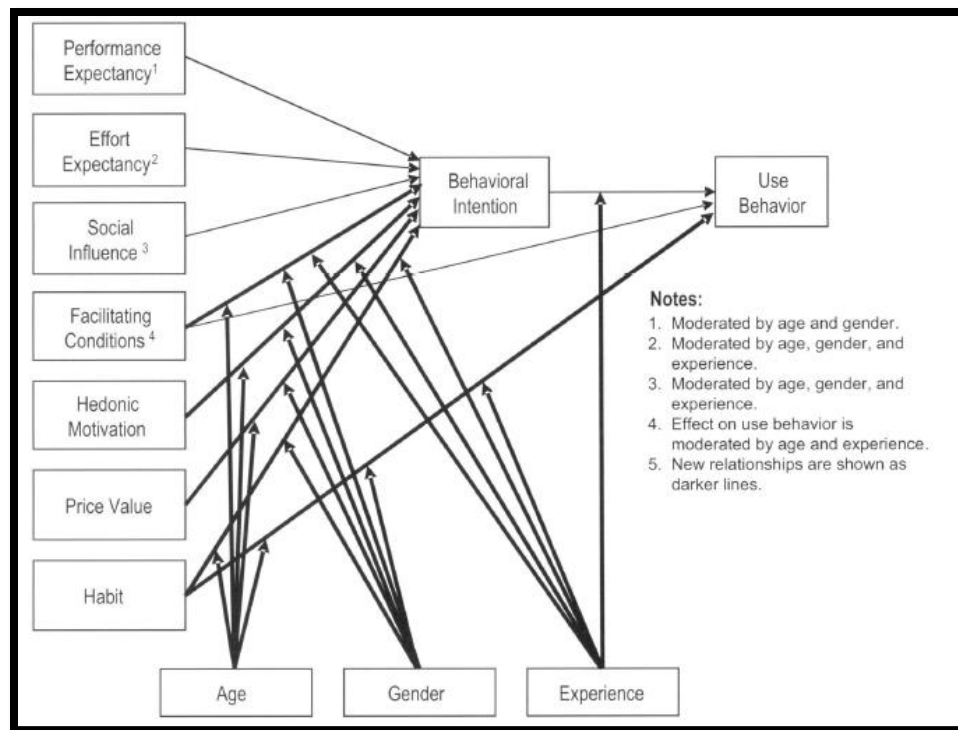


Figure 5: The Unified Technology of Acceptance and Use of Technology Model2 (UTAUT2)

Adopted from (Venkatesh et al., 2012)

2.4 Related Works

This study reviewed existing works consisting of keywords “e-government adoption”, “adoption of e-services”, “e-services implementation” and “Acceptance of e-services” from different journal articles, master’s thesis and Ph.D. dissertation works.

A prior study by Warkentin et al., (2002), examined the effect of citizen trust on customers who intend to use the online system to file for tax returns. A population of size 1000 was surveyed from different countries to collect data about variables that are considered to have an impact on the adoption of online service, including the United States, Latin America, Africa, and others. The population was diverse to conduct the study as it includes different socioeconomic classes, urbanization, and national culture. Based on the findings, for new users, characteristic based and cognitive-based backgrounds were found to be crucial. On the other hand, for experienced users, it was suggested that their previous interaction with the system determines their level of trust. The study concludes by emphasizing how trust is an important aspect of the adoption of any e-government service.

Carter & Belanger (2003), emphasized e-government success is highly dependent on the adoption of e-services by the targeted customers. In their study, a survey questionnaire that was designed based on diffusion of innovation or DOI factors was administered to 140 undergraduate students, 136 complete answers were returned. The reliability of study constructs was evaluated through the use of Cronbach's alpha and factor analysis was employed to check construct validity. The research hypothesis were tested using multiple regression techniques. The study concludes perceived relative advantage, perceived image, and perceived compatibility were found to be factors that could enhance citizens’ intentions to use e-government services. However, the other construct in the model, ease of use were not found significant to enhance the intention to use e-government services by the students.

Jyoti & Yogesh (2005) aimed to examine citizens' awareness and the effect of demographic characteristics on citizens' adoption of e-government initiatives in the United Kingdom. To fulfill the purpose of the study, a survey questionnaire contained of multiple-choice questions that addressed demographic variables and two yes/no questions were delivered to e-government adopters and non-adopters. Grounded in the stratified sampling technique, a total of 358 usable responses were received out of 1600 distributed questionnaires. Based on the findings, citizens

who use the internet tend to be more aware of e-government initiatives. Moreover, demographic variables successfully differentiated adopters and non-adopters group.

AlAwadhi & Morris (2008) used the UTAUT model to determine the adoption of e-government services in Kuwait. To meet the research aim, the research employed quantitative research in the form of a survey method. Overall, 880 completed questionnaires were returned out of 1013 distributed questionnaire with a response rate of 86.8%. Based on the finding, facilitating conditions, effort expectancy, peer influence (social influence), and performance expectancy were found to be significant in the use and adoption of e-government services.

Colesca & Dobrica (2008), in their study on the adoption and use of e-government services in Romania, used an extended version of TAM model. A survey questionnaire was administered to 530 citizens from different districts, 481 usable responses were analyzed after eliminating incomplete responses. The study finding revealed usefulness, ease of use, quality, and trust in e-government determines the rate of adoption. while, demographic variables, educational background, and age variables were found significant in the model.

Alshehri, Drew, & Alfarraj, (2012), studied the challenges and barriers citizens face to adopt e-government in Saudi Arabia. An online survey questionnaire was used as a primary data collection instrument. The population was taken from both IT employees and members of the general public and 400 citizens' responses were finally used. The finding of this research confirmed some systemic barriers including ICT infrastructural weakness, lack of awareness, lack of trust, and lack of qualified IT experts. Finally, the study has generated a list of possible recommendations that can help the public sector and policymakers to move towards the successful adoption of e-government services.

Alomari (2014), studied e-government adoption on the customers of two Jordanian departments: The Jordan government income and sales tax department and the driver and vehicle licenses department, which aimed at providing insight and evaluation into the factors that could influence e-government effective functioning in the Jordan social community through its interaction with citizens. The study was based on two well-known theoretical frameworks, diffusion of innovation theory (DOI) and technology acceptance model (TAM). The study collected data from 356 citizens via a survey, to discover their understanding of 10 predetermined factors. The outcome of the research indicated that trust in the internet; website design, religious beliefs,

resistance to change, perceived usefulness, relative advantage, and complexity are the main factors that affect citizen's acceptance and usage of e-government services.

Samsudeen (2013), adopted a unified theory of acceptance and use of technology (UTAUT) model to understand factors that could influence citizens' adoption of electronic services provided by the Sri Lankan government. The research employed survey method and questionnaires were delivered to respondents in an online and printed form. Responses from study participants were analyzed using regression analysis. Performance expectancy, effort expectancy, and social influence were found to influence customers' intention to use e-government services. However, the facilitating condition construct was found to have no impact on customers' intention.

Mansoori (2017), in his Ph.D. work, investigated citizens' adoption of e-government services in the United Arab Emirates Abu Dhabi region. In this study, the unified theory of acceptance and use of technology model was modified by adding 2 trust constructs: trust in the internet and government trust along with the original UTAUT variables. The research population tried to include different kinds of Abu Dhabi's residents. Overall, 638 survey questionnaires were analyzed using regression and structural equation modeling (SEM) techniques. Performance expectancy, effort expectancy, trust in e-government, and trust in the internet were found to influence customers' behavioral intentions. While social influence construct doesn't have a significant impact on the use of online e-government services.

In her Ph.D. dissertation, ElKheshin, (2016) employed an extended version of the theory of acceptance model (TAM) to study determinants of e-government services adoption in Egypt. The study employed a multi-method approach. Survey questionnaires were distributed to 1500 participants, 897 were qualified to be used for analysis purposes. Chi-square test used to find if there is any difference between adopters/non-adopters group, Cronbach's alpha was employed to check for reliability of measures.

The analysis result from both survey and interview method discovered, perceived usefulness, perceived ease of use, and attitude positively influence Egyptian behavioral intention. External factors, trust in government, trust in the internet, website design, the perceived public value had also a positive impact on the use of e-government services.

A master's thesis by Adefris (2018), focused on the adoption of e-government in Ethiopia, in the case of Ethiopian revenues and customs authority (ERCA) large taxpayers. This study is the first

of its kind to study customers' perceptions of factors influencing online public service in Ethiopia. The researcher utilized a multi-method approach by combining quantitative surveys and qualitative interviews. The study revealed a significant and positive relationship between most of the research hypotheses except for social influence construct. Moreover, one of the demographic variables, gender was found to be significant in determining customer adoption while age has no effect.

2.5 Justification for Conducting this Study

From the literature review above, the researcher was able to identify gaps in studies that were conducted previously in Ethiopia and other countries. According to the researcher's knowledge, in Ethiopia, there is only a single study that had focused on e-government adoption from customers' perspectives. The study modified UTAUT by adding two constructs awareness and website quality, However, this study was a case study and focused on customers of Ethiopian Revenues and Customs Authority large taxpayers. Even if this study can be categorized under the same domain as the previous one, it is unique for three reasons.

1. This study is the first to include a vast amount of customers' opinions on the factors that could influence e-government services adoption in Ethiopia. Therefore, the study tried to sample customers of 34 online services provided by two ministries and one authority.
2. The study modified the UTAUT model by incorporating website quality, awareness, and two trust constructs into the original UTAUT model to get a comprehensive view of factors in e-government adoption. A previous study by Adefris (2018) recommended future studies to include the influence of trust variables in the model and this study included trust in the internet and trust in government construct variables and investigated their influence on Ethiopian customers.
3. Finally, contrary to Adefris (2018) research, the proposed model in this study identified use behavior and behavioral intention both as an outcome variable.

Chapter Three

III. Research Model and Methodology

Introduction

This chapter, **chapter 3** intends to present the general research methodology. The first section provides a detailed explanation of the research model, study construct, and the proposed model for Ethiopian e-government adoption. Then, it explains the research paradigm that will guide the research, study design, and general research methodology. Followed by, detailed description of the study population, sampling techniques, and sample size are covered. The final section gives an overview of the data analysis and presentation method including the pilot test.

3.1 Research Model

3.1.1 Model Construct and Hypothesis Development

As discussed earlier in **chapter 2**, TAM, TPB, DOI, and UTAUT1 and 2 are amongst the most widely used models to examine the rate of acceptance and adoption of e-government technology in different works. The UTAUT model is the result of the integration of eight previously used models. Thus, it consists of constructs that possess the ability to explain higher variance. By taking the fact that UTAUT was designed in 2003 and its modified version, UTAUT 2 made in 2012, it can be considered a new model. Except for UTAUT, which explains around 70% of the variance in usage intention, all the other models are blamed to have less explanatory power that ranges from 30-50%. Accordingly, the UTAUT model is adopted because of its ability to predict the variance in behavioral intention and use behavior than any other model. Also, the newness of the model makes it suitable for further validation.

Therefore, this study makes use of the UTAUT model and modified the model by adding four constructs: trust, awareness, and website quality. These constructs are believed to be relevant for e-government services adoption in the case of Ethiopia as several other studies confirm the impact of the constructs in their studies, which will be discussed later in this section. Trust concept is represented by two constructs: trust in the internet (TNET) and trust in government (TGOV) and two other constructs: awareness (AW) and website quality (WQ).

In the original UTAUT model, there are six main variables, performance expectancy, effort expectancy, social influence, facilitating condition, behavioral intention, and use behavior. Four independent variables, performance expectancy, effort expectancy, social influence, and facilitating condition are modeled to have a direct influence on the dependent variable behavioral intention. While facilitating condition and behavioral intention have a direct influence on use behavior.

Integrating constructs into the UTAUT or other models has become common practice in most of the studies conducted in the e-government area. For example, ElKheshin (2016) integrated trust constructs and website design with original TAM constructs. Mansoori (2017) modified UTAUT by adding two trust constructs. Alshehri, Drew, & Alghamdi, (2012) also used UTAUT by adding website quality construct. Bwalya (2009) guaranteed trust constructs and website quality constructs are of much importance for studies in an e-government area.

Venkatesh et al., (2003) used UTAUT to examine employees' technology acceptance and use. However, the justification for using additional constructs in the current study model could go along with Venkatesh's recommendation, that future research can add other constructs that can enhance the model prediction ability in explaining behavioral intention and use behavior. Also, this study considers e-government as a new technology that needs to be studied in a different country having a different cultural setting, and in a different type of service, which is online public services.

Performance Expectancy

Venkatesh et al., (2003) define performance expectancy as “... *the degree to which an individual believes that using the e-government system will help him or her to attain gains in the job*”. To make it more suitable for the e-government context, this study uses a definition by Alshehri (2012) which provides a more detailed definition as “*the degree to which the customer believes that using e-government services will help him or her to facilitate communication with the government in terms of benefits such as: saving time and money, improving the quality of government services, and increasing the equity between all citizens.*”

Performance expectancy in UTAUT is formed from five constructs of previous models. perceived usefulness from TAM, job fit from MM, extrinsic motivation from TPB, relative advantage from MPCU, and outcome expectations from IDT. In this study, PE construct can be

measured through how e-government systems benefit customers' in saving time, money, effort, and enable them to get quality service from government offices. A web portal that enables customers to save resources can be adopted easily.

The analysis result of Venkatesh et al., (2003) revealed, performance expectancy is one of the strongest predictors of behavioral intention. Similarly, Rabaa et al., (2016), found perceived usefulness as the strongest predictor of e-government adoption. Adefris (2018) confirmed PE has a direct and significant effect on customers' BI in the case of Ethiopian large taxpayers. Thus, the following hypothesis is formulated for this study:

H1: Performance expectancy will have a positive influence on customers' behavioral intention to use e-government services.

Effort Expectancy

Effort expectancy is "...the degree of ease associated with the use of the e-government system" (Venkatesh et al., 2003). Effort expectancy in UTAUT is made up of three constructs named perceived ease of use from TAM, complexity from MPCU, and ease of use from IDT models.

There is a saying that "complexity is the enemy", complex systems are hard to follow and difficult to use. Whereas, simplicity or easy to use is favored or desirable functionality of any system. Talib et al., (2013) indicated that e-government systems that are perceived to be effortless have a higher chance to be adopted. Ahmad et al., (2012) strengthen this idea by indicating, it is more favorable for e-government systems designed to be easy to use to increase the likelihood of customers which makes use of the system.

The findings of a study by Carter & Bélanger (2005) showed that perceived ease of use from TAM model was a significant determinant of behavioral intention. The analysis of a study on the evaluation of e-government services quality in Nigeria by Hien (2014) indicated that perceived ease of use is an important dimension for the adoption of public e-services. In addition, regression analysis result from Mansoori (2017) study confirmed EE to be significant. Thus, the following hypothesis is formulated for this study:

H2: Effort expectancy will have a positive influence on customers' behavioral intention to use e-government services.

Social Influence

Social influence is “...the degree to which an individual perceives that important others believe that he or she should use e-government systems ” (Venkatesh et al., 2003). The social influence construct is a component of three constructs from different models. subjective norm from TRA/TPB/TAM2, social factors from MPCU, and image from IDT models. Social influence construct is perceived as the influence of important people such as family, friends, and work colleagues on the customers' intention to use e-government services.

The impact of social influence on individuals' behavioral intention is somehow a controversial issue. Some argue social influence is amongst the main factors to influence BI including, a study by Al-shafi (2010) in Qatar and Samsudeen (2013) in Srilanka. On the other hand, Adefris (2018) found out that social influence is insignificant to influence e-government adoption. On another study on e-banking adoption in Ethiopia by Desta (2018), social influence construct was insignificant in three datasets including ATM users, Mobile banking users, and Internet banking users. Similarly Venkatesh et al., (2003) found out the impact of social influence was only in mandatory contexts. Thus, the following hypothesis is formulated for this study,

H3: Social influence will have a positive influence on customers' behavioral intention to use e-government services.

Facilitating Condition

Facilitating condition is defined as “...the degree to which an individual believes that organizational support and technical infrastructure exists to support the use of e-government systems” (Venkatesh et al., 2003). Facilitating condition is made up of perceived behavioral control from TPB/DTPB and C-TAM-TPB models, facilitating conditions from MPCU and compatibility from the IDT model. The response of customers on the customers' ability to access online government services, the availability of technical staff to serve customers requests, availability of necessary resources such as reliable internet connection, and other enabling conditions are used to measure facilitating condition construct.

The analysis of Venkatesh et al., (2003) showed, facilitating conditions to be insignificant due to the presence of effort expectancy construct. If an e-government system is designed to be easy to use, then, it reduces the need for help and assistance from government staff. However, in the modified UTAUT 2 Venkatesh et al., (2012), facilitating conditions construct was found to be significant, even though it was moderated by gender and age. (Adefris, 2018; Samsudeen, 2013)

were unable to confirm the positive and significant relation between FC and BI. Therefore, this study formulated the following hypothesis:

H4: Facilitating condition will have a positive influence on customers' behavioral intention to use e-government services.

In the proposed model, the facilitating condition is modeled to have relationships with two dependent variables behavioral intention and use behavior. Alshehri (2012) confirmed facilitating conditions has a significant effect on the customers' use behavior. Similarly, (AlAwadhi & Morris, 2008; Mansoori, 2017) and the analysis result of (Adefris, 2018) showed a significant and positive relationship between facilitating condition and use behavior. Thus, this study comes up with the following hypothesis,

H5: Facilitating conditions have a positive influence on the use of e-government services.

Trust

Trust construct has not been part of the original UTAUT model. However, many suggested trust in an online service is relevant for e-government adoption (Albeshir, 2015; Alomari, 2010; ElKheshin, 2016; Mansoori, 2017; Mutawa, 2013). The adoption of online government services relies on customers' trust in the electronic channel the service delivered through and the provider of the services or the government. The role of trust in e-services adoption has been studied by incorporating the variable with different models including UTAUT (Alshehri, 2012; Gupta & Bhaskar, 2016; Mansoori, 2017), TAM (Alomari, 2010; Carter & Weerakkody, 2008; ElKheshin, 2016) and some others.

The feeling of being monitored by the internet and the fear of losing personal information and documents as well as the lack of assurance in the capability of the government to meet citizens' needs regarding e-government are some of the hindering issues to adopt e-government. The assurance of trust in online government services could encourage customers to make use of e-government systems. Thus, it is necessary to make sure customers' information, documents and privacy are secured enough.

Study on trust and risk in e-government by Carter & Bélanger (2005), suggested trustworthiness is a potential predictor of customers' intention to use e-government. Similarly, Balmi (2016), studied the impact of quality antecedents on individual tax payer's adoption of E-Filing in India, he found out trust as one of the constructs that influence the adoption of the e-Filing system.

This study categorized trust into two constructs: trust in the internet (TNET) and trust in government (TGOV). Trust in government represents customers' trust in the entity providing the service. While trust in the internet represents customers' trust in the channel through which the service is delivered. According to Al-khattab (2015) and Carter & Belanger (2008), trust in the government is “*the integrity and competence of the government departments and agencies perceived by its customers*”. TGOV construct measures customers' perception of the capability of government departments to provide quality services that could fulfill customers' needs. Mansoori (2017), in his thesis work confirms trust in the government is significant to predict e-government adoption in UAE. The analysis of a Ph.D. work by ElKheshin (2016) in Egypt, confirmed government trust determines the rate of adoption from responses of Egyptian society.

Trust in the internet is defined as “*An individual's perception of the institutional environment, including the parameters and directives that make an environment feel safe in sharing personal information and documents*” (McKnight, 2002). The TNET construct is constructed with questions that capture customers' opinions on how they feel whenever they send information, document, and other sensitive personal files to the Ethiopian national e-services portal. In a study by Mansoori (2017) which modified UTAUT by adding two trust constructs indicated, trust in the internet is an influential factor for e-government services adoption in the UAE. In another research by ElKheshin (2016), supported the relationship between trust in the internet and e-government adoption is positive and significant. Ethiopia is one of those countries who face several challenges to develop and implement laws, rules, and regulations for governing issues related to ICT legal and regulatory framework, public key infrastructure (PKI), cybersecurity, etc. therefore this study hypothesizes:

H6: Trust in the government will have a positive influence on customers' behavioral intention to use e-government services.

H7: Trust in the internet will have a positive influence on customers' behavioral intention to use e-government services.

Website Quality

Government web portals allow the government to interact with its citizens. Website quality is defined as “*the user's evaluation of the website's features that meet the user's needs and reflects the overall excellence of the website*”.

In this study, website quality construct is designed to capture the concept of web portal availability, information quality, content quality, and design. Availability shows the probability of the system is ready to respond to customers' needs and requests at a specific time (Alateyah, Crowder, & Wills, 2013). Their study also revealed system availability positively influences customers' intention. System quality is also another important aspect of government web portal adoption and success. In Thailand e-government portal adoption research by (Wang et al., 2005), identified four characteristics of system quality: functionality, reliability, usability, and efficiency. The analysis result later confirmed all of the characteristics of system quality are the determinant factor of e-government adoption.

ElKheshin (2016) analysis proved, a government web portal which contains well-presented information and content possesses a higher chance to be utilized by customers for future interaction. Kumar et al., (2007) emphasized the design of the government web portal should be given priority. Manhas (2015) analyzed the website design of 10 government websites in India by taking page size, composition, and download time evaluation parameters. He noticed customers get satisfaction in their actual interaction with the government web portal, the government has to make websites that are easy to use and accessible to all customers. Further, a good website design enables users to get information and services quickly, with good presentation, and easy navigation.

In (Alshehri, 2012; Hanna & Zawaideh, 2017) study, the finding showed the relationship between website quality and customer intention was strong and its influence was the strongest compared to other constructs in the model. Alomari (2014), in the adoption of e-government by Jordanian citizens, website design was a significant factor. Similarly, (Alateyah, Crowder, & Wills, 2012) in their research identified website design affects the intention of Saudi citizens to adopt e-government services. Gilbert & Balestrini (2004) argues, attractive website design enhances consumers' willingness to accept and adopt e-government services. A survey on trends and developments in the use of electronic services for taxpayers' service delivery by (OECD, 2010), participants suggested the online system to have the look and feel like the paper they fill manually and the content should use the same language as the paper form.

Zelege (2018), in his study, come across three usability features: content, appearance, and navigation to ask users if the Ethiopian e-government portal meets their expectation. The overall

response from participants of the study indicated the majority of the respondents are not satisfied with the current Ethiopian government web portal's content, look, and appearance. Based on evaluation using web content accessibility guidelines (WCAG) and world wide web consortium (W3C), the finding of the research showed government web portals in Ethiopia have many accessibilities and usability issues. These websites' didn't follow standardized e-government website design procedures. The researcher also reported Ethiopia's e-government websites to have a poor appearance and holds content and information that needs a regular update.

It was found that Saudi Arabians struggle to adopt e-services as the portals are designed predominately in English to satisfy the demands of users from other western countries (Mutawa, 2013). In similar research by Bwalya (2009), most of the Zambian government web portals are designed and presented with the English language thus leads to Zambia and pointed out as the main barrier for low rate adoption.

This study argues, for customers to make continual use of online services, the government web portal should meet the different attributes of web portal quality such as availability, system quality, information, and content quality and design. Thus research hypothesizes:

H8: Website quality will have a positive influence on customers' behavioral intention to use e-government services.

Awareness

Awareness factor can be defined as “*the degree to which users are aware of e-government services and its potential*” (Alghamdi, 2016). In a developing country like Ethiopia, where e-government is in the early stage of implementation, Jaruwachirathanakul & Fink (2006) suggested information and knowledge about services that are provided online and the benefits of using these systems has great potential to enhance customers motivation to use e-government. During the first e-government implementation plan, the Ethiopian government intended around 70% of its citizens to be aware of e-government (e-gov, 2013). However, as indicated in a document in electronic government implementation plan II, e-gov (2016), lack of public awareness is identified as one of the reasons for the low-level adoption of e-services in Ethiopia.

Customers who are aware of e-government, its benefits and advantages are more likely to use and adopt e-government systems. Extant literature reported a lack of awareness as the major reasons for the low rate of adoption (Alghamdi, 2016; Alshehri, 2012; Gupta & Bhaskar, 2016).

It has been suggested that awareness created by the government to the general public would enhance the likelihood of online services adoption. Besides, benefit all government ministries and agencies and contributes to successful implementation.

Alsaif (2013), amended UTAUT by adding awareness construct as one of the variables that affect customers' behavioral intention to adopt e-government services and later confirmed its impact through responses from research participants'. Gupta & Bhaskar (2016) indicated awareness is the challenge the Indian government face to make successful implementation of e-government. Adefris (2018) discovered awareness of online services as a significant determinant of adoption in Ethiopia. Thus, this study hypothesizes:

H9: Awareness will positively influence the behavioral intention of customers' to use e-government services.

Behavioral Intention

Behavioral intention *refers* to “a person’s subjective probability that he/she will perform some behavior” (MartinFishbein & Icek, 1975). According to the technology acceptance model, TAM, behavioral intention shows the actual use of a given IS system and therefore determines technology acceptance and adoption. Ajzen (1991), states the intention variable captures the motivational factor that influences an individual’s actual behavior. Intentions indicate the individuals' willingness to tryout the technology and how much effort they put on to perform a specific behavior.

Venkatesh et al., (2003) theorized individual intention has a significant and positive effect on use behavior. In TPB, intention is determined by the attitude of usage, perceived behavioral control, and subjective norm. While in the TAM model, attitude towards use determines behavioral intention. A higher degree of individuals behavioral intention indicates a greater probability of the individual to perform a specific task. In the proposed model, performance expectancy, effort expectancy, social influence, and facilitating conditions are designed to predict an individual’s behavioral intention. Whereas, BI also is modeled to have a direct effect on use behavior.

H10: Behavioral intention will have a positive influence on the use of e-government services.

3.2 Proposed Model for E-Government Services Adoption in Ethiopia

In a country like Ethiopia where e-government and its services are considered new technology, to examine reasons behind the low-level response to e-government and its services are very important. Thus, the current study aims to adapt and modify a conceptual model to investigate factors influencing the customers' adoption of e-government services in Ethiopia. To do so, the original UTAUT model is modified by incorporating four constructs.

The UTAUT model consists of 4 independent variables, performance expectancy, effort expectancy, social influence, and facilitating condition. Behavioral intention and use behavior are dependent variables. However, the proposed model consists of eight independent variables which include four variables from the original UTAUT and the other four variables: website quality, awareness, trust in the internet, and trust in government.

Venkatesh et al., (2003) model consist of four moderate variables gender, age, experience, and voluntariness. The proposed model in this study doesn't include the influence of moderator factors. Therefore, PE, EE, SI, FC, WQ, AW, TNET, and TGOV are hypothesized to directly influence customer BI. FC and BI are modeled to have a direct influence on customers' use behavior USE. Generally, from the proposed model, ten hypotheses are generated and are summarised as follow:

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

H2: Effort expectancy will have a positive influence on customers' behavioral intention to use e-government services.

H3: Social influence will have a positive influence on customers' behavioral intention to use e-government services.

H4: Facilitating condition will have a positive influence on customers' behavioral intention to use e-government services.

H5:Facilitating condition will have a positive influence on the use of e-government services.

H6: Trust in the internet will have a positive influence on customers' behavioral intention to use e-government services.

H7: Trust in government will have a positive influence on customers' behavioral intention to use e-government services.

H8: Website quality will have a positive influence on customers' behavioral intention to use e-government services.

H9: Awareness will have a positive influence on customers' behavioral intention to use e-government services.

H10: Behavioral intention will have a positive influence on the use of e-government services.

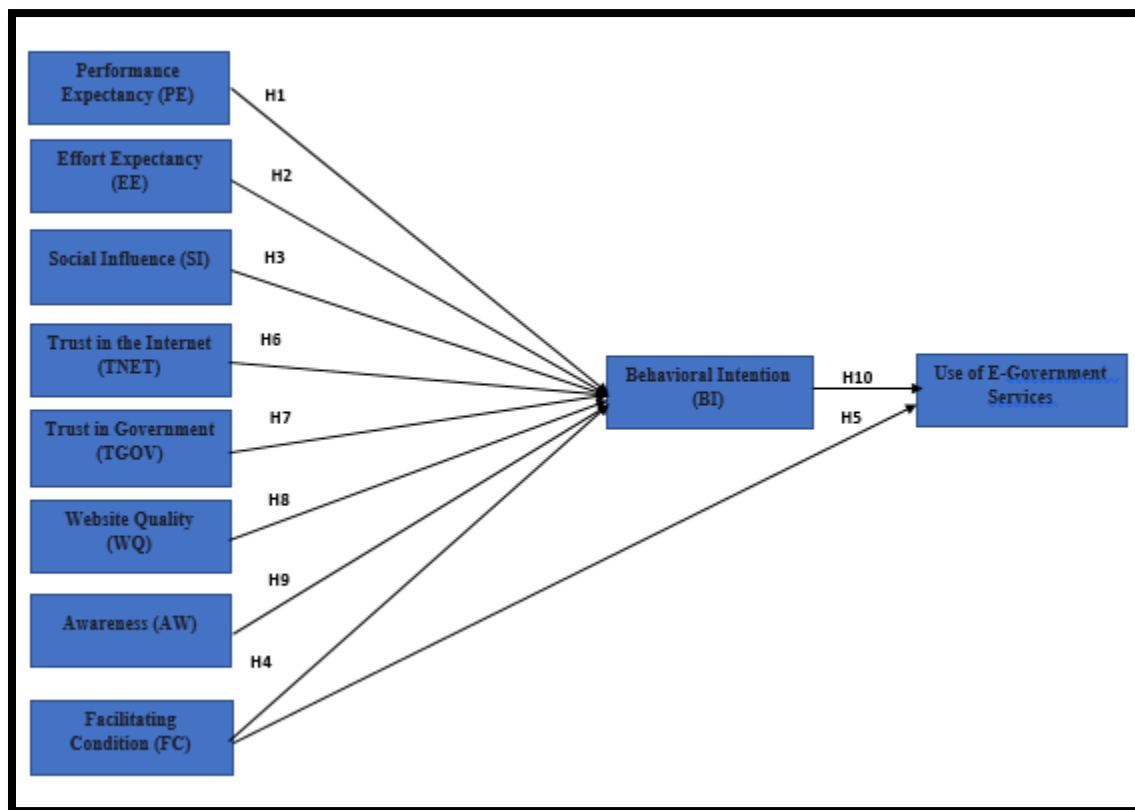


Figure 6: E-Government Services Adoption Model

Adopted from (Venkatesh et al., 2003)

3.3 Research Methodology

The objective of this study is to test the research model based on responses from selected customers of three governmental offices and come up with influential factors. To achieve its objective, the researcher needs to gather customers' opinions on factors influencing the adoption

of the national e-services portal, and analyze the data to find out the main influential factors based on constructs relationship. In this case, quantitative research is more favorable. According to Creswell (2014), quantitative research test theories by examining the relationship among research variables. Accordingly, this study uses a quantitative method to test the modified UTAUT by examining the relationships between study constructs and find out the main influential factors that influence customers' adoption in Ethiopia.

Studies conducted based on the positivist world view focuses on numerical data analysis, measurement and are mostly hypothesis-driven. Positivists use deductive reasoning to find out causes for an effect or outcome as they assume reality is objective therefore they study from general to specific (Creswell, 2014). Based on the narrative above, as the main driver of this study is hypothesis testing, this study can be categorized under the positive paradigm.

Surveys are touted to be desirable when the researcher deals with the collection of information that reflects an individual's attitudes, behaviors, opinions, and beliefs that cannot be observed directly (Avedian, 2014). Most of the studies in the adoption of e-government are filled with survey design (Peter, Huff, & Munro, 1998). This study considers a large number of customers from three Ethiopian governmental offices. Therefore in such cases survey designs are more favorable as it allows the researcher to collect multiple answers at the same time from different participants, cross-sectional survey design is selected for the study as it allows the researcher to collect multiple information at a specific time.

3.4 Sampling Design and Target population

The overall population of this study includes all customers who make use of the national e-services portal to request services from 34 governmental offices. However, due to time constraints, this study purposively selected customers of 3 government offices that make use of the national e-services portal to interact with the Ethiopian government. The capital city Addis Ababa is used as the setting of this study. Most of the Ethiopian government ministries and agencies are found in the capital city. Therefore, high concentration of customers for e-government services is found in this city. The study carefully chooses customers of the ministry of innovation and technology, the federal transport authority, and the ministry of water and irrigation, these offices of the Ethiopian government collectively provide more than 34 online services to their customers.

Even though, the overall population for conducting this study are all customers that belong to 34 Ethiopian governmental offices that utilize the national e-services portal. Most of the time studying the whole population is difficult in terms of time constraint and manageability issues. In such cases, sampling becomes important where a subset of units from a sample population is studied.

The reasons for choosing three offices are described below.

1. Ministry of Innovation and Technology (MInT) is a pioneer organization responsible for activities related to the implementation of e-government. There is a directorate by the name “E-Government Directorate” responsible for e-government related tasks all over the country. The ministry is the lead in service transformation activities from all other ministries. Currently, the ministry has been fully utilizing the national e-services portal to provide its customers with more than 5 online services including the provision of licensing services for installation and maintenance of cable, wireless local loop exchange and maintenance of terminal equipment in telecommunication service, issuance of ICT company certificate for professional competency, provision of telecommunication resale services, provision of telecommunication value-added services license (VAS) and provision of satellite television receive-only (TVRO) license.
2. Federal Transport Authority (FTA) is another government office that made more than 18 services online including the issuance of the vehicle import permit, issuance of the cross border for freight trucks, issuance of competency assurance for garage service, public transport competence assurance licensing, and others. This office is the most crowded office that serves a significant number of visitors who apply for various services daily that makes it worthy to be included in this study.
3. Ministry of Water and Irrigation is the third government office that is selected for this study. The ministry uses a national e-services portal to reach customers who need its services related to registration, renewal, upgrading and returning of professional and company license competency certificate. The ministry made more than 11 online services available to its customers.

For the current study, three Ethiopian governmental offices are selected for the above-mentioned reason, while, survey participants are selected based on their availability in selected offices during the specified period of data collection. Thus depending on the nature of the research, the study employed a convenient sampling technique where customers' availability is taken as the major criteria to collect customers' opinions on influential factors in e-government adoption. Even if the current study assesses customers' opinions through 3 governmental offices due to the similar nature of the services, findings of this research are likely to represent other customers from other Ethiopian government offices which are not directly included in this study.

Smart-PLS is appreciated for its ability to handle smaller sample size however, in most cases small sample sizes raises the question on the research generalizability. Therefore, the estimation of a sufficient sample size is key to make the research findings generalizable to the whole population and in other contexts too. (Chin, 1998; Henseler & Ringle, 2009), suggested minimal sample size must be 10 times larger than blocks with the largest number of formative indicators in the model or the maximum number of independent (exogenous) LVs directed towards (impacting) the dependent (endogenous) LV. in this study model there is one block of the formative construct (Use) containing four formative indicators and an endogenous variable BI impacted by eight exogenous LVs. Thus by taking the maximum of the two, we can get 8 multiplied by 10 which gives 80 sample sizes as the minimum sample size for this study.

3.5 Instrument Development

The study adopted questionnaire items from different researches. Most of the research constructs are adopted from Venkatesh's study (Venkatesh et al., 2003). However, the other four constructs which are not part of the original UTAUT are adopted from several works of literature including Mansoori (2017) for trust in government and trust in internet constructs, awareness construct questions were adopted from Alghamdi (2016) work, and website quality is adopted from Alshehri et al., (2012). Some modification has been made on the questionnaire item to capture the context of the study. The study tried to keep the ethical consideration of research as much as possible. The respondents are informed that participation in the research is completely voluntary. During the design of the survey questionnaire, the demographic section is designed not to contain questions that are too personal such as: the respondents' income and marital status.

The survey questionnaire design contains two sections. The first section is designed to capture the respondent's demographic characteristics such as age, sex, and educational level. The second section contains questions that capture the concept of construct and used to measure the factors influencing the adoption of e-government services with a five-point Likert scale. The survey questions are divided as follow: (1) multiple-choice questions for the demographic variables with a single answer such as age, gender, education level, and internet experiences and e-government experience (2) close-ended questions using a five-point Likert scale with endpoints that ranges from “strongly disagree” to “strongly agree” and with a midpoint “neutral” to address respondents' opinion on each question. In most studies, a five-point Likert scale and seven-point Likert scale are mostly used. This study decided to make use of a five-point liker scale. The justification for using a five-point Likert scales is for its ability to reduces respondents' frustration (Joshi, Kale, Chandel, & Pal, 2015), this scale was also used by other e-government researchers such as (ElKheshin, 2016; Mansoori, 2017). The questionnaire was initially developed using the English language. However, by considering the respondents' request, the Amharic version of the questionnaire was also prepared.

Table 2: Research Construct and their Items

#	Performance Expectancy	Adopted from
1	Using e-Services enables me to access government services	(Venkatesh et al., 2003)
2	Using e-Services enables me to get government services more quickly.	
3	If I use e-Services, I will increase my ability to get government services	
4	Overall, using e-Services portal would increase my overall productivity.	
	Effort Expectancy	(Venkatesh et al., 2003)
5	By using the e-Services portal I am able to obtain government services more easily.	
6	Learning to use e-Services portal is easy.	

7	My interaction with e-Services portal is clear and understandable.	
8	Overall, I found e-Services portal easy to use.	
	Social Influence	(Venkatesh et al., 2003)
9	My family and friends think that I should use e-Government services to get government services	
10	I will use e-Government services if the people who are important to me used it	
11	Overall, people who influence my behavior think I should use the e-Government services	
	Facilitating Condition	(Venkatesh et al., 2003)
12	I have the resources necessary to use e-Services portal	
13	I have the knowledge necessary to use e-Services portal	
14	I can get help from others when I have difficulties using e-Services portal	
15	There is a specific person or team available for help and assistance whenever I encounter technical difficulty while using e-Services	
	Behavioral Intention	(Venkatesh et al., 2003)
16	I intend to continue using e-services portal to get government services in the future	
17	I will always try to use e-Services portal to get government services.	
18	Overall, I plan to continue using e- Services portal	
	Trust of the Internet	(Mansoori, 2017)

19	The Internet has enough safeguards to make me feel comfortable to use e-Services.	
20	I feel assured that legal and technological structures adequately protect me from problems on the Internet.	
21	I feel secure to send personal information and documents over e-Services portal.	
22	Overall, the Internet is robust and safe to use e-Government services.	
	Trust of the Government	(Mansoori, 2017)
23	I believe that government departments have the ability to meet citizens needs in regards to e-Government services	
24	The government can be trusted to carryout faithful online interaction	
25	I am confident that the forms I submit through e-Services portal will be processed and not ignored	
26	Overall. I trust the government	
	Website Quality	(Alshehri et al., 2012)
27	e-Services portal looks attractive and use fonts and colors properly	
28	e-Services portal contains important content about the services provided	
29	e-Services portal has multiple language options	
30	Overall, e-Services portal is always working and do not crush	
	Awareness	(Alghamdi, 2016)
31	I have a good knowledge of e-Government services and	

	their benefits	
32	The customers receive training from their government to make the best use of e-Government services	
33	Offering workshops and visual presentations about e-Government would encourage me to attend and know more	
34	Overall, I am satisfied with the current awareness campaigns and advertisement about e-Government and its services	
	Use behavior of E-Government Services	(Alshehri et al., 2012)
35	I want to use e-Government services to perform my government requests	
36	I frequently use e-Government services	
37	I use e-Government services regularly	
38	Overall, most of my government requests are done through e-Government services	

3.6 Pilot Test

Even if there is no commonly agreed upon the sample size for pilot testing, the research questionnaire was pre-tested through responses from 12 respondents that completed the overall survey questionnaire. These responses were not used as part of the main analysis rather used to check: 1) whether each survey item can be clearly understood by research participants and to gather respondents' feedback on items that are difficult to understand and make the proper modification. 2) to estimate the average time required to fill the entire questionnaire. An example of a modified survey item based on customers response is Trust in internet item 3 which states "I feel confident that encryption and other technological advancements in internet make me feel secure to send personal information over e-Services portal" have been modified to "I feel secure in sending personal information and documents over e-services portal".

3.7 Data Analysis Tools and Techniques

In the quantitative method, the researcher begins by collecting relevant data based on the conceptual framework or model. The data collected are then going to be analyzed with the application of statistical analysis software. This study uses two statistical analysis techniques that are mostly employed in adoption studies: SPSS version 20 and Smart-PLS version 3 statistical analysis software package. Respondents answer for section 1 which contains questions for demographic variables are coded into SPSS version 20 and further analysis of these variables are also conducted.

For hypothesis testing researchers use the most widely used analysis technique: AMOS or Smart-PLS based on the study aim either prediction or explanation. Smart-PLS is considered an appropriate statistical analysis tool that allows estimating models that are complex and for studies that aim at producing predictive results (Sarstedt et al., 2017). Therefore this method is employed to test the causal relationship between LVs in this study.

Chapter Four

IV. Data Analysis and Discussion

Introduction

In this chapter, **chapter four**, the data collected from study participants are analyzed to answer research questions presented in **chapter one** to provide influential factors on the adoption of e-government service in Ethiopia from the customer's perspective. Thus, this chapter presents a result of demographic analysis and a detailed discussion of hypothesis testing based on the structural equation modeling technique. The first section depicts the preparation of survey data for statistical analysis, response rate, and respondents profile for three demographic characteristics: gender, age, and educational background. Followed by, a brief explanation of the concept of structural equation modeling SEM and the justification for employing the PLS-SEM technique in this study. Then, detailed analysis of the measurement model: reliability and validity assessment, multicollinearity test are reported. Hypothesis testing results and discussion of the findings are presented at last.

4.1 Preparation of Survey Data for Statistical Analysis

The survey questionnaire was prepared to have two sections. The first section is dedicated to collect respondents' demographic characteristics such as gender, age, educational background, and e-government experience. The second section consists of questions from the modified UTAUT model. However, before filling out the questionnaire, participants were informed about the purpose of the study and the approximate time needed to fill the questionnaire. The contact address of the researcher was also included in case if the respondent finds difficulties during filling out the questionnaire paper and to communicate with the respondents who needed further explanation. Printed questionnaire paper that consists 38 close-ended items for ten constructs were distributed to 400 customers from 3 government offices: the Ministry of innovation and technology (MInT), Ethiopian Federal transport authority (FTA) and the Ministry of water and irrigation. with five-point Likert scale measurement from 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree to 5 = strongly agree. Overall, the questionnaire took 30 consecutive working days or 6 weeks that starts from March 11 and ended on April 22.

Data cleaning procedures are believed to make the analysis result more accurate. Thus, before conducting the analysis, data collected from research participants were cleaned and treated by following procedures adopted from previous studies. This research followed the data preparation procedure undertaken by (ElKheshin, 2016), which includes the following steps:

1. The questionnaires were checked visually after they were received. Responses from each respondent were numbered as they were returned and reviewed for completeness and eligibility. For example, if a respondent answered all survey questions the same, the data were considered ineligible.
2. The data from the usable responses were passed into SPSS 20 statistical package.
3. After data were entered into SPSS 20, every data were again manually checked to see if there was an error during data entering.
4. Frequencies were computed using SPSS for each variable to check for missing data.

4.2 Descriptive Statistics

4.2.1 Response Rate and Respondent's Profile

Survey questionnaires were distributed to 400 customers, a total of 316 responses were returned. This makes the total response rate of the study to be 79%. From 316 returned questionnaires 22 were discarded from further analysis due to (1) questionnaire consisting of the same answer for all questions: quantity 9 and (2) Responses having a missing value that exceeded 15%, or missing value for more than 6 items were removed quantity: 13 based on the recommendation of (Hair et al., 2014). Smart-PLS provides three mechanisms to handle missing values mean value replacement, casewise deletion, and pairwise deletion. This study used mean value replacement for missing values in the study. Finally, the remaining 294 usable responses from e-government adopters were found to be valid for further data analysis.

Respondents 'Gender

Table 3: Respondents frequency per Gender

Respondents Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	198	67.3	67.3	67.3
	Female	96	32.7	32.7	100.0
	Total	294	100.0	100.0	

The study respondents' gender values were represented by a value of 1 and 2 for "Male" and "Female" respectively. As observed from **Table 3**, from 294 respondents, 198 (67.3%) of them were males while 96 (32.7%) were females. This result clearly shows in Ethiopia, males utilize e-government services more than females do. The analysis result is no surprise. Even if there is an impressive change in women's educational participation, reports indicated that Ethiopian is a country where women didn't get equal opportunity to schools, and only half of the girls who enroll in primary schools ever make it to grade 5 (Mengesha, 2001).

Respondents 'Age

Table 4: Respondents frequency per Age

Respondents Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-29	59	20.1	20.1	20.1
	30-39	133	45.2	45.2	65.3
	40-49	76	25.9	25.9	91.2
	over 50	26	8.8	8.8	100.0
	Total	294	100.0	100.0	

The study respondents' age were categorized into four groups which ranges from [18-29], [30-39], [40-49], and [over 50], represented by 1, 2, 3 and 4 respectively. As shown in **Table 4**, most of the e-government adopters are aged between [30-39] and contribute 45.2% of the total respondents, followed by the age group [40-49] with 25.9% and age group [18-29] with 20%.

Respondents who are aged over 50 contribute to only 8.8% of the total respondents ‘population. Here we can conclude that in Ethiopia, youngsters between age 18 to 39(65.3% in this study) tend to more interact with the government using the e-services portal,

Respondents’ Educational Level

Table 5: Respondents frequency per Educational Level

Respondents Educational level					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High school or less	18	6.1	6.1	6.1
	Diploma	37	12.6	12.6	18.7
	Bachelor’s degree	196	66.7	66.7	85.4
	Master’s degree and more	43	14.6	14.6	100.0
	Total	294	100.0	100.0	

Educational level is another demographic variable that is included in this study. Educational level indicates the highest academic achievement by study participants’. Four educational levels categories: [high school or less], [diploma], [bachelor’s degree], and [master’s degree and more] are included in the study questionnaire and represented by values of 1, 2, 3, and 4. As **Table 5** shows a majority of respondents 196 (66.7%) completed university 1st degree. While 43 (14.6%) of the respondents indicated they had completed 2nd degree or/and more. Whereas, 37 (12.6%) of the participants completed diploma programs. Out of 294 respondents, Only 18 were found to have the least educational qualification which is high school complete or less. This result indicated e-government services are more adopted by individuals who achieved a higher educational qualification. Individuals’ who got a chance to learn in higher educational institutions do have more possibility to be familiar with computers and internet technology.

At the end of the first section, respondents were asked if they have any experience in using e-government services such as the national e-services portal to get online Ethiopian government services. For those individuals who answered yes to the question are informed to proceed to the next section. While for those participants who have never experienced e-government are informed to leave the questionnaire.

4.3 The Concept of Structural Equation Modeling (SEM)

Structural equation modeling (SEM) analysis works by integrating path analysis and factor analysis in the analysis of a single model. In supporting this idea, Hox (1999) describes SEM as *a combination of factor analysis and regression or path analysis*. SEM is an important tool to estimate a network of causal relationships between latent variables in the research model (Civelek, 2018). The analysis conducted based on SEM can be used to test a model, to test formulated hypotheses, to modify the examined model, and/or to examine a set of related models (Bollen, 2005).

Many researchers including (Hair et al., 2016; Kante, Chepken, & Oboko, 2018; Urbach & Ahlemann, 2010), witnessed wide use of SEM techniques in information technology researches. Venkatesh et al., (2003) used SEM particularly (PLS-SEM) to test the relationship between the latent variable (LVs) in his research model.

The complete SEM model consists of two components: the measurement model and the structural model. The measurement part of the model creates and examines the relationships between the indicators or observed items and unobserved variables. While, the structural model, create and examine a set of hypothesized relationships between more than two or more constructs. Thus the relationships among indicators and LVs and between latent variables (LVs) constitute the overall structural equation model.

Several techniques are out there that allow researchers to evaluate their research models. These models are but not limited to, factor analysis, correlation analysis, regression analysis, ANOVA, structural equation modeling, and others. However, among the other techniques, SEM becomes most desirable due to the feature that allows it to outperform other models, which are listed below.

1. One of the most important reasons for the widespread of SEM is its ability to be used to test direct and indirect relationships among LVs in a single model (Civelek, 2018).
2. SEM is considered a convenient statistical analysis tool that allows simultaneous and complete examinations of relationships when the model is complex (Sarstedt et al., 2017). A complex model consists of relationships that a construct might act as both dependent and independent variables according to the relationship the construct has with other constructs in the model.

3. SEM can be used to examine the causal relationships between latent constructs that are measured by multiple indicators (Lei & Wu, 2007).

In this study model, the behavioral intention (BI) construct acts as dependent on its relationship with PE, EE, SI, FC, WQ, AW, TNET, and TGOV. While it also acts as an independent variable in another relationship with facilitating condition (FC) and Use behavior (USE). The facilitating condition (FC) construct has an arrow towards both BI and USE constructs and the proposed model consists of a total of ten where eight of them are independent and two dependent variables.

Structural equation modeling has two techniques (1) partial least square (PLS-SEM) and (2) covariance-based (CB-SEM). However, PLS-SEM or partial least square SEM is regarded as the most fully developed system (Hair et al., 2016). As a result, many researchers in information science and system disciplines used this method to perform their analysis including (AL Mansoori, 2017; ElKheshin, 2016; Alsheri et al., 2012).

Justifications for using PLS-SEM in this study are:

1. PLS-SEM can best analyze non-parametric data or non-normal distribution (Hair et al., 2014).
2. PLS-SEM can be used if the model is complex with a large number of constructs and indicators (Urbach & Ahlemann, 2010).
3. PLS-SEM can handle both reflective and formative constructs (Hair et al., 2016).
4. Formative indicators can only be analyzed using PLS-SEM (Henseler & Ringle, 2009).
5. PLS-SEM can be used when the researchers' primary objective is prediction (Urbach & Ahlemann, 2010; Wong, 2013).

The PLS-SEM technique is appreciated for its high performance with a smaller sample size. (Hair et al., 2012). Chin (1998) indicated, in PLS-SEM, a minimum sample size for a model containing an endogenous variable is ten times the number of arrows pointing towards it from an exogenous variable or ten times the maximum number of formative indicators per construct. In the current study, the proposed model consists of 8 exogenous variables pointing towards an endogenous variable behavioral intention (BI) therefore a minimum of 80 samples size is required. Even if PLS performs well with small-sized data, adequate estimation of the sample

size is required to improve the overall estimation of the model, and to reduce standard errors (Akter et al., 2011). Based on Wong (2013) a minimum sample size of 91 is required for a model consisting of 10 constructs. Thus, this study exceeds the minimum requirement set by (Hair et al., 2012; Wong, 2013).

Generally, PLS-SEM is found to be a convenient method to be used in the current study due to (1) The study involves the use of Likert scale data that are non-parametric. (2) The proposed model consists of ten constructs that make the model larger. (3) The model consists of both formative and reflective indicators and formative indicators can only be analyzed using PLS-SEM. (4) this research aims to predict the main factors influencing the adoption of e-government in Ethiopia.

4.4 Structural and Measurement Model

The complete structural equation model consists of two sub-components the measurement model and the structural model. Thus, model validation in PLS-SEM is a two-step process: measurement model and structural model assessment. Measurement models are called outer models, whereas structural models are called inner models. SEM consists of multiple indicators. These indicators are either reflective or formative. The measurement model (outer model) specifies the relationship between latent variables and their indicators, while the structural model (inner model) specifies the relationship between latent variables (LV) (Urbach & Ahlemann, 2010).

In PLS-SEM, a variable is either exogenous or endogenous. An exogenous variable is the one that has path or arrows pointing outwards and none leading to it and an endogenous variable has at least one path leading to it and represents the effect of variables (Wong, 2013). In the current study, Performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), awareness (AW), website quality (WQ), trust in the internet (TNET), and trust in government (TGOV) are exogenous variables. while behavioral intention (BI) and use behavior (USE) are endogenous variables. Moreover, in PLS-SEM measurement model consists of formative and reflective indicators. All constructs in the study model are modeled with reflective indicators except for the USE construct that is modeled with four formative indicators.

Model validation in SEM involves evaluating whether data collected from respondents support research hypotheses in the structural model as well as in the measurement model (Urbach

&Ahlemann, 2010). PLS-SEM doesn't report goodness of fit as that of CB-SEM, therefore (Chin, 1998) proposed assessment of both structural and measurement models to validate the research model (Henseler et al., 2009; Urbach & Ahlemann, 2010; Wong, 2013).

The figure below, **figure 7** is adopted from adopted (Urbach & Ahlemann, 2010), which shows components of both the inner model (structural) and outer model (measurement). Indicators of the latent variables are directly measured items on the questionnaire and are represented by rectangular boxes, while circles in the model show latent variables.

- A Greece letter λ indicated numerical values that quantify the relationship between indicators and their latent variables.
- A Greece letter β indicates numerical values of path coefficient that quantify the relationship between two LVs respectively or in other words, β value indicates the strength of the relationship between variables.
- The numbers in the circle indicate by how much the variance of the latent variable is being explained by the other latent variables.

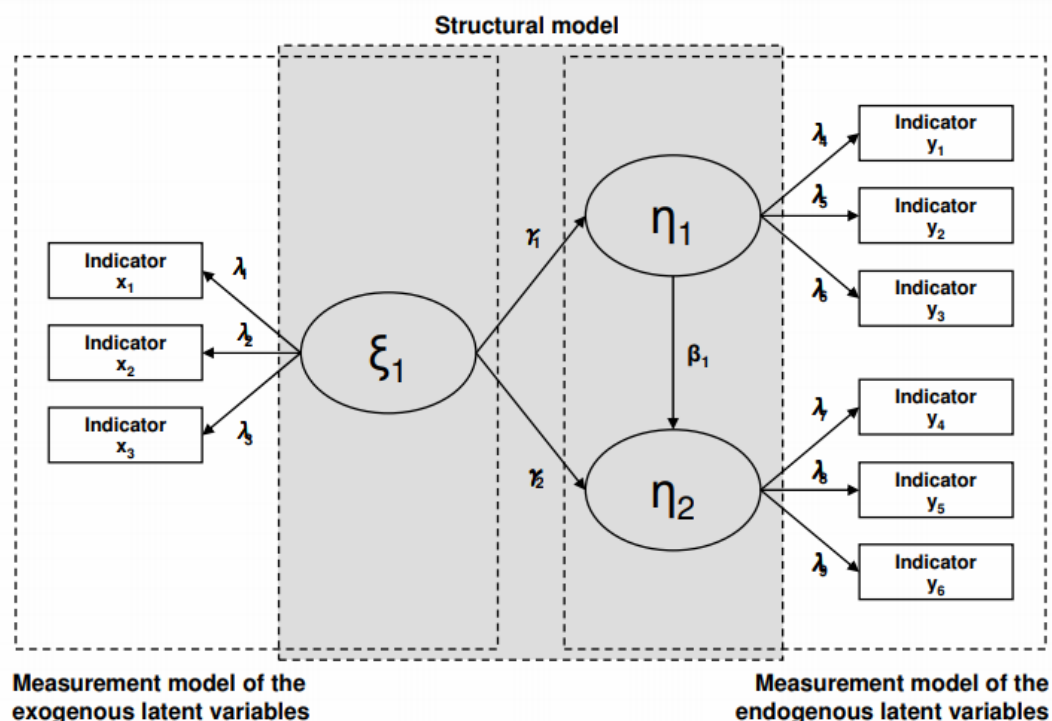


Figure 7: Structural Model and Measurement Model

Adopted from (Urbach & Ahlemann, 2010).

4.4.1 Measurement Model Assessment

The measurement model determines the relationship between the observable indicator variables and the LVs (Urbach & Ahlemann, 2010). In the measurement model indicators are either formative or reflective. Formative indicators are the one which forms the construct. These indicators are considered “cause” of the latent variables. While, reflective indicators are considered as the “effect” of the latent variables, as these variables are caused by LVs. The measurement model employs an assessment of reflective and formative measurement models. The proposed model in this study consists of both reflective and formative models. Following guidelines developed by (Wong, 2013), this study reports indicator reliability, internal consistency reliability (ICR), convergent validity and discriminant validity for reflective measurement model and convergent validity, collinearity and significance, and relevance of indicator weights for formatively measured constructs.

4.4.1.1 Measurement Models for Reflective Model

In the outer (measurement) model, it is essential to assess the reliability and validity of the research construct and its indicators. Following the guideline developed by (Wong, 2013), this section report results of internal consistency reliability (ICR), indicators reliability, construct validity, discriminant validity for the reflective measurement model. All the values reported are found from the report of SmartPLS after running the PLS algorithm with the initial setting of the Path weighting scheme, Data metric mean= 0, Var=1, Maximum iterations= 1000, with 1.0E-5 stop criterion and initial weight of 1.0.

Internal Consistency Reliability (ICR)

Internal consistency is examined by using the most widely applied measures: Composite validity and Cronbach's alpha (α). Internal consistency reliability shows how well the indicators for construct measures what it intends to measure. Cronbach's alpha is explained to be the most widely used internal consistency measure. However, it is limited by its assumption that all indicators are equally reliable (Urbach & Ahlemann, 2010). Whereas, composite reliability assumes all indicator loadings are not equally reliable. Therefore, it is believed to provide a more appropriate measure of internal consistency reliability.

The rule of thumb for a construct to be reliable should beat least 0.70 in both measures (Henseler et al., 2009; Urbach & Ahlemann, 2010; Wong, 2013). Further, Hilton et al., (2004) have

suggested four different categories of reliability: value between (0.50 and below) indicates low reliability, high moderate reliability (0.50-0.70), values in between (0.70- 0.90) shows high reliability and value of (0.90 and above) shows excellent reliability. However, Sarstedt et al., (2017) implied higher values don't always mean high reliability, in some cases values larger than 0.95 might be problematic, which indicates the item is redundant and identical. As can be shown in **Table 6**, the research questionnaire is reliable, as both measure values for all constructs are above the desirable value 0.7.

Table 6: Composite Reliability and Cronbach's α Measures

	Cronbach's Alpha	Composite Reliability
AW	0.81	0.87
BI	0.73	0.85
EE	0.71	0.82
FC	0.88	0.92
PE	0.81	0.87
SI	0.79	0.85
TGOV	0.79	0.87
TNET	0.82	0.86
WQ	0.87	0.91

Indicator Reliability

Urbach & Ahlemann (2010), explained indicator reliability shows the extent to which a variable or set of variables is consistent regarding what it intends to measure. In PLS-SEM indicators reliability is reported using indicators loading or outer loadings (Hair et al., 2011; Wong, 2013). Indicator loadings are values that show a correlation between the indicators and LV.

A Greece letter λ indicates numerical values that quantify the relationship between indicators and their latent variables. Generally, it is postulated that an LV should explain at least 50 percent of each indicator's variance. Thus, indicator loadings are significant at a minimum value of $\lambda = 0.50$ and with a preferred value of $\lambda > 0.70$ (Hair et al., 2016; Wong, 2013).

As shown in **Table 7** below, most of the indicator items outer loading have individual indicator reliability values that are higher than the preferred value of 0.7, except for two indicators: the third item of effort expectancy (EE03) with 0.46 and the first item of trust in internet construct (TNET01) with 0.55. Accordingly, (Hair et al., 2018) recommends an indicator with loading below 0.5 should be discarded. Thus EE03 has been removed from further analysis due to low loading value that is far below the desired 0.70 value.

Table 7 : Reliability and Validity measures with Factor loadings for reflective indicators

Latent variable	Indicators	Outer loading (λ)	Composite reliability (ICR)	Convergent validity (AVE)	Discriminant validity (square root of AVE)
AW	AW01	0.79			
	AW02	0.85			
	AW03	0.79			
	AW04	0.74	0.87	0.63	0.79
BI	BI01	0.76			
	BI02	0.82			
	BI03	0.84	0.85	0.65	0.81
EE	EE01	0.82			
	EE02	0.83			
	EE03	0.46*			
	EE04	0.78	0.82	0.54**(0.68)	0.74
FC	FC01	0.87			
	FC02	0.90			
	FC03	0.88			
	FC04	0.79	0.92	0.74	0.86

PE	PE01	0.81			
	PE02	0.86			
	PE03	0.80			
	PE04	0.71	0.87	0.63	0.80
SI	SI01	0.86			
	SI02	0.71			
	SI03	0.85	0.85	0.65	0.81
TGOV	TGOV01	0.85			
	TGOV02	0.79			
	TGOV03	0.78			
	TGOV04	0.72	0.86	0.62	0.79
TNET	TNET01	0.55*			
	TNET02	0.74			
	TNET03	0.91			
	TNET04	0.88	0.86	0.62	0.78
WQ	WQ01	0.80			
	WQ02	0.93			
	WQ03	0.90			
	WQ04	0.77	0.91	0.73	0.85

*Shows a low loading factor below the preferred value (0.7) and ** show AVE score below 0.6.

Convergent validity

Convergent validity involves the degree to which individual items reflecting a construct converge in comparison to items measuring different constructs (Urbach & Ahlemann, 2010). The most commonly applied criterion for convergent validity is the average variance extracted (AVE). On average, the latent variable is expected to explain more than half of the variance in its

indicators (Henseler et al., 2009; Wong, 2013). In this study, most of the indicators were borrowed from previous studies that have already been tested for their validity. The third item of effort expectancy is found to be the reason for the lowest AVE scores of 0.54. Thus it was removed from further analysis. After removing the indicator EE03, AVE values for effort expectancy construct show substantial improvement to 0.68. Henseler et al (2009) indicated researchers should be careful towards eliminating an indicator from a construct and stated an indicator should be eliminated if the elimination of that indicator could bring significant change in values of composite reliability and average variance extracted. Even if TNET01 has a loading of 0.55, it was kept in the model due to the AVE score of 0.62 and its indicator reliability 0.86 is significantly above threshold values for both measures.

Discriminant Validity

Discriminant validity assessment becomes essential and common practice for validity examination in structural equation modeling (SEM). It involves the degree to which the measures of different constructs differ from one another (Urbach & Ahlemann, 2010). Thus it makes sure an item does not unintentionally measure another construct. There are two methods to ensure the existence of discriminant validity in a research model.

The first method for assessing the existence of discriminant validity is through Fornell and Larcker (1981) criterion as cited in (Urbach & Ahlemann, 2010; Wong, 2013). Fornell–Larcker method assesses discriminant validity at the construct level (Henseler et al., 2009). In this method, discriminant validity is examined by comparing the square root of AVE with correlation values between corresponding LVs. Thus a construct should have the square root of AVE greater than the correlation between any of the corresponding latent variables. Wong (2013) explained the square root of AVE should be greater than all correlation values for the construct. As shown in **Tables 8** below, all AVE values for each construct are greater than correlation values (values in bold). Therefore it confirms the existence of discriminant validity.

Table 8: AVE, Correlations and Square root of AVE's

	AVE	AW	BI	EE	FC	PE	SI	TGOV	TNET	USE	WQ
AW	0.63	0.79									
BI	0.65	0.58	0.81								
EE	0.68	0.42	0.54	0.82							
FC	0.74	0.36	0.43	0.46	0.86						
PE	0.63	0.15	0.44	0.25	0.31	0.80					
SI	0.65	0.21	0.12	0.01	-0.13	0.00	0.81				
TGOV	0.62	0.42	0.54	0.55	0.52	0.36	0.00	0.79			
TNET	0.62	0.42	0.23	0.32	0.13	0.22	0.15	0.27	0.78		
USE	0.00	0.31	0.41	0.46	0.57	0.36	0.02	0.52	0.16		
WQ	0.73	0.39	0.66	0.38	0.24	0.28	0.11	0.36	0.08	0.24	0.85

The second method to assure the existence of discriminant validity is a cross-loading method. Cross-loading is an alternative method to examine discriminant validity at an indicator level (Henseler et al., 2009). In the cross-loadings method, an indicator is expected to have the highest score for its latent variable than any other construct. Smart-PLS reports all the correlation results. Thus the highest correlation, in this case loading above 0.70 for each indicator is highlighted for display purpose.

As **Table 9** shows, the heading of the table column contains the name of the construct and the row contains items for each construct. The result (highlighted cells) indicated that most of the items load the highest to their expected construct than any other construct which confirmed discriminant validity is also achieved at the level of an indicator. Overall, it can be said that discriminant validity was assured in this study at the construct level with Fornell–Larcker method and indicators level with cross-loadings.

Table 9: Loadings and Cross-loadings for the reflective model

	AW	BI	EE	FC	PE	SI	TGOV	TNET	WQ
AW01	0.79	0.27	0.28	0.21	0.06	0.24	0.21	0.34	0.16
AW02	0.85	0.39	0.22	0.27	-0.02	0.2	0.22	0.38	0.17
AW03	0.79	0.4	0.26	0.2	0.08	0.26	0.18	0.33	0.19
AW04	0.74	0.61	0.47	0.39	0.26	0.05	0.56	0.28	0.54
BI01	0.35	0.76	0.42	0.26	0.26	0.1	0.36	0.08	0.7
BI02	0.48	0.82	0.45	0.46	0.39	0.01	0.49	0.12	0.39
BI03	0.56	0.84	0.45	0.3	0.41	0.19	0.47	0.33	0.53
EE01	0.31	0.49	0.83	0.41	0.15	-0.05	0.55	0.22	0.33
EE02	0.4	0.39	0.85	0.27	0.16	-0.01	0.39	0.28	0.29
EE04	0.34	0.45	0.79	0.45	0.29	0.08	0.4	0.29	0.31
FC01	0.28	0.33	0.4	0.87	0.33	-0.02	0.43	0.05	0.19
FC02	0.32	0.35	0.38	0.9	0.31	-0.03	0.5	0.18	0.19
FC03	0.33	0.46	0.38	0.88	0.27	-0.25	0.48	0.09	0.25
FC04	0.32	0.33	0.44	0.79	0.15	-0.14	0.37	0.13	0.18
PE01	0.1	0.35	0.25	0.27	0.81	-0.02	0.31	0.18	0.28
PE02	0.2	0.41	0.23	0.28	0.86	0.06	0.32	0.27	0.22
PE03	0.1	0.34	0.15	0.12	0.8	-0.01	0.25	0.1	0.2
PE04	0.07	0.28	0.14	0.33	0.71	-0.07	0.25	0.13	0.18
SI01	0.24	0.1	-0.03	0.06	0.08	0.86	0.04	0.18	0.06
SI02	0.04	0	-0.02	-0.2	0.06	0.71	-0.07	-0.01	-0.03
SI03	0.13	0.1	0.04	-0.28	-0.09	0.85	-0.04	0.08	0.13
TGOV01	0.37	0.5	0.49	0.45	0.31	0.04	0.85	0.25	0.29
TGOV02	0.24	0.4	0.46	0.27	0.27	-0.02	0.79	0.15	0.24
TGOV03	0.45	0.41	0.32	0.33	0.23	0.01	0.78	0.24	0.34
TGOV04	0.27	0.39	0.45	0.59	0.32	-0.06	0.72	0.18	0.27
TNET01	0.07	0.01	0.15	-0.04	0.3	0.03	0.1	0.55	-0.05
TNET02	0.27	0.09	0.22	0.1	0.17	0.06	0.22	0.74	0.08
TNET03	0.43	0.24	0.22	0.07	0.16	0.2	0.2	0.91	0.07
TNET04	0.32	0.2	0.38	0.18	0.22	0.08	0.28	0.88	0.07
WQ01	0.34	0.58	0.41	0.22	0.25	0.16	0.41	0.16	0.8
WQ02	0.39	0.62	0.33	0.21	0.22	0.07	0.29	0.12	0.93
WQ03	0.37	0.14	0.36	0.21	0.2	0.11	0.29	0.04	0.9
WQ04	0.19	0.46	0.15	0.15	0.31	0.02	0.24	-0.09	0.77

4.4.1.2 Measurement Models for Formative Model

One of the major reasons for the application of Smart-PLS in this study is its ability to deal with formative construct and its indicators. Several researchers agree formative models should be treated differently than that of a reflective model (Henseler et al., 2009; Urbach & Ahlemann, 2010; Wong, 2013). In contrast to the reflective model, in a formative model, the causal relationship is directed from the formative indicator to the LV. As a result, any change in the indicator can impact the latent variable.

A formative construct is a collective result of its indicators (Urbach & Ahlemann, 2010). Thus, indicators in a formative construct are not expected to correlate. Therefore, assessing ordinary reliability and convergent validity for an LV made of uncorrelated items is meaningless (Wong, 2013). Most commonly reported measures for formative indicator validity are outer weights and their significance through bootstrapping, construct validity, and multicollinearity (Garson, 2016; Henseler et al., 2009; Urbach & Ahlemann, 2010; Wong, 2013).

Outer Model Weights and Significance

Formative indicators validity needs to be examined to check whether a particular indicator is relevant for the construction of an LV. Henseler et al (2009), recommends a researcher should assess the validity of the formative model at the indicator and construct level. To check for indicators' significance, bootstrapping is applied in most cases. The weight of an outer model is significant at a t-value of 1.96 at a significance level of 95%. while the value of 1.65 is for a 90% significance level. Therefore, bootstrapping algorithm was run for a factor weighting scheme with no significant changes, 294 cases, and 1000 re-samples settings. As shown in **Table 10**, t-values for USE01 and USE04 except USE02 and USE03 are found to be significant. Wong (2013), recommends one should check for indicators loading before removing formative indicators. Thus a value of 10.4 and 5.04 respectively, allows them to be kept in the model.

Table 10: outer model weights with corresponding T-Values

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)
USE01 -> USE	0.38	0.36	0.17	*2.30
USE02 -> USE	0.12	0.13	0.13	**0.91(10.4)
USE03 -> USE	-0.02	-0.03	0.07	**0.33(5.04)
USE04 -> USE	0.66	0.66	0.12	**5.30

* Significance at 0.05 and ** significance at 0.001.

Construct Validity

Construct validity for the formative model can be examined through discriminant validity. Mackenzie et al. as cited in (Urbach & Ahlemann, 2010) stated the correlation between the formative and all other constructs should be less than 0.70. As shown in **Table 8**, the correlation between formative construct and other constructs in the study are much less than the recommended value and ranges from 0.02 – 0.57, which shows that the constructs differ sufficiently from one another.

Multicollinearity

Multicollinearity exists when two or more variables are inter-correlated (Garson, 2016). Variance inflation factor (VIF) or/and tolerance values are used to assess the degree of multicollinearity among formative indicators (Henseler et al., 2009). The VIF values indicate how much of an indicator's variance is explained by the other indicators of the same construct (Urbach & Ahlemann, 2010). Collinearity assessment involves using regression to compute the variance inflation factor (VIF) for each indicator in the formative model. (Wong, 2013) recommends VIF values < 5 and tolerance value > 0.2 are desirable to indicate the indicator doesn't contain redundant information. This study used the SPSS software regression method to report the variance inflation factor (VIF) and tolerance values. As it can be seen from **Table 11**, the VIF value for formative indicators ranges from 1.25-2.36 and the corresponding tolerance values for all indicators are also above 0.2, which ranges from 0.42- 0.79. Indicating no collinearity problem is found between formative indicators.

Table 11: Collinearity (VIF/Tolerance) for formative indicators

Coefficients*								
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.935	.215		9.003	.000		
	USE01	.148	.074	.162	1.998	.047	.423	2.366
	USE02	.183	.067	.218	2.729	.007	.433	2.308
	USE03	-.090	.045	-.118	1.991	.047	.795	1.257
	USE04	.175	.063	.182	2.765	.006	.639	1.566
*. Dependent Variable: BI								

Furthermore, a similar multicollinearity test was conducted for all constructs in the model. As shown in **Table 11 and 12**, VIF values of all endogenous and exogenous constructs, the result indicates no collinearity issue for all constructs in the model as their VIF value is below 5 and tolerance is well above 0.2.

*Table 12: Collinearity (VIF/Tolerance) for the inner model***

Coefficients**								
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Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.388	.204		-1.89	.059		
	PE	.195	.037	.207	5.26	.000	.762	1.31
	EE	.188	.050	.169	3.76	.000	.588	1.70
	SI	.028	.034	.030	.840	.402	.898	1.11
	FC	.041	.042	.044	.988	.324	.605	1.65
	WQ	.409	.038	.425	10.77	.000	.758	1.31
	AW	.252	.044	.243	5.77	.000	.663	1.50
	TNET	-.087	.040	-.085	-2.17	.030	.766	1.30
	TGOV	.130	.045	.132	2.90	.004	.571	1.75
**. Dependent Variable: BI								

*Table 13: Collinearity (VIF/Tolerance) for the inner model****

Coefficients***								
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.77	0.18		9.76	0.00		
	FC	0.36	0.47	0.42	7.68	0.00	0.82	1.21
	BI	0.18	0.50	0.19	3.63	0.00	0.82	1.21
***. Dependent Variable: USE								

4.4.2 Structural Model Assessment

Once a researcher successfully completed the assessment of the outer or measurement model, the next step is to evaluate the structural model, the structural model evaluation focuses on testing the relationship between research constructs. In this study, the main emphasis of structural model assessment focuses on path testing between exogenous and endogenous variables in order to make decisions about hypotheses presented earlier in **chapter 3**. In **figure 8** below, rectangular boxes, colored yellow: represent observable indicators and is part of the outer model. While, circles, colored blue are study constructs and are part of the inner model.

Determination coefficient (R^2)

The first step in PLS-SEM structural or inner model assessment is to analyze the coefficient of determination R^2 . To check how well the proposed model performed, the causal relationship between the endogenous and exogenous LVs was measured using R^2 . Chin (1998), specified three categories for R^2 value of 0.67 and above categorized as substantial, value round 0.33 as average or moderate 0.19, and below as weak. R^2 result shows how much does an endogenous variable is explained by its exogenous variable. Thus the higher R^2 values, the more desirable it is. As is shown in **figure 8** below, R^2 for behavioral intention (BI) is 0.67, while it is 0.35 for the other endogenous LV Use.

This result indicates 67% of the variance in BI is explained by eight exogenous variables included in the research model. based on Chin (1998), this result can be categorized under “substantial” or (significant) level. While two variables BI and FC explains around 35% of the variance in endogenous latent variable USE, this result can be categorized under “average” or moderate range. Generally, it can be said that the proposed model containing eight exogenous (predictor) variables performed well in explaining the variance in Behavioral Intention (BI) with R^2 of 67%, this result is very near to Venkatesh et al., (2003) study, who had found R^2 value of 70% for behavioral intention. However, the proposed model was found to moderately explain variance in user behavior with 35%.

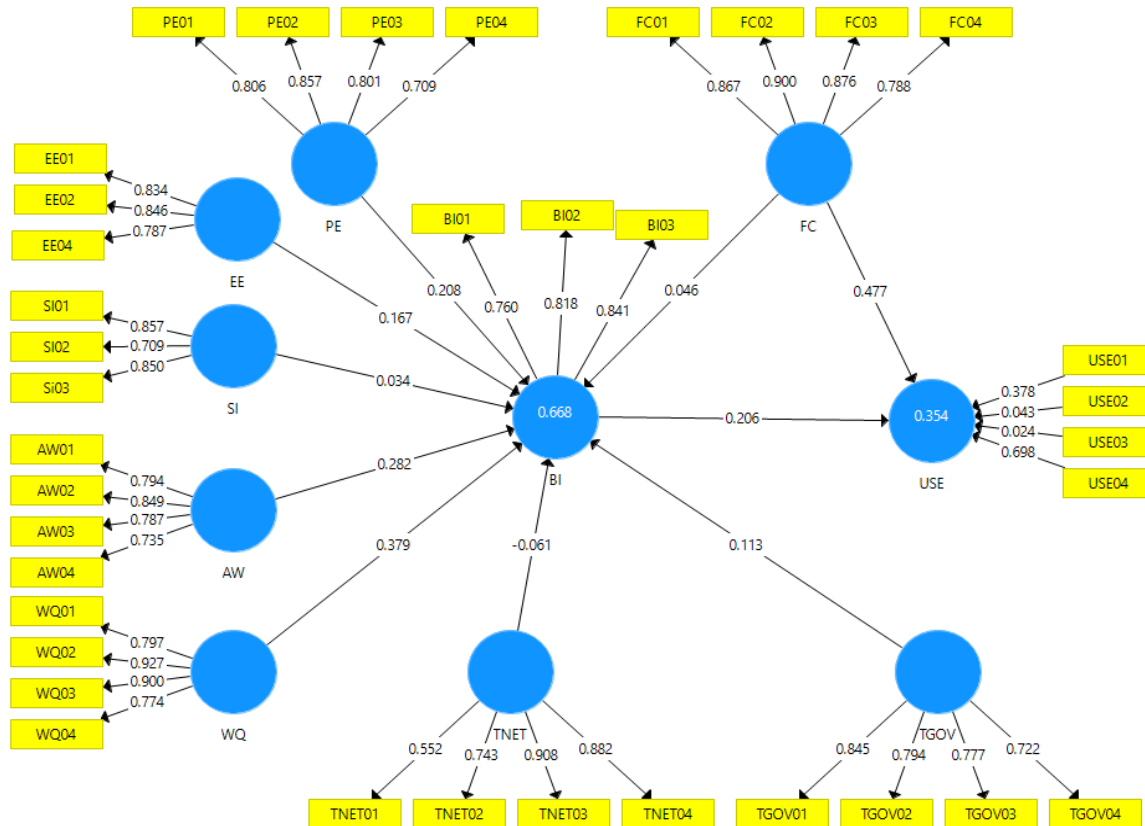


Figure 8: Structural and Measurement Model for the Proposed Research Model

Path coefficient Assessment

Estimation of path coefficient β is used to test the strength of the relationship or connection between exogenous and endogenous variables. Path coefficients of the PLS structural model can be interpreted as standardized beta coefficients of ordinary least squares regressions (Henseler et al., 2009). As Urbach & Ahlemann (2010) stated, path coefficient β result should be checked for its algebraic sign, magnitude, and significance. While the algebraic signs of path coefficient indicate the agreement between the initial theoretical assumption of the study and the actual empirical result. The magnitude of path coefficient β shows the strength of the causal relationship between variables; this value ranges between -1 to 1. A value closer to 1 shows a strong relationship between LVs, while a value closer to 0 indicates weak relation. Moreover, for the hypothesized relationships to be supported, using a two-tailed t-test with a significance result at 0.05 level, a t-value of 1.96 is acceptable (Henseler et al., 2009; Wong, 2013).

P-Value

The use of p-value for hypothesis testing has become a common approach in diverse fields. Kock (2015), confirmed use of p-value and confidence interval brings similar results for hypothesis testing. P-value is a value between 0-1 and it is employed to determine the significance of the hypothesis. An independent variable having a smaller p-value tends to more influence the dependent variable or in other words, if a variable has a larger p-value, implies lower significance but smaller p-values imply higher significance. P-value of 0.001 shows strong significance, p-values in between 0.001 – 0.01 shows moderate effect, and p-value between 0.01 – 0.05 show weaker significant effect between LVs. lastly, the p-value above 0.05 shows an insignificant effect (ElKheshin, 2016). **Table 14**, below presents hypothesis testing results based on t-statistics and path coefficient from the analysis result of bootstrapping.

Table 14: Path coefficients T-values, and hypothesis testing

Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Path coefficients	T Statistics (O/STDEV)	P Values	Hypothesis testing
AW -> BI	0.29	0.28	0.04	0.28	7.38	0.000	Supported
BI -> USE	0.23	0.23	0.07	0.21	3.30	0.001	Supported
EE -> BI	0.17	0.16	0.04	0.17	4.05	0.000	Supported
FC -> BI	0.04	0.05	0.05	0.05	0.87	0.384	Not supported
FC -> USE	0.46	0.47	0.07	0.48	6.29	0.000	Supported
PE -> BI	0.21	0.21	0.05	0.21	4.41	0.000	Supported
SI -> BI	0.03	0.04	0.04	0.03	0.80	0.423	Not supported
TGOV -> BI	0.12	0.12	0.05	0.11	2.46	0.04	Supported
TNET -> BI	-0.06	-0.05	0.05	-0.06	1.28	0.202	Not supported
WQ -> BI	0.37	0.37	0.04	0.38	9.18	0.000	supported

PE -> BI

Performance expectancy is defined as “*the degree to which the customer believes that using e-government services will help him or her to facilitate communication with the government in terms of benefits such as: saving time and money, improving the quality of government services, and increasing the equity between all citizens*” (Alshehri et al., 2012). In the survey questionnaire, PE was represented through four inquiries focused on customers' opinion regarding the usefulness of the Ethiopian national e-services portal to save time, money, and increase the overall productivity of the customer.

H1: Performance Expectancy will have a positive influence on customers' behavioral intention to use e-government services.

The validity of the first hypothesis has been supported with ($\beta=0.21$, $p<0.001$). Accordingly, customers' behavioral intention to use and adopt e-government services increases whenever they perceive that online government services are useful to perform effective and efficient interaction with the government. Thus, a customer who experiences the benefits associated with the adoption of e-government services such as: saving time, money, and effort as well as quality service, favors the use of online services than traditional communication. The analysis result supports the proposed hypothesis and proved that performance expectancy is influential factor in customers' behavioral intention to adopt e-government services.

This result is consistent with previous local research by Adefris (2018) and international studies including Venkatesh et al., (2003), an empirical study by Mansoori (2017), Alshehri (2012), Alsaif (2013), and Talib et al., (2013) in Iraq. Moreover, Wang et al., (2005) found out an e-government portal that can save customers money and time and energy positively influence adoption.

EE -> BI

Effort expectancy is “*the degree of ease associated with the use of the system*” (Venkatesh et al., 2003). In the survey questionnaire, effort expectancy was represented with four items having the concept of ease of use, learnability, and related concept of the national e-services portal.

H2: Effort Expectancy will have a positive influence on customers' behavioral intention to use e-government services.

The validity of the second hypothesis was supported with ($\beta=0.17$, $p<0.001$). The result indicates, if customers perceive that e-government services such as the national e-services portal are userfriendly and less complex, motivates customers' behavioral intention to adopt e-government. This result is in agreement with Venkatesh et al., (2003) finding that effort expectancy variable has a positive and significant relationship with an individual's behavioral intention to use technology. Similarly, (Gupta & Bhaskar, 2016; Mutawa, 2013) reported a lack of user-friendliness is a major issue for low-level adoption of e-government websites. Carter & Bélanger (2005) showed that perceived ease of use, which is one of the elements of effort expectancy construct in UTAUT was the significant determinant of intention. Another study on the evaluation of e-government services quality in Nigeria by Hien (2014) indicated perceived ease of use as an important dimension for the adoption of public e-services.

SI -> BI

The social influence (SI) construct in this study is defined as “*the degree to which an individual perceives that important others believe he or she should use e-government services*” (Venkatesh et al., 2003). Unlike other constructs in this study, social influence was represented by three questions on customers' opinions towards the influence of their family, friends, and work colleagues' to use e-government services.

H3: Social influence will have a positive influence on customers' behavioral intention to use e-government services.

The empirical result of the third hypothesis was not supported by ($\beta=0.03$, $p>0.05$). The result shows that customers in Ethiopia are not influenced by their social interaction with their family, friends, and colleagues. One possible explanation for this result could go in accordance with Mansoori (2017) justification that the adoption of e-government services in the Ethiopian customers is not at a high enough level that could allow information regarding the benefits and advantages of e-government services to be diffused from e-government adopter to non-adopter.

Moreover, another explanation could be the respondents' educational background. As indicated in **Table 4** above, more than 80% of respondents possess either bachelor's, masters, or more degree. Related justification can also found in Desta (2018) work that explains users of e-government systems might rely on the characteristics of the system such as usefulness or ease of use than their family, friends, and/or colleagues influence.

Adefris (2018) found similar results on customers of ERCA online services. Talib et al., (2013) also confirmed social influence does not affect customers' intention to use e-government services. Moreover (Alshehri, Drew, & Alfarraj, 2012) reported social influence was found to be non-significant to predict customers BI,

FC -> BI and FC -> USE

Facilitating condition is defined as “*the degree to which an individual believes that organizational, governmental assistance and technical infrastructure exists to support the use of e-government services*” (Venkatesh et al., 2003). In the context of this study, customers' perception of facilitating condition construct was measured through four inquiries focused on the customers' ability to access online government services, the availability of technical staff to serve customers' needs, and the accessibility of necessary resources. In the proposed model, facilitating condition is modeled to have two relations with two dependent variables behavioral intention and use of e-government.

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

The statistical analysis result ($\beta=0.05$, $p>0.05$) revealed that there is no significant relationship between FC and BI. A similar result was reported by Venkatesh et al., (2003) that facilitating conditions was not a significant determinant of customers' behavioral intention. As a justification, he indicated the ease of use of technology reduced the need for help and assistance from others. In this study, most of the respondents are educated and are able to use modern technology. Thus, these reasons could reduce their intention to request support from governments staffs. Also (Samsudeen, 2013), confirmed the relationship between FC and BI was not significant in his study in Sri Lanka.

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

For the second hypothesis, the study confirmed facilitating condition is the strongest significant determinant of customer's use behavior with ($\beta=0.48$, $p<0.001$). The influence of facilitating condition construct is found to be stronger than any other construct in the study. The result indicates the availability of facilitating condition ssuch as the accessibility of necessary resources, an essential skill, and the availability of assistance from the government strongly

encourage customers to use and adopt e-government services. Similar findings are found in Alsaif (2013), Adefris (2018), and Venkatesh et al., (2003) work indicated e-government adoption is highly influenced by the availability of resources, skill, and other infrastructure, technical, and technological facilitating conditions.

WQ -> BI

Web quality is “*the user’s evaluation of a website’s features that meets the user’s needs and reflects the overall excellence of the website*” (Aladwani& Palvia, 2002). The website quality variable is added to the original UTAUT model to understand its influence on Ethiopian customer’s behavioral intention to adopt government services. Four website quality characteristics including appearance, availability, information, and content quality and design are used to measure website quality construct in the survey questionnaire.

H6: Website quality will have a positive influence on behavioral intention to use e-government services.

Smart-PLS result confirmed website quality is the first major significant construct that influences Ethiopian customers' behavioral intention to adopt e-government services with ($\beta=0.38$, $p<0.001$). In this study, website quality is found to be the first strongest predictor of behavioral intention and its impact is greater than any other construct in the proposed model except for the facilitating condition construct. Study by Zeleke (2018), reported government websites in Ethiopia lacks attractive appearance, and most of e-government portals content needs regular updates. Adefris (2018), provides evidence for a positive and significant relationship between website quality and customers' behavioral intention. Moreover, Alshehri et al. (2012) also supported website quality plays an important role in the acceptance and adoption of e-government services in Saudi Arabia.

AW-> BI

The Awareness construct is defined as “*the degree to which users are aware of e-government services and its potential*” (Alghamdi, 2016). Customers' satisfaction from utilizing e-government, the government effort to make customers aware of e-government and its services and related matters are contained within the survey questionnaire.

H7: Awareness will have a positive influence on behavioral intention to use e-government services.

The validity of hypothesis testing using Smart-PLS shows that awareness construct is one of the strongest determinant of e-government services adoption with ($\beta=0.28$, $p<0.001$). This result suggests, once customers become aware of e-government, its potential, and the benefits of using online government services, there is a higher chance of adopting e-government and its services. Alshehri (2012) suggests, awareness programs area foundation stone for the successful use of online government services. (Adefris, 2018) confirmed, adoption of e-government services is highly influenced by awareness construct.

TGOV-> BI

Trust in government refers to “*the integrity and competence of the government department and agencies perceived by customers*”(Al-khattab, 2015). Trust in government construct were represented by four items that cover the government’s trustworthiness and competency in carrying out online transactions faithfully.

H8: Trust in government will have a positive and significant influence on customers’ behavioral intention to use e-government services.

The statistical analysis of trust in government-related questions revealed a positive and significant result with ($\beta=0.11$, $p<0.05$). Grounded on customers’ responses, customers who believe that the government department can meet their needs in online services, as well as the trustworthiness of the government to keep their best interest are more likely to adopt online government services. Gupta & Bhaskar (2016) find out Indians are influenced by trust in government construct from their study on e-government services adoption in India. Similarly, (Alghamdi, 2016b; Alsaif, 2013; ElKheshin, 2016; Mansoori, 2017) also confirmed trust in the government to be an influential factor in customers' behavioral intention in their particular countries.

TNET-> BI

Trust in the internet refers to “*an individual’s perceptions of the institutional environment, including the parameters and directives that make an environment feel safe to share their personal information and documents* (Mc Knight, 2002). Trust in internet construct was

represented by four items that portray the concept on how customers believe that technological, legal infrastructure, encryption, and other more advanced techniques can protect their privacy from problems on the internet.

H9: Trust in the internet will have a positive and significant influence on customers' behavioral intention to use e-government services.

The statistical analysis result exposed trust in the internet doesn't influence customers' behavioral intention with ($\beta = -0.06$, $p > 0.05$). The negative path coefficient result clash with the initial research assumption where trust in the internet and behavioral intention has a positive and significant relationship. Even if some studies revealed trust in the internet to be an influential variable in e-government adoption, in this study, both path analysis and t-value are not strong enough to support the research hypothesis.

Similar findings by Carter & Belanger (2004) can be used as a possible justification for the result. Currently, most of the online government services provided by the Ethiopian government are tasks related to issuance, renewal, and application for individual competency certificates, value-added services, and related tasks, these activities can be completed regardless of the level of trust the customers have on the government.

BI-> USE

Behavioral intention (BI) refers to “a person's subjective probability that he/she will perform some behavior” (Fishbein & Icek, 1975). In UTAUT model validation, Venkatesh et al., (2003), discovered behavioral intention is a determinant of user behavior. In the current study, unlike other constructs behavioral intention was measured with three questions that capture customers' decision to utilize the e-services portal based on their previous interaction.

H10: Behavioral intention will have a significant positive influence on the use of e-government services.

Smart-PLS statistical analysis indicated behavioral intention construct predicts the use of e-government services with ($\beta = 0.21$, $p > 0.001$). A Ph.D. dissertation by Mansoori (2017) confirmed the same result with the current study. Based on the analysis result, if customers had previous experience with the national e-services portal, it implies that the customer has a higher chance to perform future transactions utilizing e-services.

Adjusted R², Effect size (f²), and Q-square effect (Q²)

Even if the predictor variable may have an irrelevant correlation with an endogenous latent variable, adding a predictor exogenous variable might tend to increase the prediction ability of the proposed model. Therefore, Garson(2016) suggested adjusted R² can be used to correct such bias.

As previously described, the coefficient of determination R² value 0.668 was found by eight variables that have a direct impact on BI and 0.354 for use construct found from two constructs BI and FC. However, the adjusted R² for behavioral intention and use behavior is 0.658 and 0.349 respectively, which doesn't show a significant change from the original R² values.

One method to assess the accuracy of the predictive model is Chone's f². The effect size f² is calculated as the increase in R² relative to the proportion of variance of the endogenous latent variable that remains unexplained. The f² value of 0.02 is categorized as a small effect, 0.15 as moderate, and over 0.35 as a strong effect (Henseler et al., 2009, Cohen, 2998). The result shown in **Table 15** below, the effect size f² values ranged from lowest 0.00 to highest 0.31, these can be categorized from small to strong effect. Therefore, it can be concluded that dropping WQ and FC variables from the model could bring significant change.

Table 15: Effect Size for individual exogenous LVs change on endogenous LVs

Omitting exogenous LV	Original R ² value		New R ² value		Effect size f ²	
	BI	USE	BI	USE	BI	USE
AW	0.67	0.35	0.62	0.35	0.14	0.00
EE	0.67	0.35	0.65	0.35	0.05	0.00
FC	0.67	0.35	0.67	0.20	0.00	0.29
PE	0.67	0.35	0.64	0.35	0.10	0.00
SI	0.67	0.35	0.67	0.35	0.00	0.00
TGOV	0.67	0.35	0.66	0.35	0.02	0.00
TNET	0.67	0.35	0.67	0.35	0.01	0.00
WQ	0.67	0.35	0.57	0.35	0.31	0.00

Another means to examine the accuracy of the predictive model is to use Stone-Geisser's Q^2 (Sarstedt et al., 2017). Stone-Geisser's Q^2 omits single points in the data matrix, imputes the omitted elements, and estimates the model parameters using the blindfolding algorithm. The process also continues until each data point is omitted and the model is re-estimated. An omission distance of D from 5 to 10 is recommended (Akter & Ray, 2011; Sarstedt et al., 2017).

In PLS, models predictive relevance Q^2 can be calculated in two ways: cross-validated communality and cross-validated redundancy. However, (Akter & Ray, 2011) recommend the use of cross-validated redundancy for large models. Therefore, after running the blindfolding algorithm with cross-validated redundancy and an arbitrary setting of omission distance 9, Q^2 has been found 0.42 degree of predictive relevance regarding the endogenous LV BI. (Sarstedt et al., 2017), indicating a value of Q^2 larger than zero for a particular endogenous construct indicates that the path model's predictive accuracy is acceptable for this particular construct.

4.5 Refined Study Model

As it can be seen from the findings of hypothesis testing above, behavioral intention is dependent on performance expectancy, effort expectancy, behavioral intention, and facilitating condition from the original UTAUT model and trust in the government, website quality, and awareness constructs from the proposed model. However, social influence, facilitating condition, and trust in the internet variables were found to not influence Ethiopian customers' behavioral intention to use e-government. The actual use of the e-government services construct is confirmed to be influenced by both behavioral intention and facilitating condition.

The new refined model consists of a relationship between seven LVs: PE with BI, EE with BI, TGOV with BI, WQ with BI, AW with BI, FC with Use, and BI with Use are kept in the refined study model.

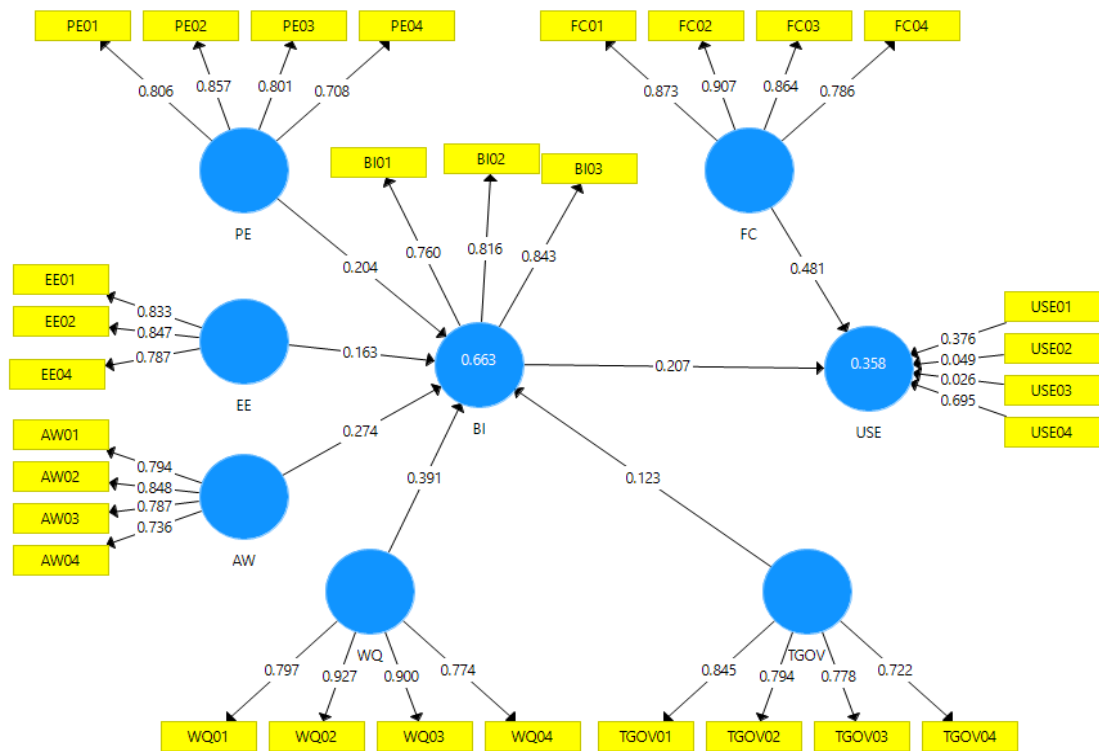


Figure 9: Refined Research Model

Chapter Five

V. Conclusion and Recommendations

Introduction

In the previous chapter, **chapter 4** accomplished the analysis phase and identified the main factors that influence customers' behavioral intention and use behavior to adopt e-government services in Ethiopia. This final chapter, **chapter 5**, summarizes the overall finding of the study along with study recommendations. The first section of this chapter presents a review of the overall findings of the study, followed by answers to the research questions presented earlier in **chapter 1**. Then, recommendations based on research findings are briefly discussed, next, the study's theoretical and practical contribution follows and finally, limitations of the study together with future research areas in e-government are discussed.

5.1 Overview of the Study

The Ethiopian government introduced e-government by 2010. Ethiopian customers have been part of this opportunity for some years now. However, it is not reached to the point where customers are satisfied with the current national e-services portal. Thus, this study identified factors that influence customers' adoption of the national e-services portal.

Even if the first initial efforts were made in 2013 by launching 49 e-services, by the end of 1st phase implementation plan period 125 informational and 152 transactional e-services were developed for some of the country ministries, agencies, and other governmental offices (FDRE, 2016). However, currently, customers' participation in adopting these services is reported below. Therefore, this study aimed to identify and discuss the main factors that influence customers' intention to adopt public electronic services.

Extant works of the literature revealed lack of awareness about the services, computer literacy, culture, digital divide, demographic factors, website design, service quality, language, and security issues are among the main inhibiting factors identified and investigated to influence customers' adoption of e-government services (Carter & Belanger, 2003; ElKheshin, 2016; Mansoori, 2017; Talib, Imarah, Abdulameer, Zwain, & Al-hakim, 2013b). Generally, studies on e-government implementation, adoption, and success are few in Ethiopia. The study was able to

get only one study by (Adefris, 2018), where he studied e-government adoption on Ethiopian custom and revenue authority large taxpayers customers.

The current study adopted, modified, and tested a conceptual model for the adoption of e-government services mainly based on UTAUT constructs and other adoption factors briefly described in previous chapters (**chapters 2 and 3**). The conceptual model consists of (PE), effort expectancy (EE), social influence (SI), facilitating condition (FC), and behavioral intention (BI) from the UTAUT model. Additional four constructs are added based on a detailed study of literature on e-government areas which are website quality (WQ), awareness (AW), trust in the internet (TNET), and trust in government (TGOV).

The choices that are made for survey research design were related to the study's aim to find out factors influencing the adoption of e-government services from a vast amount of customers to develop a conceptual model consisting of influential variables. Thus, to achieve the aim of the research, the study employed a quantitative method based on survey design. Overall, 400 questionnaires were distributed and 316 usable responses were returned. While 22 were discarded from further analysis due to (1) questionnaire consisting of the same answer for all questions and (2) Responses having a missing value that exceeded 15%.

Detailed analysis of both the demographic and structural model was also conducted and reported in **chapter 4**. In the case of demographic analysis, SPSS version 20 was used to report the analysis. The result shows, more males are engaged in e-government than females do in Ethiopia. Most of the e-government adopters are aged from 30 to 49 from the total population. Research participants reported the majority of them have a minimum of a bachelor's degree. For hypothesis testing, Smart-PLS was employed. In this study, an evaluation of the proposed model was conducted using structural and measurement model assessment. For the measurement model, the reliability of the study was assessed through composite reliability and Cronbach's alpha, the result for all constructs is above the recommended value 0.7. Construct validity is assured through the assessment of both convergent and discriminant validity, most of these values are all above the recommended value 0.5. Additionally, the research encountered no multicollinearity problem.

The hypothesis presented in **chapter 3** were tested if they are either supported or rejected by customers' responses. Therefore, from a total of 10 hypotheses, 7 were confirmed to be

significant to predict e-government adoption. performance expectancy, effort expectancy, facilitating condition, awareness, website quality, and trust in the government determines customers' behavioral intention to use e-government. Whereas, from two constructs that are hypothesized to influence customers use behavior, both facilitating condition and behavioral intention were confirmed to determine adoption. The proposed model predicting power was tested through the coefficient of determination R^2 . The proposed model has a strong influence in predicting customers' behavioral intentions with 67%, whereas the model moderately explains the change in use behavior (USE) with 35%.

Therefore, a refined model consisting of seven constructs performance expectancy, effort expectancy, facilitating condition, awareness, website quality, trust in government, and behavioral intention was used as a final model to explain factors that influence Ethiopian customers' behavioral intention and use behavior to adopt e-government services.

Here is the finallist of the supported hypothesis:

H1: PE has a positive influence on Ethiopian customers' behavioral intention to use e-government services.

H2: EE has a positive influence on Ethiopian customers' behavioral intention to use e-government services.

H3: FC has a positive influence on Ethiopian customers use behavior.

H4: TGOV has a positive influence on Ethiopian customers' behavioral intention to use e-government services.

H5: AW has a positive influence on Ethiopian customers' behavioral intention to use e-government services

H6: WQ has a positive influence on Ethiopian customers' behavioral intention to use e-government services

H7:BI has a positive influence on Ethiopian customers use behavior.

Here are the final lists of the hypothesis that ar not supported.

H8: SI has a positive influence on Ethiopian customer's behavioral intention to adopt e-government services.

H9: FC has a positive influence on Ethiopian customers' behavioral intention to use e-government services. and

H10: TNET has a positive influence on Ethiopian customers' behavioral intention to use e-government services

Out of 10 hypotheses, only 3 hypotheses were not supported by the study finding. These relationships were removed from the refined model. Generally, even if the current study assessed customers' opinions through 3 governmental offices due to the similar nature of the services, the study believes, findings of this research are likely to represent other customers from other Ethiopian government offices which are not directly included in this study.

5.2 Discussion and Answering the Research Questions

1. Why are online e-government services less adopted by customers in Ethiopia?

Initially, the study basis its assumption on low-level responses to the established electronic government services. The national e-services portal is one of the e-government services, which is designed to provide a common platform and generic tools for online transactional services from government departments to citizens, non-citizens, businesses, and governmental and non-governmental organizations. To identify factors that could influence customers' intention, this study reviewed several works of literature and studies conducted in local, regional, and international contexts.

Theories and models have long been developed to identify factors that cause users to adopt different types of technologies. These models include a DOI (Diffusion of Innovation) which was developed by (Rogers, 1962), TPB (Theory of Planned Behaviour) model by (Ajzen, 1991), TAM (Technology Acceptance Model) by (Davis, 1989), and UTAUT¹ &2 (Unified Theory of Acceptance and Use of Technology) by Venkatesh et al., (2003) & (2012)

According to Venkatesh et al., (2003), the unified theory of acceptance and use of technology (UTAUT) was found to explain around 70% of the variance in behavioral intention and the model explains 53% of the variance in usage behavior. As well as, the adjusted R² result of the model implied, the model explains 69% of the variance in behavioral intention. This makes the UTAUT model have high explanatory power in predicting the variance of both behavioral intention and usage behavior more than any other model. Also, UTAUT is the most recent model,

as the time of its development was in 2003, the modified version of this model was then formed in 2012.

This model consists of 4 determinants of behavioral intention namely, performance expectancy, effort expectancy, social influence, and facilitating condition. 2 determinants of usage behavioral intention and facilitating condition as well as four moderators gender, age, experience, and voluntariness. However, in recent years, researchers began to add some variables to the original model due to several reasons. One of these causes can be the nature of the technology being studied, in services such as e-government services, trust in the services provider (trust in government), trust in the medium of communication (trust in the internet), quality of services provided through website or web portal (website quality) and awareness about the services provided online (awareness) are important aspects. Thus, are added to the original UTAUT model to examine influential factors in customers' intention to use e-government services. Researchers who included and later confirmed the influence of some of these variables in their study model includes (Alghamdi, 2016; Alsaif, 2013; Carter & Bélanger, 2005; ElKheshin, 2016; Mansoori, 2017, Alsheri et al.2012).

The analysis result from Smart-PLS support modified UTAUT produces that performance expectancy (PE), effort expectancy (EE), facilitating condition (FC), trust in government (TGOV), awareness (AW), and website quality (WQ) are influential factors in e-government adoption in Ethiopia. Besides, the finding revealed social influence and facilitating condition doesn't necessarily influence customers' behavioral intention. Thus, it can be concluded that lack of human, telecom infrastructure and technical support from the government, the web portal that disregards many website quality features, lack of customers knowledge on e-government and its services, lack of competence in providing online services by the government are found to be the reasons why Ethiopian customers less use established online services in Ethiopia.

Out of eight exogenous LVs, facilitating conditions, website quality, and awareness are found to influence the customer's behavioral intention to adopt e-government services more than any other construct in the study. Moreover, it is found that behavioral intention and facilitating condition construct has a significant and positive relationship with the use of e-government services. The results of this study revealed that the research model explained 67% of the variance

in customers' behavioral intention and explained 35% of the variance in the use of e-government services.

2. How can the findings of this study assist the Ethiopian government to enhance customers' adoption of e-government in Ethiopia?

The list of recommendations in the following section has detail on how the finding of this study could help the Ethiopian government to have a clear picture of what and how to improve the rate of adoption. Further, it will contribute to the successful implementation of e-government.

5.3 Recommendation for Ethiopian Government

1. Recommendations related to Performance expectancy

Currently, most of the implemented e-services are partially electronic. Thus, most customers need multiple visits to government offices to complete their transactions. Moreover, in some cases, customers need to travel to the capital city Addis Ababa to get information and services from other regional areas.

This study recommends the Ethiopian government:

- To provide online government services that are delivered fast by reducing unnecessary procedures that are needed to complete a single transaction.
- To implement an e-services delivery framework that is completely electronic and needs no personal visit to government offices.
- Currently, the national e-services portal lacks an online payment option. therefore, to make customers satisfied with what the government offers, the government should update the design of the current national e-services portal to have an online payment option.

2. Recommendation related to Effort expectancy

Ease of use or less complexity is the desired feature in website design. Therefore, one of the practical recommendations from this study to the Ethiopian government is to update the design of the current national e-services portal to include videos, images, and texts which can help users of the system to easily utilize the national e-services portal and related systems.

3. Recommendation related to Facilitating condition

Reliable, fast, and affordable internet connection is an important facilitating condition that can arouse customers' intention to engage in an electronic environment. These days, there is an improvement in the internet service provided by ethio-telecom. However, it is difficult to conclude the users are satisfied with the quality of service. Therefore, the government of Ethiopia shall solve such kinds of problems by allowing other service providers to join the untouched market. As a country where more than half of its population is illiterate, it's beneficial to have an appointed customer service officer that is well educated and trained to handle customers' requests whenever customers face difficulty.

4. Recommendation related to Website quality

The government of Ethiopia needs to make the national e-services portal and other related services reliable, available, and secure systems. To make this, the architecture of the national data center requires enhancement including aspects related to scalability, reliability, and security.

The current portal Help and Support feature needs enhancement. Many indicated the availability of chat room features on the government portal is of greatest help to assist customers in difficulty during application for services. Therefore, the Ethiopian government should make the current national e-services portal interactive by adding online chat room features. Further, a document containing instructions on how to apply for services should be placed in a place easily visible for customers to avoid customers' confusion and frustration.

The design of the national e-services portal currently allows the customer to fill their information using one full form. The current design shall be improved from one full form to wizards due to wizards' simplicity for users to input their information and documents easily. Additionally, the Ethiopian national e-services web portal lacks multiple language options. It presents the contents in two languages in Amharic, which is the country's official working language, and in English. The portal content should also need to be presented using two or more other mostly spoken local languages such as Afan Oromo and Tigrigna.

5. Recommendation related to Awareness

During the first e-government implementation plan, the Ethiopian government intended around 70% of its citizens to be aware of e-government. However, the lack of public awareness is identified as one of the reasons for the low-level adoption of e-services in Ethiopia. For future

implementation, this issue needs to be addressed by enabling customers to be informed about e-government, e-services, and their benefits and advantages through public awareness programs. The Ethiopian government owns several reachable media such as television, radios and newspapers, and social media channels. Therefore, public awareness campaigns can be done using various communication platforms including newspapers, magazines, television, radio programs, and social media.

Furthermore, mobile penetration has reached more than 60% in the country. The Ethiopian government can also take this opportunity to enable its ministries and agencies to send short code messages to inform the public about the services these organizations provide and the benefits of using the system, to promote the use of established e-services to the public. Moreover, Even though initial promotion and advertisement were done during the launching of e-services back in 2013, continual promotion is highly required to draw customer's attention towards online government services.

6. Recommendation related to Trust in government

Different departments of the Ethiopian government need to work hard on organizational culture to possess the ability to provide customers with effective and efficient online services. To do so, government employees' ability to offer customers quality services should be improved through offering different workshops, seminars, and other self-development training programs to get the technical skills necessary to execute and secure e-government systems. Lastly, the government of Ethiopia should establish transactions that are free from risks and protect customers' information and documents privacy through the application of data security and privacy law and regulations.

5.4 Research Contributions

This study is an important step in identifying, examining, and discussing factors influencing the adoption of e-government services from Ethiopian customers' perspective. This section discusses research contribution into two parts: theoretical contribution and practical contribution.

5.4.1 Theoretical Contributions

- One of the study theoretical contributions of this study is a critical review that is presented in **chapter 2**. This study provided a broad review of the concept of e-

government, e-services, benefits, and challenges as well as detailed information one-government initiatives and its improvement that have been made so far in Ethiopia.

- E-government is a relatively new concept. This kind of studies helps the current gap in the literature on the evolving field of online public services, e-government and e-government adoption in Ethiopia.
- Further, one of the most important contributions of this study is that it empirically examined the proposed research model modified UTAUT through the application of the Smart-PLS technique. From the hypothesis testing section, it has been found out constructs that were added on original UTAUT model awareness, website quality, and trust in government found to be significant influencers of adoption of e-government services from consumers' perspective.
- Finally, the UTAUT model was validated in a new type of technology (e-services), in a country like Ethiopia with different populations.

5.4.2 Practical Contributions

- Thus one of the practical contributions of this study is to contribute to the current body of knowledge one-government adoption in Ethiopia by focusing on customers' points of view.
- The revised e-government services adoption model can be used as a useful document for government and policymakers to improve customers' participation in already established online services and to be developed in the future for achieving successful e-government.
- This study provided some useful recommendation that needs to be improved to enhance customers to adopt online e-government services for different Ethiopian government departments, ministries, and agencies.

5.5 Recommendations for Future Research

Ethiopia is relatively new to e-government implementation and adoption. While conducting this study; there is a lack of studies regarding e-government as a whole. Thus, different areas of Ethiopian e-government implementation, adoption, challenges, and opportunities, etc. need to be explored deeply in future researches. Some areas that needed further work includes

Population: This study included only customers of three government ministries and agencies but the study recommends future research to explore other government department customers' opinions on factors influencing the adoption of online services.

Methodology: This study suggests future study to use qualitative method to add further insight in to Ethiopian e-government area.

The current study doesn't include moderate factors influence in the UTAUT model. Therefore, future research can address the impact of age, gender, educational level, and experience variables.

The present study only focused on the adoption of e-government services from the customers' perspectives. However, e-government adoption in Ethiopia also needs to be further studied from the government perspective.

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Appendices

Appendix i. Letter of Approval from Federal Transport Authority

አዲስ አበባ ዩኒቨርሲቲ
የተፈጥሮ ሳይንስ ኮሌጅ
የኢንፎርሜሽን ሳይንስ ት/ቤት



ADDIS ABABA UNIVERSITY
College of Natural Science
School of Information Science

Date: - March 05, 2019
Ref: - SIS/41/2019/11

To whom it may Concern

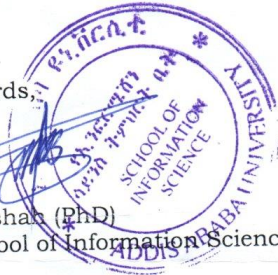
Dear Sir/Madam,

Student Bethelhem Feyisa (ID.No GSR/0328/10) is a graduate student at the School of Information Science, Addis Ababa University. She is currently conducting a MSc. Thesis research under the title "Adoption of E-Government Services in Ethiopia: Consumers Perspective".

I would like to thank you in advanced for all the assistance that you would provide to the student.

With Regards,


Tibebe Beshah (PhD)
Head, School of Information Science



Ato Tewdros
Please provide all the necessary information for the fulfillment of the thesis



☎: 1176

☎: +251-(11)-122-91-91

Appendix ii. Letter of Approval from the Ministry of Water and Irrigation

ADDIS ABABA UNIVERSITY
College of Natural Science
School of Information Science

ወ/ሮ ሰላሳ አብነት
የተረፎ ሳይንስ ኮሌጅ
የኢንፎርሜሽን ሳይንስ ትምህርት

Logo of Addis Ababa University

Date: - March 08, 2019
Ref: - SIS/41/2019/11

To whom it may Concern

Dear Sir/Madam,

Student Bebelberm Feyisa (ID.No 088/0328/10) is a graduate student at the School of Information Science, Addis Ababa University. She is currently conducting a MSc. Thesis research under the title "Adoption of E-Government Services in Ethiopia: Consumers Perspective".

I would like to thank you in advanced for all the assistance that you would provide to the student.

With Regards,

Tibebu Bekele (PhD)
Head, School of Information Science

PR & Comm. Direct
For your kind Corp.
Tibebu

Stamp: SCHOOL OF INFORMATION SCIENCE, ADDIS ABABA UNIVERSITY

Handwritten notes and stamps:

- 18/2/19
- 112
- 61
- Atto Asake & Partners
- Please provide the necessary assistance
- 18/2/19

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Appendix iii. Survey Questionnaire in English

#	Performance Expectancy	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Using e-Services enables me to access government services					
2	Using e-Services enables me to get government services more quickly.					
3	If I use e-Services, I will increase my ability to get government services					
4	Overall, using e-Services portal would increase my overall productivity.					
	Effort Expectancy	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
5	By using the e-Services portal I am able to obtain government services more easily.					
6	Learning to use e-Services portal is easy.					
7	My interaction with e-Services portal is clear and understandable.					
8	Overall, I found e-Services portal easy to use.					
	Social Influence	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
9	My family and friends think that I should use e-Government services to get government services					
10	I will use e-Government services if the people who are important to me used it					

11	Overall, people who influence my behavior think I should use the e-Government Services					
	Facilitating Condition	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
12	I have the resources necessary to use e-Services portal					
13	I have the knowledge necessary to use e-Services portal					
14	I can get help from others when I have difficulties using e-Services portal					
15	There is a specific person or team available for help and assistance whenever I encounter technical difficulty while using e-Services					
	Behavioral Intention	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
16	I intend to continue using e-Services portal to get government services in the future					
17	I will always try to use e-Services portal to get government services.					
18	Overall, I plan to continue using e- Services portal					
	Trust of the Internet	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
19	The Internet has enough safeguards to make me feel comfortable to use e-Services.					
20	I feel assured that legal and technological structures adequately protect me from problems					

	on the Internet.					
21	I feel secure to send personal information and documents over e-Services portal.					
22	Overall, the Internet is robust and safe to use e-Government services.					
	Trust of the Government	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
23	I believe that government departments have the ability to meet citizens needs in regards to e-Government services					
24	The government can be trusted to carryout faithful online interaction					
25	I am confident that the forms I submit through e-Services portal will be processed and not ignored					
26	Overall. I trust the government					
	Website Quality	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
27	e-Services portal looks attractive and use fonts and colors properly					
28	e-Services portal contains important content about the services provided					
29	e-Services portal has multiple language options					
30	Overall, e-Services portal is always working and do not crush					
	Awareness	Strongly	Disagree	Neutral	Agree	Strongly

		disagree				agree
31	I have a good knowledge of e-Government services and their benefits					
32	The customers received training from their government to make the best use of e-Government services					
33	Offering workshops and visual presentations about e-Government would encourage me to attend and know more					
34	Overall, I am satisfied with the current awareness campaigns and advertisement about e-Government and its services					
	Use behavior of E-Government Services	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
35	I want to use e-Government services to perform my government requests					
36	I frequently use e-Government services					
37	I use e-Government services regularly					
38	Overall, most of my government requests are done through e-Government services					

Appendix iv. Survey questionnaire in Amharic

#	በውጤታማነት ረገድ	በፍጹም አልስማማም	አልስማማም	ለመወሰን እችላለሁ	እስማማለሁ	በጣም እስማማለሁ
1	ኢ-ሰርቪስ ድረ-ገጽን መጠቀም የመንግስት አገልግሎቶችን ለማግኘት ይረዳኛል።					
2	ኢ-ሰርቪስ ድረ-ገጽን መጠቀም የመንግስት አገልግሎቶችን በፍጥነት ለማግኘት ይረዳኛል					
3	ኢ-ሰርቪስ ድረ-ገጽን መጠቀም የመንግስት አገልግሎቶችን የማግኘት እድል ይጨምርልኛል።					
4	በአጠቃላይ፣ ኢ-ሰርቪስ ድረ-ገጽን መጠቀም አጠቃላይ ውጤታማነቴ እንዲጨምር ያደርጋል።					
	በጥረት ረገድ	በፍጹም አልስማማም	አልስማማም	ለመወሰን እችላለሁ	እስማማለሁ	በጣም እስማማለሁ
5	ኢ-ሰርቪስ ድረ-ገጽን መጠቀም በመንግስት ተቋማት የሚሰጡ አገልግሎቶችን በቀላሉ እንዳገኝ ይረዳኛል።					
6	ኢ-ሰርቪስ ድረ-ገጽን መጠቀም ቀላል ነው። :					
7	ኢ-ሰርቪስ ድረ-ገጽ አጠቃቀም ግልጽ እና ለመረዳት የሚቻል ነው።					
8	በአጠቃላይ፣ ኢ-ሰርቪስ ድረ-ገጽን ለመጠቀም ቀላል ሆኖ አግኝቼዋለሁ።					
	የማህበረሰብ ተጽእኖ	በፍጹም አልስማማም	አልስማማም	ለመወሰን እችላለሁ	እስማማለሁ	በጣም እስማማለሁ
9	ቤተሰቦቼ እና ጓደኞቼ የመንግሥት አገልግሎቶችን ለማግኘት የኤ-መንግስት አገልግሎቶችን መጠቀም እንዳለብኝ ያስባሉ።					
10	ለእኔ አስፈላጊ የሆኑ ሰዎች የኤ-መንግስት አገልግሎቶችን የሚጠቀሙ ከሆነ እኔም እጠቀማለሁ					
11	በአጠቃላይ፣ በባህሪ ላይ ተጽዕኖ የሚያሳድሩ ሰዎች የኤ-መንግስት አገልግሎቶችን መጠቀም እንዳለብኝ ያስባሉ።					
	ምቹ ሁኔታዎች	በፍጹም አልስማማም	አልስማማም	ለመወሰን እችላለሁ	እስማማለሁ	በጣም እስማማለሁ
12	ኢ-ሰርቪስ ድረ-ገጽን ለመጠቀም የሚያስፈልጉ ግብአቶች አሉኝ።					
13	ኢ-ሰርቪስ ድረ-ገጽን ለመጠቀም አስፈላጊ እውቀት አለኝ።					

14	የኢ-ሰርቪስ ድረ-ገጽ አገልግሎቶችን መጠቀም በሚያስቸግረኝ ጊዜ ከሌሎች ሰዎች እርዳታን ማግኘት እችላለሁ።					
15	ኢ-ሰርቪስ ድረ-ገጹን በምጠቀምበት ጊዜ ለሚያጋጥመኝ የቴክኒክ ችግር እርዳታ የሚሰጥ አንድ የተወሰነ ግለሰብ ወይም ቡድን አለ።					
	ባህሪያዊ ዝንባሌዎች	በፍጹም አልስማማም	አልስማማም	ለመወሰን እንቅጥራለሁ	እስማማለሁ	በጣም እስማማለሁ
16	ለወደፊቱ የመንግስት አገልግሎቶችን ለማግኘት ኢ-ሰርቪስ ድረ-ገጹን መጠቀም እቀጥላለሁ።					
17	የመንግስት አገልግሎቶችን ለማግኘት ኢ-ሰርቪስ ድረ-ገጹን ሁሌ ለመጠቀም እሞክራለሁ።					
18	በአጠቃላይ፣ ኢ-ሰርቪስ ድረ-ገጹን መጠቀም ለመቀጠል አቅድ አለኝ።					
	በኢንተርኔት ቴክኖሎጂ ላይ ያለ እምነት					
19	ኢንተርኔት የኢ-ሰርቪስ አገልግሎቶችን ለመጠቀም ምቹት እንዲሰማኝ ለማድረግ የሚያስችል በቂ ጥበቃዎች አሉት።					
20	የህግ እና የቴክኖሎጂ መዋቅሮች በኢንተርኔት ላይ ከሚከሰቱ ችግሮች በበቂ ሁኔታ እንደሚጠበቁኝ እርግጠኛ ነኝ።					
21	የግል መረጃዎቼን እና ሰነዶቼን በኢ-ሰርቪስ ድረ-ገጹ ላይ ለመላክ ደህንነት ይሰማገኛል።					
22	በአጠቃላይ፣ ኢንተርኔት የኤ-መንግስት አገልግሎቶችን ለመጠቀም ምቹ እና አስተማማኝ ነው።					
	በመንግስት ላይ ያለ እምነት	በፍጹም አልስማማም	አልስማማም	ለመወሰን እንቅጥራለሁ	እስማማለሁ	በጣም እስማማለሁ
23	የመንግሥት ዲፓርትመንቶች ከኤ-መንግስት አገልግሎቶች ጋር በተያያዘ የዜጎችን ፍላጎት የማሟላት ችሎታ አላቸው ብዬ አምናለሁ፡፡					
24	መንግሥት በኢንተርኔት በኩል የሚደረጉ ግንኙነቶችን በታማኝነት እንደሚያከናውን እምነት ሊጣልበት ይችላል።					
25	በኢ-ሰርቪስ ድረ-ገጹ በኩል የምልካቸው ቅጾች ችላ ሳይባሉ ምላሽ እንደሚሰጠኝ እርግጠኛ ነኝ።					
26	በአጠቃላይ፣ በመንግስት ላይ እምነት አለኝ።					
	የዌብሳይት ጥራት	በፍጹም አልስማማም	አልስማማም	ለመወሰን እንቅጥራለሁ	እስማማለሁ	በጣም እስማማለሁ

27	የኢ-ሰርቪስ ድረ-ገጽ ለዕይታ ሳቢነው።					
28	የኢ-ሰርቪስ ድረ-ገጽ ስለሚሰጣቸው አገልግሎቶች አስፈላጊ መረጃ ይሟላል።					
29	የኢ-ሰርቪስ ድረ-ገጽ ብዙ የሀገር ውስጥ ቋንቋ አማራጮች አሉት።					
30	በአጠቃላይ፣ ኢ-ሰርቪስ ድረ-ገጽ ሁልጊዜ የሚሰራና የማይቋረጥ ነው፡					
	ግንዛቤ	በፍጹም አልስማማም	አልስማማም	ለመወሰን እንደ ቸገራለሁ	እስማማለሁ	በጣም እስማማለሁ
31	በኤ-መንግስት ጥቅሞች እና አገልግሎቶች ላይ ጥሩ ዕውቀት አለኝ።					
32	ደንበኞች የኤ-መንግስት አገልግሎቶችን በጥሩ ሁኔታ ለመጠቀም እንዲችሉ ከመንግስት ስልጠና ያገኛሉ።					
33	ስለ ኤ-መንግስት አገልግሎቶች የሚቀርቡ አውደጥናቶች እና መግለጫዎች አገልግሎቱን በይበልጥ እንድጠቀም ያበረታቱኛል።					
34	በአጠቃላይ፣ በኤ-መንግስት አገልግሎቶች ላይ የሚሰጡ የግንዛቤ ማስጨበጫና ዘመቻ ሥራዎች ደስተኛ ነኝ።					
	የኤ-መንግስት አገልግሎቶችን የመጠቀም ባህሪ	በፍጹም አልስማማም	አልስማማም	ለመወሰን እንደ ቸገራለሁ	እስማማለሁ	በጣም እስማማለሁ
35	የመንግስት ተቋማት የሚሰጡት ንዝረት አገልግሎቶች ለማግኘት የኤ-መንግስት አገልግሎቶችን ለመጠቀም እፈልጋለሁ።					
36	በአብዛኛው የኤ-መንግስት አገልግሎቶችን አጠቀማለሁ።					
37	የኤ-መንግስት አገልግሎቶችን በመደበኛነት አጠቀማለሁ።					
38	በአጠቃላይ ፣ አብዛኞቹ የመንግስት ጥያቄዎቹ የሚስተናገዱት በኤ-መንግስት አገልግሎቶች በኩል ነው።					

