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# Continued use of e-government services: An Expectation Confirmation theory and Trust theory approach

(Research Report)

BCom Masters by Research (Information Systems)

Information Systems Division

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Date Submitted: 31st March 2017

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I would like to firstly, thank and commend my supervisor, Jean-Marie Bancilhon for the unwavering support and guidance throughout this two-year period. His extensive knowledge in the research field, and coaching on research thought leadership has been invaluable. I will apply and share this acquired knowledge as I journey forward in my career and academic pursuits. I would also like to thank my family and friends for their steadfast support during this Masters degree. Your engagement, advice, motivation and words of encouragement, spurred me on to the end. Special mention goes to Patricia Mutale, Selina Mutale, Desmond Mutale, Rufaro Muza, John Goba, Prudence Mambo, Alethea Dzambo and Nadine Dzambo.

# ABSTRACT

The present study is part of a larger project which centers on smart cities. The current study focuses on Gauteng residents' electronic service post-adoption behaviour. Through interconnected structures, a city is defined as smart if investment in technology infrastructure and human capital result in sustainable growth and improves the quality of life of its residents.

Residents' post-adoption behaviours have emerged as one of the key areas of study in information systems research. The long-term viability of a new technology, however, depends on a resident's continued use behaviour rather than on their initial acceptance decisions. Prior research on continued use is neither clear about acceptance and continued use behaviour nor on the theoretical underpinnings. Research suggests that there may have been an insufficient understanding of the continued use phenomenon that has led to misapplications of theories resulting in the potential generation of spurious correlations. This study uses the e-government context as an instance of an electronic service through which the continued use phenomenon is explored.

Governments in developing countries are being challenged in their engagement and retention of residents' continuous use of e-government services. This is because after initial use of the e-government service, a majority of residents revert to traditional methods such as the telephone or face to face to obtain the service. The continued use among residents of e-government services is therefore pivotal to the success of resident focused e-government initiatives and their long term viability. This study follows in the footsteps of developing countries in studying e-government services where continued use intention rather than intention to use is the dependent variable.

Drawing from Expectation Confirmation theory (ECT) and Trust theory, the current study aims to determine, understand and explain the effects of factors such as satisfaction and distrust on e-government service continued use intention. The aim is to explore how the variables from ECT and Trust interact to provide a better explanation on how individuals arrive to a continued usage state. Trust may interact with an individual's perceived performance and satisfaction from ECT.

A model is derived and hypotheses are stated and tested. A quantitative research approach is used in this study.

The present study uses a cross sectional design. Data was collected through surveys from 203 residents from the City of Ekurhuleni. This city is one of the most prominent cities within South Africa that is progressing towards becoming a smart city. Ekurhuleni provides residents with numerous e-government services such as the capability to pay for municipal bills and to report infrastructure issues, and an open data portal with diverse statistics on the city.

The model explained 36% of the variance in continued use intention. From the research it emerges that Hypothesis 7c trust in city e-services positively influences continued use intention was the most significant hypothesis. Contributions to research and practice are given, followed by areas of future research.

The findings from this study will enhance our understanding of the extent to which the continued use intention of a technology is determined by the interaction between expectation and trust factors, and their impact on continued use intention.

***Keywords****: Continued Use; Continuance; Continued Use Intention; Electronic Government; Expectation Confirmation Theory; Trust; Smart city*

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# 1 INTRODUCTION

Quality of life refers to the belief in one's position in life from the perspective of the value systems and culture that shape one's environment, relative to one's objectives, expectations, concerns and standards (The World Health Organization Quality of Life Group, 1995). Researchers suggest that quality of life is a broad and subjective concept as it includes an individual's psychological state, economic welfare, social relationships, physical health, personal beliefs and level of independence (Hajduova, Andrejovsky, & Beslerova, 2014; Soares, Fraga, Delgado & Ramos, 2015; Tecau, 2015). Quality of life is a global indicator that goes beyond health status and relates to all areas of life that are significant to an individual (Cuadrado-Ballesteros, Mordan & Garcıa-Sanchez, 2014). A well-functioning government is important for improving the quality of life of residents[1] (United Nations, 2014). Such a well-functioning government is more likely to provide residents with much needed services (Forlizzi, 2010) and in addition, these services may have a positive effect on the quality of life of residents (Soares et al., 2015).

According to the United Nations (2014), there is a requirement for governments to provide residents with critical, efficient and equitable services. These services must satisfy resident needs, promote economic growth and enable resident participation in service delivery and policy-making (Kotamraju & van der Geest, 2012). This is because the provision of salient services supports the empowerment and enhancement in the well-being of all residents (Deakin, 2010). Well-being is defined as the balance point between an individual's psychological, physical and social resources and the challenges they face (Dodge, Daly & Sanders, 2012). Governments are however faced with challenges in providing residents with services (Elkadi, 2013). Examples of challenges include, administrative overburdens and the inability to provide

[1] Residents include everyone who lives in South Africa irrespective of whether they are citizens or not.

services to a broad set of residents (Hadi & Nawafleh, 2012). Researchers suggest that e-government services are a solution for the service delivery challenges faced by governments (Almarabeh & AbuAli, 2010; Elkadi, 2013).

E-government services enable governments to improve the transparency, effectiveness and efficiency of service delivery (Olszak & Ziemba, 2011). The importance of e-government services in the delivery of services by governments to residents is driving the need for further research on e-government services. The present study focuses on continued use within the context of e-government services. It centres on factors that influence a resident's intention to continue using e-government services, after first having tried them.

This section introduces and defines the purpose and context of the study. This is followed by the research problem, problem statement, study significance and study scope.

## 1.1 Purpose of the study

The purpose of this study is to examine the impact of various factors on continued use of e-government services by residents. This study uses the Expectation Confirmation Theory (ECT) and Trust theory as theoretical lenses to understand the e-government continued use phenomenon. The present study explores continued use from a continued use intention perspective. Information technology continued use intention is regarded as a fundamental driver that influences the continued use of the technology (Bhattacherjee, 2001). Evidence suggests that intention to perform a behaviour predicts actual behaviour (Sheppard, Hartwick & Warshaw, 1988). Based on this, continued use intention serves as a proxy for continued use behaviour within the current study. In addition, the study does not report on actual continued use behaviour as this would involve a longitudinal study and this is beyond the scope of this masters study, even though research suggests that the longitudinal method is the preferred way for collecting

data on continued use behaviour (Bhattacherjee, 2001; Venkatesh & Goyal, 2010; Ortiz de Guinea & Markus, 2009).

Drawing from ECT, the study aims to determine, understand and explain the effect of factors such as satisfaction on e-government continued use intention. Trust theory serves as an alternative theoretical framing to examine continued use intention. Here, trust is used to determine, comprehend and explain how trust influences e-government continued use intention. This study contributes to literature around information system use and continued use by including trust in government, distrust, perceived risk and trust in e-government services as salient factors that may have direct effects on continued use intention. The trust and satisfaction constructs are derived from literature and operationalised. The study also aims to explore how the variables from ECT and Trust theory interact to provide a better explanation of how individuals arrive at a state of continued usage. Trust may interact with the ECT constructs of an individual's satisfaction and perceived performance. Hypotheses derived from Trust theory and ECT are developed and tested. A model that comprises trust and satisfaction determinants of continued use intention is developed and tested. Study results are interpreted in order to contribute to the body of knowledge on continued use intention.

It is essential to understand the continued interaction of residents with e-government services. This is because an e-government service that is intended to be used indefinitely may only be considered successful and its benefits may only be realised if users sustain its usage over a long-term period (Rehman & Esichaikul, 2011).

## 1.2 Context of the study

### 1.2.1 *E-Government Goals and Challenges*

#### *1.2.1.1 Goals*

The context of this study is the e-government service. The capability to leverage on information communication technology and its benefits has become an indicator of a country's socio-economic ranking (Venkatesh, Sykes & Venkatraman, 2014). Governments globally are shifting towards using information technology to provide services (Almarabeh & AbuAli, 2010; Stratigea, Papadopoulou & Panagiotopoulou, 2015). This has led to governments using the application of specific technologies such as electronic services to modify the way they interact with internal government departments, businesses and residents (Kotamraju & van der Geest, 2012). A type of electronic service used by governments is the e-government service (Al-Fakhri, Cropf, Higgs & Kelly, 2008). An e-government service refers to a technology-based service that enables information to flow between a government employee and a consumer such as a resident or business (Forlizzi, 2010). This includes services such as online municipal rate payment systems (Lean, Zailani, Ramayah & Fernando, 2009) and information kiosks (Rana, Williams, Dwivedi & Williams, 2012).

One goal of e-government services is to maximize efficiencies (Kotamraju & van der Geest, 2012). For instance, residents can use digital technologies such as websites comprising application software to file their tax returns. Manually filing taxes at a government office may be time-consuming (Tan, Benbasat & Cenfetelli, 2013). E-government services also aim to decrease administrative overheads within government departments (Castro, Atkinson & Ezell, 2010). An example of this is electronic forms that have resulted in administrative activities being performed by consumers instead of government staff. This reduces the administrative burden on government employees (Nam, 2014). Lastly e-government services aim to improve the delivery

of government services (Belanger & Carter, 2012), for example, residents are empowered with data regarding government services as they can access information related to specific services on a web portal and may make informed decisions based on the information. The involvement of government employees is reduced. Hadi and Nawafleh (2012) argue that the concept of e-government will have a global benefit as it will ultimately lead to the holistic access and electronic provision of public sector services.

E-government services have been implemented in both developing and developed countries (Schuppan, 2009). Regardless of the level of development of different countries, technology now increasingly contributes to and supports the way many governments function (Hadi & Nawafleh, 2012). Examples of countries where e-government services have been implemented include countries such as the India, South Korea and Turkey (Rana et al., 2012; Venkatesh et al., 2014). The acceptance of e-government services globally has been on an increase (Al-Fakhri et al., 2008; Ochara & Mawela, 2015) and governments have been able to obtain benefits from using e-government services such as reduced spending by providing services on internet platforms (Lee & Kwak, 2012). These platforms accumulate a lower cost than traditional means of providing services (Alshawi & Alalwany, 2009). As a result, governments may encourage residents to perform government related transactions online as this reduces transaction costs for both the government and residents (Almarabeh & AbuAli, 2010). In addition, if residents perform transactions online it may reduce the involvement of government employees in service delivery. (Alshawi & Alalwany, 2009).

#### *1.2.1.2 Challenges*

Although e-government services offer benefits to the government and residents, they are not without their own challenges (Abu-Shanab, Al-Rub & Nor, 2010). One of the issues faced in the implementation of e-government services is the disparity between the residents who have access to technology and residents who do not have access to technology (Reddick, Abdelsalam & Elkadi, 2012). This digital divide can be defined as the gap between people with access to

technology and those without access whereby people without access to technology cannot access information that provides economic opportunities, restricts them from learning computer skills and prevents them from sharing the benefits of e-government (Lawson-Body, Willoughby, Illia & Lee, 2014). E-literacy is another challenge in which marginalised groups in society are incapable of using information technologies due to computer illiteracy (Dada, 2006; Venkatesh et al., 2014). These groups of people are mostly found in rural areas where they have the highest illiteracy rates, are faced with less developed infrastructure and have connectivity constraints (Schuppan, 2009). Another challenge identified by Almarabeh and AbuAli (2010) is that governments may need to update policies and legislation continually in order to facilitate the use of e-government services. Legislatures need to ensure that laws are modified to accommodate electronic transactions and documents (Choi, Park, Rho & Zo, 2016). If existing laws are not modified it may impede the use of e-government services as electronic transactions and documents may not be compliant with legislation (Almarabeh & AbuAli, 2010).

### 1.2.2 *E-government Resident Perspective*

From a resident perspective, e-government services aim to provide residents with quick means to obtain information online. E-government services also aim to increase the accessibility of government services for residents (Wang & Chen, 2012). This enables residents to use government services in an efficient and cost effective way as residents do not need to travel to service centres and wait to be served (Verdegem & Verleye, 2009). E-government services may be accessed at any time, in comparison to traditional methods, which can have time restrictions (Forlizzi, 2010). An example of this is that some services offered at centres may only be accessed during specific hours while using an e-government service for the same service may not have time restrictions. Another benefit of e-government services is that these services are envisioned to be more personalised in nature (Verdegem & Verleye, 2009). Residents get access to information that is specific to them and in some instances may customise the e-government services according to their preferences (Wang & Chen, 2012). E-government services are also

suggested as a means for the greater inclusion of residents in policy decision making (Gauld, Goldfinch & Horsburgh, 2010), for instance, forums can be made available online for residents to participate in policy and decision making.

E-government services have a number of criticisms and challenges from a resident viewpoint. E-government services are criticised for not taking into consideration the needs of the residents but rather focusing on technology functionality and supply side factors instead (Verdegem & Verleye, 2009). This may result in the services provided not meeting the specific needs of residents. The design of e-government services has also been driven by technology capabilities rather than on resident needs (Verdegem & Verleye, 2009). Governments need to focus on the needs, beliefs and preferences of residents (Al-Hujran, Al-Debei, Chatfield & Migdadi, 2015). If governments understand residents' requirements, they can create e-government services that are specific to residents' requirements and preferences (Verdegem & Verleye, 2009). Another challenge is that residents lack awareness on the available e-government services (Hadi & Nawafleh, 2012). Residents need to understand what e-government services are available for them to fulfil their needs. In some instances, residents have found the information that is provided by governments on e-government services to be unreliable, incomplete and unclear (Al-Hujran et al., 2015).

Taking into consideration that e-government services are a form of technological advancement, e-government services may influence and exacerbate the digital divide from a resident perspective. This is because some residents do not have access to the e-government services and are excluded from using them, thus widening the digital divide (Reddick et al., 2012).

### 1.2.3 *E-Government Maturity Models*

#### *1.2.3.1 E-Government Developmental Stages*

E-government services pass through several developmental stages until they reach their highest potential stage, where government information and services from different government departments, agencies and systems are integrated on a single portal (Irani, Al-Sebie & Elliman, 2006). This enables residents to obtain e-government services from a single access point (Alshawi & Alalwany, 2009). Many researchers have proposed that e-government services go through different developmental stages (Almazan & Gil-Garcia, 2008; Kim & Grant, 2010; Layne & Lee; 2001). Back in 2001, for instance, Layne and Lee (2001) developed a four-stage e-government maturity model with the following stages: 1) catalogue, 2) transaction, 3) vertical integration, and 4) horizontal integration. Similarly, within 2002, Chandler and Emanuels (2002) formulated a four level model. However, their model consisted of the following phases: information, interaction, transaction and integration. In 2012, Alhomod, Shafi, Kousarrizi, Seiti, Teshnehlab, Susanto and Batawi (2012) also constructed a four-stage maturity model and their model had the following levels: 1) presence on the web, 2) interaction between the citizen and the government, 3) complete transaction over the web and 4) integration of services.

Kim and Grant (2010) created a five-stage model and their model comprised the following stages: 1) web presence 2) interaction 3) transaction 4) integration and 5) continuous improvement. Almazan and Gil-Garcia (2008) developed a maturity model consisting of five levels, namely: presence, information, interaction, transaction, integration and political participation. Chen, Yan and Mingin (2011) argue that e-government maturity occurs within three levels and their maturity model consists of the following levels: catalogue, transaction and integration.

#### *1.2.3.2 Comparison of E-Government Maturity Models*

Alhomod et al. (2012), Almazan and Gil-Garcia (2008), Chandler and Emanuels (2002), Kim and Grant (2010) and Layne and Lee (2001) have similar first stages where there is information available online on government services and structures. Chen et al.'s (2011) first stage also consists of government information being available online. In addition, residents are able to download forms and presentation catalogues are available online. On the second stage, Alhomod et al. (2012), Chandler and Emanuels (2002) and Kim and Grant (2010) have stages that are alike, their stages focus on residents interacting with governments using email and downloading forms from government websites. In contrast Chen et al. (2011) and Layne and Lee (2001) focus on residents using e-government portals to conduct online transactions. Within Almazan and Gil-Garcia's (2008) second stage there is an increased number of government websites and presence of government portals which can be used as an entry point to agency webpages. In this stage, the websites have a great amount of dynamic information and this information is updated regularly. In the third stage, Alhomod et al. (2012), Chandler and Emanuels (2002), Kim and Grant (2010) have a similar understanding that looks at residents using e-government services in a transactional way. On the other end, Chen et al. (2011) and Layne and Lee's (2001) third levels involve the integration of systems within similar jurisdictions and functions. Almazan and Gil-Garcia's (2008) third stage focuses on two-way communication between residents and the government where this is facilitated through electronic mails. There is also the use of other forms of interactive communication such as internet-based chats and forums. Furthermore, there is customisation that exists in terms of resident profiles on government webpages. Focusing on the fourth stage, Alhomod et al. (2012), Chandler and Emanuels (2002), Kim and Grant (2010) and Layne and Lee (2001) have stages that are alike, with their stages emphasising integration of government services across various departments and agencies. Almazan and Gil-Garcia's (2008) fourth stage in comparison prioritises residents conducting secure online transactions such as electronic payments. Within the fifth stages, Kim and Grant (2010) look at political participation using web portals and continuously improving on the e-government services that are offered. In

comparison Almazan and Gil-Garcia's (2008) fifth stage emphasises e-government service portals having a single point of checkout. According to Almazan and Gil Garcia (2008) this would be across multiple agencies, different functions and levels of government. Almazan and Gil-Garcia (2008) also have a sixth phase which concentrates on political participation in which there are online polls on bills or laws and residents can vote for or against these. Residents can also have public debates with ministers on policies and promote public ideas.

#### *1.2.3.3 Mobile Government*

Mobile government (m-government) refers to the provision of e-government services on mobile information technology platforms. M-government includes the use of government services and applications on mobile devices and wireless internet infrastructure (Almarashdeh & Alsmadi, 2017). A key benefit of m-government is that it is seen as an innovation mechanism that enables greater levels of efficiency and effectiveness (Liu, Li, Kostakos, Goncalves, Hosio and Hiu, 2014). Since mobile technology is expanding, the provision of m-government increases governments' capacity to deliver outcomes and produce benefits for residents, businesses and internal government departments (Ohme, 2014).

### 1.2.4 *Background to E-government within South Africa*

#### *1.2.4.1 Case for E-Government within South Africa*

South Africa is a country where urbanisation is increasing and approximately 63 percent of South Africa's population live in urban areas (National Treasury, 2015). According to South Africa's National Development Plan, by 2033 approximately 70 percent of the population may be located in urban areas (Department of Planning, Monitoring and Evaluation, 2012). Urbanisation may bring a challenge in providing services to a growing urban population. South Africa faces challenges in terms of service provision. The population is increasing at a pace of

1.58 percent per annum (Statistics SA, 2014) and this is higher than the rate at which governments can deliver services and provide infrastructure (Okeke, 2014). E-government services can be used to address service provision challenges by providing an alternative method for residents to access services. This may reduce government constraints in terms of service provision. For instance instead of increasing the number of municipal offices to provide services to the growing population, the services can be provided online. One additional challenge is the illiteracy characterized by the rural population. Residents have low literacy levels and lack electronic service skills (Ochara & Mawela, 2015).

Internet use by the residents of South Africa is also increasing. According to the World Bank (2015), South Africa's internet users per 100 in 2011 increased by approximately 42 percent from 25 users per 100 in 2010 to 34 users per 100. In 2012 it increased by approximately 21 percent to 41 users per 100. This creates an opportunity for government to provide e-government services to an increased number of residents since e-government services are provided over the internet. This may enable governments to provide services to a greater percentage of the population.

South Africa's mobile cellular subscriptions are also increasing and in some instances, there is more than one phone per resident. In 2011 South Africa's mobile cellular subscriptions per 100 people increased by approximately 26 percent to 123.2 users per 100 from 97.9 users per 100 in 2010 (World Bank, 2015). In 2012, it increased by approximately 6 percent to 130.6 users per 100 (World Bank, 2015). If residents have mobile phones that have internet access, it potentially increases residents' accessibility to e-government services. Mobile phones and internet services are key elements of information and communication technology infrastructure within a smart city (Allwinkle & Cruickshank, 2011).

Given that South Africa has a higher mobile penetration among residents in comparison to internet access (World Bank, 2015), if mobile devices have internet or mobile application capability this can increase the potential footprint on which the government can provide e-

government services. As a result, the South African government can focus on e-government services that are accessible on mobile devices as an alternative channel to e-government services provided online.

#### *1.2.4.2 E-Government Services within South Africa*

Within South Africa at a national level, residents are offered e-government services that enable them to pay for their taxes through the South African Revenue Services electronic filing (e-filing) system. The South African Revenue Services electronic filing (e-filing) system for tax filing has enabled the government to reduce administration costs since residents can file their taxes over the internet (South African Revenue Service, 2015). This has enabled the government to increase its revenue from tax (South African Revenue Service, 2016).

At a provincial level in KwaZulu Natal for instance, the Provincial Department of Economic Development provides a website to facilitate job creation (Thakur & Singh, 2013). From a metropolitan level, e-government services provided enable residents to make payments for municipality accounts and report on infrastructure defects (City of Cape Town, 2015; City of Ekurhuleni, 2015). An example of an e-government service provided in South Africa is the e-Siyakhokha service, which the City of Ekurhuleni provides to residents to register and pay for utility accounts (City of Ekurhuleni, 2015a).

#### *1.2.4.3 Specific E-Government Context*

The current study has a specific focus on the e-Siyakhokha service which is a transactional e-government service provided by the City of Ekurhuleni (City of Ekurhuleni, 2015a). The service's design centres on enabling easier and faster interaction between residents and the City of Ekurhuleni. e-Siyakhokha is a component of the City of Ekurhuleni's Smart City Strategy that looks at improving customer service by 1) providing services electronically to residents and 2) enabling electronic exchanges between residents and City of Ekurhuleni. The e-Siyakhokha

service provides residents with the capability to 1) make payments to the Ekurhuleni Metropolitan Municipality 2) lodge complaints and queries, and 3) view their municipal account and payment histories (City of Ekurhuleni, 2015b).

## 1.3 Research Problem

E-government service implementation within developing countries is taking place at a slower rate in comparison to developed countries (Shajari & Ismail, 2013). According to the United Nations (2014) only a small percentage of e-government initiatives within developing countries are successful. Governments in developing countries are facing challenges in engaging and retaining residents to use e-government services continually (Teo, Srivastava & Jiang; 2008). The possible reason for this is that after initial use of the e-government service a majority of residents revert to traditional methods for obtaining the service such as the telephone or face-to-face (Elkadi, 2013). This is because the e-government services may not meet resident expectations (Teo et al., 2008), residents may lack trust in e-government services (Belanger & Carter, 2008) and residents may prefer to use service channels with which they are more familiar (Reddick & Turner, 2012).

The continued use among residents of e-government services is integral towards the success of resident focused e-government initiatives and the long-term viability of the e-government service. Residents need to use e-government services continually for both governments and themselves to potentially benefit from their capabilities (Rehman & Esichaikul, 2011). Wangpipatwong, Chutimaskul and Papasratorn (2009) argue that although initial acceptance is a key indicator of e-government success, it does not result in desired e-government outcomes unless residents move beyond the initial acceptance phase and continually use the e-government services. It is thus important to firstly understand continued use because the benefits of using a technology may be realised through long-term use and secondly to understand the reason

residents revert to traditional service channels and lastly to understand the mechanisms through which initial adoption leads to continuous usage.

Most research on e-government services in developing countries consists of studies that predominantly focus on residents' initial e-government service acceptance (Alawadhi & Morris, 2008; Navarrete, 2010). One example of such a study is by Venkatesh et al (2014) which was conducted in India, where the researchers developed and tested a model to predict e-government service use by including factors relating to demographics and personality. The present study furthers research on e-government services in developing countries on continued use and goes beyond mere acceptance. This research extends the current knowledge on e-government services in developing countries by conducting an individual level study that focuses on user beliefs. This is important for understanding the continued use of e-government services as beliefs influence residents' technology usage behaviour (Bhattacherjee, 2001).

The current study focuses on Expectation Confirmation Theory (ECT) from Management Science and Trust Theory from Information Systems literature to improve the understanding of the determinants that contribute towards the intention to continue using e-government services by residents. ECT is included in this study because it is both the dominant theory that is used to explain continued use and has been found to have explanatory power in predicting continued use (Hossain & Quaddus, 2012). This theory suggests that satisfaction has a direct influence on an individual's intention to continue using a technology (Bhattacherjee, 2001). Satisfaction in turn is influenced by confirmation, expectations and performance.

Trust theory is included as trust factors may influence an individual's long-term technology usage behaviour. Through Trust theory, factors such as trust in an Information Technology (IT) artefact (Vance, Elie-Dit-Cosaque & Straub, 2008) and distrust (McKnight & Chervany, 2001) are theorised to have an influence on information system success. Trust is especially important within the e-government context when all that is available online to residents is a software application embedded in a web page (Gefen & Straub, 2003). There are a few studies that have

empirically sought to verify the significance of trust during the post adoption stages of technology (Belanche, Casalo, Flavian & Schepers, 2014). The present study focuses on the role of trust during post adoption, specifically during the continued usage stage by using Trust theory. The selection of theories is fully justified in Chapter 3. This paper contributes towards the successful long-term resident use of e-government services. It specifically focuses on e-government services that are provided at a municipality level.

## 1.4 Problem statement

### 1.4.1 *Main problem*

The intention of this research is to examine and provide insight to academia and practice on the determinants that influence residents' post-adoption use of e-government services after initial acceptance. This paper has a particular focus on factors relating to user satisfaction and trust. Satisfaction is included in this study because it has been found to have a significant influence on the post-adoption behaviour of individuals (Hossain & Quaddus, 2012). Residents are more likely to continue using e-government services if they are satisfied with their use. Trust is included in this study because if a resident trusts the government they are likely to work towards specific outcomes such as the continued use of an e-government service (Morgan & Hunt, 1994).

### 1.4.2 *Sub-problems*

- Justify and establish the extent to which Expectation Confirmation Theory provides the constructs that allow for a deeper understanding of continued use intention.
- Justify and establish the extent to which Trust Theory provides the constructs that allow for a deeper understanding of continued use intention.

### 1.4.3 *Research Questions*

1. What are the relevant theories that can be used within the context of continued use intention?
2. How can these theories contribute to our better understanding of the continued use intention phenomenon?
3. How can the development of a model that comprises factors that influence continued use intention contribute to our better understanding of continued use?
4. What is the relative explanatory power of the select theories in their explanation of continued use intention?

## 1.5 Significance of the study

### 1.5.1 *Contribution to research*

This study contributes to the existing body of knowledge on technology continued use intention. It builds on prior work in information systems and marketing, by developing and testing a model of the determinants of technology continued use intention that include attention to 1) the satisfaction of users and 2) trust. Satisfaction of the users is reflected by factors derived from the Expectation Confirmation Theory. Trust determinants are derived from Trust theory.

E-government service continued use is explained by using a theoretical model that combines continued use intention with constructs from Expectation Confirmation Theory and Trust theory. The findings from this study could enhance our understanding of the extent to which the continued use intention of a technology is determined by expectation related factors versus factors relating to trust, and thus comprehend the relative significance of these factors to continued use intention. This study broadens our understanding on the interplay between factors

from Expectation Confirmation Theory and Trust theory within the continued usage stage of post-adoption. This study also contributes on a theoretical level to the understanding of how theories that are commonly used within e-commerce maybe applied to the e-government context. The e-government services context is relatively new and does not have established theories underpinning the phenomenon, and using the theories proposed above may provide for such a theoretical underpinning.

Previous research on continued use appears not to be explicit between acceptance and continued use behaviour and their underlying theoretical considerations (Bhattacherjee & Barfar, 2011).These previous studies used models such as UTAUT and TAM that were used to originally explain acceptance. The misapplication of theories and models may have led to spurious correlations. This study fills a gap in that it looks at e-government service continued use intention by taking into consideration factors that may be relevant and applicable to continued use intention by placing an emphasis on satisfaction and trust. The continued use of e-government services by residents plays a significant role in the delivery of smart cities as e-government services are used to facilitate digital interactions between residents and their governments (Deakin, 2010).

### 1.5.2 *Contribution to practice*

The study may provide guidance to governments in understanding whether the continued use intention of e-government services can be explained in terms of trust and satisfaction. This can be used during and after e-government implementations to identify focus areas for achieving the continued use of e-government services, for instance if trust is identified as a factor which has a significant influence on continued use intention, the government may launch campaigns that focus on improving the trust residents have in government. This may help governments successfully implement e-government services and achieve long-term e-government and Smart City success.

The government can also decide on what aspects of their e-government services to enhance. The factors that the present research finds to have a significant influence on continued use intention could guide the development of the enhancements. This may result in the government creating e-government services that are more user centred. The study results can also be used when the government is planning their e-government strategy.

## 1.6 Scope of the study

- On a theoretical level, this study is bound by expectation confirmation theory and trust theories.
- This study is bound by context in relation to e-government services, smart cities and technology continued use.
- The unit of analysis of this study is the individual.
- The population of the study is limited to residents from developing countries, specifically the residents of the City of Ekurhuleni.
- Cross-sectional rather than a longitudinal research design

## 1.7 Conclusion

Chapter one provided an introduction and context of the study. This was followed by an explanation of the research problem and the study's aims and objectives. Chapter one also highlighted the study's significance and scope.

## 1.8 Structure of the Report

Chapter two focuses on prior research on continued use, continued use intention and e-government services. It comprises a systematic literature review that focuses on continued use intention and e-government services.

Chapter three provides the theoretical underpinnings of the study. Chapter four consists of a review that centres on continued use intention and the satisfaction and trust factors that influence an individual's technology continued use intention. Chapter five comprises a synthesis of literature on the types of usage.

Chapter six describes the research methodology, research design, the study's population, data collection and data analysis procedures used to address the study's objectives. In addition, it focuses on the study's limitations, validity and reliability concerns and ethical considerations.

Chapter seven presents the results of the study's survey on residents e-government services continued use intention. Chapter eight discusses the results obtained from the study's survey.

Chapter nine draws conclusions from the study. It highlights the implications for academia and practice, reviews the initial research questions and summarises the overall findings in relation to the resident e-government service continued use intention.

# 2 SYSTEMATIC LITERATURE REVIEW

## 2.1 Introduction

This review provides a Systematic Literature Review (SLR) of prior studies on continued use, continued use intention and e-government services. It first focuses on the research method. It then looks at the research methodology and research questions. It then highlights the data sources, study selection and search strategy. Finally, the SLR highlights the inclusion and exclusion criteria, data extraction and synthesis, and study results. In addition, implications of the results are also provided.

## 2.2 Background

Within information systems research there is a growing interest in individuals' technology post adoption behaviours, specifically their technology continued use behaviour (Ortiz de Guinea & Markus, 2009). The long-term viability of a new technology depends more on users' continued use behaviour rather than their initial acceptance decisions (Venkatesh, Thong, Chan, Hu, Brown, 2011). This is because a technology's expected benefits are realised through its long-term sustained use by the individuals who are expected to benefit from its use (Bhattacherjee & Barfar, 2011). However, there are few theories which primarily focus on continued use (Bhattacherjee & Lin, 2015), in comparison, for example, to theories which focus on technology acceptance such as the Innovation Diffusion Theory, Social Cognitive Theory, Theory of Planned Behaviour and Theory of Reason Action (Venkatesh, Morris, Davis & Davis, 2003).

The Expectation Confirmation Theory (ECT) is a key theory that is used to explain an individual's continued technology use and is the dominant lens that is used to explain individuals' continued use behaviour (Bhattacherjee & Barfar, 2011). ECT helps explain the technology usage process by illustrating how an individual's initial expectations of a technology

are transformed through confirmation into satisfaction with the technology, then leading to continued use behaviour (Lankton, McKnight, Wright & Thatcher, 2016). Alternative lenses have also been used to explain continued use, for instance, the Cognition Change Model (Sun, 2013), Self-perception Theory (Ortiz de Guinea & Markus, 2009) and Social Exchange Theory (Hu, Kettinger & Poston, 2015). Although these various lenses may help in explaining continued use, integrating the different theoretical lenses may provide for a more comprehensive perspective on continued use (Venkatesh et al., 2011). The reason for this is that it may lead to a richer and more encompassing understanding of continued use and further our knowledge on continued use (Gioia & Pitre, 1990). Information technology continued use *intention* is viewed as a key predictor of *actual* technology continued use (Bhattacherjee, 2001). Research implies that an individual's intention to perform a behaviour predicts the actual behaviour (Sheppard at al., 1988). Based on this, continued use intention is used as a proxy for continued use behaviour within the systematic literature review. Furthermore, Bhattacherjee and Lin (2015) suggest that there is a need to examine the alternative lenses that shape continued use behaviour and how these perspectives may influence each other. This necessitates the identification of the theoretical lenses that are relevant to continued use and can be potentially integrated together. However, to date no systematic studies which focus on continued use have been found. In order to do this, the present SLR aims to assess the evidence on theories, frameworks and models that have been used to explain continued use and continued use intention.

Information Systems research has a strong interest in providing a greater emphasis to context in theorising (Orlikowski & Iacono, 2001; Johns, 2006). Depending on the context, individuals may apply different decision making processes (Venkatesh et al., 2011). This may be of particular interest when focusing on technology artefacts. For example different factors have been found to influence technology use from an employee and consumer perspectives (Hong & Tam, 2006). One important context is systems that facilitate the transmission of sensitive and personal information between residents or businesses and their respective governments. These systems are known as e-government services (Forlizzi, 2010). E-government services have gained popularity

within industry and research (Venkatesh et al., 2011) and are seen as a powerful mechanism that can modify the manner in which governments operate and provide services and how residents interact with them (Olszak & Ziemba, 2011). Elkadi (2013) suggests that e-government services are a solution for the service delivery challenges faced by governments. However, developed countries are at more advanced levels of e-government maturity in comparison to developing countries were e-government services are at an infancy stage (Olszak & Ziemba, 2011). This may be attributed to challenges faced in developing countries such as a lack of e-government awareness among residents, lack of infrastructure and economic will (Schuppan, 2009). The increased popularity of e-government services and a lack of e-government success within developing nations, has made it necessary to comprehend the current state of e-government research within developing nations. Thus, the present study also aims to examine e-government service studies within developing countries.

This SLR objectives are to 1) summarise previous research on e-government services, continued use and continued use intention, 2) analytically examine contributions of prior research on e-government services and continued use and continued use intention, 3) identify any gaps present in prior studies.

### 2.2.1 *Continued Use*

A discussion on continued use can be found within section 5.3 in chapter 5.

### 2.2.2 *E-government Services*

The appropriate use of information systems by governments can improve economic and societal conditions for residents (Gregor, Imran & Turner, 2014). Governments in many countries are embracing electronic methods for transacting with residents, businesses, agencies and employees (Seltsikas & O'Keefe, 2010). These governments are investing in the development of information systems known as e-government, to deliver public services. E-government refers to

the use of information technology to aid and improve the efficiency that the government provides services to residents, businesses, agencies and employees (Belanger & Carter, 2012). It hinges upon technology diffusion in government service administration to give rise to emergent web based technology public services that address residents' transactional requirements (Tan et al., 2013). The concept of e-government has its underpinning in the notion that the transformation provided through e-service use will result in more effective governance and economic efficiencies (Brown & Thompson, 2011).

The basic operation of e-government initiatives is increasing in various ways. Many residents use the internet to obtain government information, access government services and to engage with the government (Tan et al., 2013). Focusing on searching for government information online, residents and agencies acknowledge the value obtained from electronic information.

Government services are also available to residents online and popular online interactions include searching for public policy information, retrieving government statistics and obtaining government forms (Brown & Thompson, 2011). In addition e-services are used by residents to engage with their governments, and this is known as e-democracy or e-accountability. Residents use online platforms to provide their opinion regarding societal and government issues (Belanger & Carter, 2012). Residents are not only using the internet to discuss government issues but are also using it to cast votes (Lee & Kwak, 2012).

E-government benefits include 1) better accessibility to public services for residents, businesses and other stakeholders, 2) increased transparency, 3) improved service provision, 4) reduced corruption and 5) reduced costs (Zheng, Chen, Huang & Zhang, 2013). A number of governments are anticipating to take advantage of the improved communication with residents to improve democratic processes, enhance resident participation and reduce social exclusion (Brown & Thompson, 2011).

Residents have been slow to make use of e-government in spite of the improved services delivered and they seldom understand the benefits of e-government (Brown & Thompson, 2011).

E-government challenges include a lack of appropriate information communication technology infrastructure (Brown & Thompson, 2011), some countries lack the ability to leverage on the internet as an engine for human development (Belanger & Carter, 2012) and growth, and some governments do not implement adequate interventions to enable the diffusion of e-government services (Zheng et al., 2013).

## 2.3 Research Method

A SLR is a comprehensive literature synthesis method that comprises the following components in a well-defined way: research questions, search process, data extraction and data presentation (Kitchenham, Brereton, Budgen, Turner, Bailey & Linkman, 2009). SLRs methodologically and rigorously review research results (Rowe, 2014) in a way that is unbiased and where the extent of replication is a function of the initial rigour applied to the SLR (Fink, 2010). SLRs use the article itself as the unit of analysis and apply the same method of scientific rigor (Delgado-Rodríguez, 2006). SLRs support the development of evidence-based guidelines for researchers as well as aggregating all existing evidence on a research question (Kitchenham et al., 2009). Within an SLR, all relevant studies on a specific research question are searched for (Hjorland, 2011). While SLRs started in the medical field, they are now increasingly important in the Information Systems space (Okoli, 2015).

SLRs have gained popularity due to their strong emphasis on the literature search process. This is because they offer a detailed approach for searching for literature (Boell & Cecez-Kecmanovic, 2014). Furthermore, the use of database searches to obtain literature has become more significant (Hjorland, 2011). Formal reviews such as SLRs address the challenges that results from the complexity associated with using database searches and researchers' frustration as they are overwhelmed by the volume of documents available whilst fearing missing important literature (Boell & Cecez-Kecmanovic, 2014).

Researchers need to reduce large quantities of information into smaller and more manageable chunks. SLRs are seen as a means to refine the unmanageable quantity of information (Akobeng, 2005). This is because, SLRs through critical exploration, evaluation and synthesis separate redundant and insignificant literature from critical and important studies that deserve consideration (Murlow, 1994).

SLRs can be used to establish the generalisability of scientific findings. The diverse reviewed literature provides an interpretive perspective not available in a single study (Petticrew & Roberts, 2006). The reason for this is that studies that focus on similar research questions tend to use different study designs, different construct definitions, and different participant eligibility criteria (Mulrow, 1994).

Traditional literature or narrative reviews are criticised as being biased and disorganised as they are subject to the subjective characteristics of the reviewer, use an implicit method to gather literature and there is a tendency to cherry pick (Garg, Hackam, Tonelli, 2008). SLRs on the other hand, aim to reduce systematic bias and haphazardness as they use an explicit scientific method (Mulrow, 1994). Traditional literature reviews have a tendency to cite reports that strengthen predetermined ideas or encourage their own views on a topic (Garg et al., 2008). Another comparison is that SLRs use predefined search strategies that are comprehensive while traditional literature review searches vary in their comprehensiveness and may not be exhaustive (Mulrow, 1994).

## 2.4 Research Questions

Research questions may be formulated in a number of ways. They can either be general, abstract or at a more specific and empirical level. Problematisation of existing knowledge or the gaps in literature can be used to formulate a general abstract research question. Theoretical abstract questions are transformed into questions that can be explored empirically. General questions are further developed into more specific research questions that can be tested empirically (Boell &

Cecez-Kecmanovic, 2014). Research questions are the most important component of a SLR. This is because they are the grounding on which the entire systematic review method is based (Kitchenham et al., 2009). In the current study, the following research questions are addressed:

1. Which theories, models, and frameworks have underpinned the study of continued use and continued use intention?
2. What is the current state of resident focused e-government service studies within developing countries?

## 2.5 Data Sources

The actual data sources are not usually the subject of rigorous selection and the following databases were used to conduct searches:

- Proquest
- EBSCOhost
- JSTOR
- ACM

The current study falls within the Information Systems (IS) discipline and it was deemed appropriate to use the Association for Information Systems (AIS) "Senior Scholars Basket Journals"[2] list as a preliminary journal source. The reason for this is the AIS is an established professional authority within IS and its list consists of accredited resources (Association for Information Systems, 2011). However, because e-government and continued use are relatively new phenomena within IS research, the search will not be restricted to the AIS basket of journals. Other literature sources will include other journals and conference proceedings.

[2] A summary of the AIS basket of journals can be found in Appendix A.

The present study did not use an African specific data source as the focus of the systematic literature review was on developing countries and not exclusively African developing countries. The current selected data sources allow for a much broader focus and are not limited to African developing countries. Furthermore, preliminary searches of African databases such as the African Journal Archive did not yield any results.

## 2.6 Study Selection

The present study used the well-established PICOS framework (Akobeng, 2005) to develop search strings for identifying literature to include in the review. This framework is a method that breaks down research questions into searchable terms (Bertani et al., 2012). It guides the development of search strategies (Sayers, 2008), as it enables a researcher to search for all the potential combinations of search terms (Sayers, 2008). Search strings were created by developing specific terms from the research questions by identifying the population, intervention, comparator and outcome. In addition, alternative spellings and synonyms for the specific terms were identified. The boolean 'OR' operator was used to incorporate alternative spelling and synonyms and the boolean 'AND' operator was used to connect the specific terms from the population, intervention, comparator and outcome. At a search string level boolean logic was used but at an interface level such logic is often embedded in the software. Search results were used to identify more suitable terms. A summary of the applied PICOS framework is provided as follows:

Research question 1:

- **P**opulation: theories, models, and frameworks
- **I**ntervention: studies on continued usage
- **C**omparator: Not relevant, there was no comparison group
- **O**utcome: identification of theoretical underpinning
- **S**tudy design: Not relevant, the search was not restricted to a specific study design

Research question 2:

- **P**opulation: residents in developing countries
- **I**ntervention: e-government services
- **C**omparator: Not relevant, there was no comparison group
- **O**utcome: accurate state of research
- **S**tudy design: Not relevant, the search was not restricted to a specific design

Table 1 highlights the search terms for research question 1[3] and research question 2[4]:

Table 1: Search Terms

| | Research Question 1 | Research Question 2 |
|---|---|---|
| Population | ▪ Theory<br>▪ Model<br>▪ Framework | ▪ Residents<br>▪ Citizens<br>▪ People<br>▪ Individuals<br>▪ Developing Countries<br>▪ Developing Nations<br>▪ Developing States<br>▪ Developing Economies<br>▪ Emerging Countries<br>▪ Emerging Nations<br>▪ Emerging States<br>▪ Emerging Economies |
| Intervention | ▪ Information Technology Continued Use<br>▪ Information System Continued Use<br>▪ Information | ▪ Electronic government<br>▪ E-government<br>▪ Electronic government websites |

[3] A summary of the search strings used for research question 1 can be found in the Appendix B.
[4] A summary of the search strings used for research question 2 can be found in Appendix B.

| | | |
|---|---|---|
| | Technology Continuance<br>▪ Information System Continuance<br>▪ IS Continued Use<br>▪ IT Continued Use<br>▪ IS Continuance<br>▪ IT Continuance<br>▪ Continuous Use<br>▪ Continuance<br>▪ Continued Usage<br>▪ Continued Use Intention<br>▪ Continuance Intention<br>▪ Intention to Continue Use | ▪ E-government websites<br>▪ Electronic government services<br>▪ E-government services<br>▪ Electronic services<br>▪ E-services |
| Outcome | ▪ Underpin<br>▪ Underpinning<br>▪ Support<br>▪ Founding<br>▪ Foundation<br>▪ Grounding | ▪ Impact<br>▪ Effect<br>▪ Use<br>▪ Usage |

## 2.7 Search Strategy

Table 2 highlights the search strategy used in the present study.

Table 2: Search Strategy

| Step | Step Description | Source |
|---|---|---|
| 1. | The [5]first evaluator created the proposed search strings. | (Dikert, Paasivaara, Lassenius, 2016) |
| 2. | The [6]second evaluator assessed the proposed search strings. | (Dikert et al., 2016) |
| 3. | The first evaluator performed preliminary searches to evaluate and further refine the proposed search strings. | (Dikert et al., 2016) |
| 4. | The refined search strings were used to search for potentially relevant studies | (Dikert et al., 2016) |
| 5. | The evaluator executed the database searches. | |
| 6. | Initial selection criteria were used to exclude studies within data source searches. The basis of the criteria was a paper's title and | (Costa, Soares & de Sousa, 2016) |

[5] The student was the first evaluator.
[6] The supervisor was the second evaluator.

| | | |
|---|---|---|
| | abstract. | |
| 7. | The first evaluator independently categorised the studies into three categories: include, exclude, and uncertain. | (Afzal, Alone, Glocksien & Torkar, 2016) |
| 8. | The two evaluators used full text filtering to evaluate the text of each paper against the inclusion and exclusion criteria. The evaluators used the same systematic approach to screen the papers for exclusion. The papers needed to be assessed by more than one individual to establish inter-reviewer reliability. | (Costa et al., 2016; Okoli, 2015) |
| 9. | The two evaluators then made an inclusion or exclusion decision after discussing each paper. | (Costa et al., 2016) |
| 10. | Disagreement or uncertainty between the two evaluators was resolved through discussion. | (Afzal et al., 2016) |

## 2.8 Inclusion and Exclusion Criteria

The SLR's inclusion and exclusion criteria were explicit, consistently implemented and objective so that decisions on the inclusion or exclusion of specific research were clear. The criteria had to be explicit and consistently implemented so that the SLR would be replicable and to minimise the likelihood of bias (Okoli, 2015). A summary of the present study's inclusion and exclusion criteria is found in table 3.

Table 3: Inclusion and exclusion criteria

| | Research Question 1 | Research Question 2 |
|---|---|---|
| Inclusion Criteria | ▪ Studies which had an underpinning theory, model or framework<br>▪ Studies which focused on technology continued use or continued use intention<br>▪ Studies which used an individual level unit of analysis<br>▪ Studies which were peer reviewed<br>▪ Studies which were written in English<br>▪ Full-text studies<br>▪ Journal and conference papers<br>▪ Studies published starting from | ▪ Studies where the population was limited to residents of developing countries[7]<br>▪ Studies which focused on e-government services provided to residents<br>▪ Studies which focused on e-government service use and impact<br>▪ Studies which were peer reviewed<br>▪ Studies which were written in |

[7] A summary of developing countries can be found in Appendix C.

| | | |
|---|---|---|
| | September 2001. The decision to include studies from 2001 is because this is when continuance became a topic of interest within information systems research (Bhattacherjee, 2001). | English<br>▪ Journal and conference papers<br>▪ Full-text studies<br>▪ Studies published starting from 2006. This enabled the present study to focus on the more recent studies on e-government services.<br>▪ Within the Proquest database, results were limited to studies classified within the subject of information systems. This is because without limiting the results according to subject there was a large volume of search results and this made it difficult to filter out studies which focused on e-government services. |
| Exclusion Criteria | ▪ Studies which used an organisational level unit of analysis<br>▪ Uncompleted studies<br>▪ Duplicate studies<br>▪ Trade literature and theses<br>▪ Studies which did not focus on technology continued use or continued use intention | ▪ Studies which used an organisational level unit of analysis<br>▪ Uncompleted studies<br>▪ Duplicate studies<br>▪ Trade literature and theses<br>▪ Studies which did not focus on e-government services |

## 2.9 Data extraction and Synthesis

The student was the data extractor and was responsible for completing data extraction. The supervisor took on the role of the data assessor and was responsible for checking that the data extracted was correct. Disagreements between the data extractor and assessor were examined and the agreed final data was recorded in the study.

The current study used a narrative synthesis approach to synthesize the evidence. This approach uses text and words to describe and summarize key findings, characteristics, strengths and conclusions of studies included within an SLR (Petticrew & Roberts, 2006). Narrative syntheses

aid in the comprehension of results from several studies and combines findings from studies without using statistical analyses (Garg et al., 2008).

## 2.10 Data Search Results

The following section details the results of the systematic literature review. The first section focuses on the search process results. It then looks at research filtering. After which it looks at the specific results for question 1 and 2.

### 2.10.1 *Search Process Results*

The database searches for question 1 resulted in 1004 studies, after removing duplicates 621 studies remained. The database searches for question 2 resulted in 629 studies, after removing duplicates 261 studies remained. Table 4 gives an example on the database search results. Full search results for question 1 and 2 can be found in Appendix B.

Table 4: Example on the database search results

| Search String | EBSCOhost |
|---|---|
| (Theory OR Model OR Framework OR Theories) AND ("Information Technology Continued Use" OR "Information System Continued Use" OR "Information Technology Continuance" OR "Information System Continuance") AND (Underpin OR Underpinning OR Support) | 1 |
| (Theory OR Model OR Framework OR Theories) AND ("Information Technology Continued Use" OR "Information System Continued Use" OR "Information Technology Continuance" OR "Information System Continuance") AND (Founding OR Foundation OR Grounding) | 0 |
| (Theory OR Model OR Framework OR Theories) AND ("IS Continued Use" OR "IT Continued Use" OR "IS Continuance" OR "IT Continuance") AND (Underpin OR Underpinning OR Support) | 120 |
| (Theory OR Model OR Framework OR Theories) AND ("IS Continued Use" OR "IT Continued Use" OR "IS Continuance" OR "IT Continuance") AND (Founding OR Foundation OR Grounding) | 17 |
| (Theory OR Model OR Framework OR Theories) AND ("Continuous Use" OR Continuance OR "Continued Usage") AND (Underpin OR Underpinning OR Support) | 68 |
| (Theory OR Model OR Framework OR Theories) AND ("Continuous Use" OR Continuance OR "Continued Usage") AND (Founding OR Foundation OR Grounding) | 7 |
| (Theory OR Model OR Framework OR Theories) AND ("Continued Use Intention" OR "Continuance Intention" OR "Intention to Continue Using") AND (Underpin OR | 16 |

| | |
|---|---|
| Underpinning OR Support) | |
| (Theory OR Model OR Framework OR Theories) AND ("Continued Use Intention" OR "Continuance Intention" OR "Intention to Continue Using") AND (Founding OR Foundation OR Grounding) | 1 |
| (Theory OR Model OR Framework OR Theories) AND ("Sustained Use" OR "Sustained Usage") AND (Founding OR Foundation OR Grounding) | 2 |
| (Theory OR Model OR Framework OR Theories) AND ("Sustained Use" OR "Sustained Usage") AND (Underpin OR Underpinning OR Support) | 12 |
| Database total before duplicate removal | 244 |
| Database total after duplicate removal | 153 |
| | |
| Search String | JSTOR |
| (Theory OR Model OR Framework OR Theories) AND ("Information Technology Continued Use" OR "Information System Continued Use" OR "Information Technology Continuance" OR "Information System Continuance") AND (Underpin OR Underpinning OR Support) | 4 |

### 2.10.2 *Title and Abstract exclusion*

The first evaluator independently performed an inclusion and exclusion procedure by examining the titles and abstracts for each paper. This resulted in one of the three possible classifications for each study –'include' (for inclusion) or 'uncertain' (for further analysis in the next paper selection phase) and 'exclude' (for exclusion due to a lack of relevance for the research question). In this first step, the first evaluator excluded 458 papers for research question 1 and 177 papers for research question 2.

### 2.10.3 *Full text exclusion*

The first evaluator conducted an inclusion and exclusion process by analyzing the full-text for each paper. The study's inclusion and exclusion criteria were applied during full-text analysis. At this stage, the first evaluator excluded 96 papers for research question 1 and 50 papers for research question 2.

The first and second evaluators reviewed the full-text of the remaining papers for question 1 and question 2. The study's inclusion and exclusion criteria were also applied during this phase. A further 5 papers were excluded by consensus between the two authors for question 1 and 1 paper

for question 2. The remaining 67 papers for question 1 and 33 papers for question 2 were then synthesized.

### 2.10.4 *Research Question 1 Results*

#### *2.10.4.1 Theories, Models and Frameworks*

Before focusing on research results it was necessary to explore theories, frameworks and models. Theories are developed to 1) describe, 2) explain, 3) predict and 4) comprehend phenomena (Botha, 1989). They are about the associations between phenomena, an explanation about why events, acts, thoughts and structures occur. Theory focuses on underlying processes with the aim of understanding the systematic causes for specific phenomena (Sutton & Staw, 1994). A theoretical framework provides the specific lens through which to examine a phenomenon (Botha, 1989). Frameworks are the structures that can support or hold a theory of a study. They play a key role in the research process for a study in its entirety (McGaghie, Bordage & Shea, 2001). Models provide focus or a perspective so as to interpret particular phenomena of interest. Models form the founding for the formulation of theories (Botha, 1989).

Table 7 provides a snapshot of the results. All the actual results are available in Appendix D. In most cases, researchers used a combination of known theories or models or used a single theoretical lens and added additional predictors from different theories, models or frameworks. The results show that the Expectation Confirmation Theory is the most commonly used theory (11 studies), followed by Flow Theory (7 studies). Table 5 highlights the theories used and number of papers.

Table 5: Theories

| Theory | Number of studies |
|---|---|
| Expectation Confirmation Theory | 11 |
| Flow Theory | 7 |
| Theory of Planned Behaviour | 5 |

| | |
|---|---|
| Expectation Disconfirmation Theory | 5 |
| Theory of Reasoned Action | 3 |
| Social Cognitive Theory | 2 |
| Critical Mass Theory | 2 |
| Uses and Gratifications Theory | 2 |
| Innovation Diffusion Theory | 1 |
| Motivation Theory | 1 |
| Media Richness Theory | 1 |
| Media System Dependency Theory | 1 |
| Theory of Self-Efficacy | 1 |
| Discrepancy Arousal Theory | 1 |
| Social Exchange Theory | 1 |
| Visual Perception Theory | 1 |
| Self-Perception Theory | 1 |
| Coping Theory | 1 |
| Social Capital Theory | 1 |
| Social Presence Theory | 1 |
| Maslow's Hierarchy of Needs Theory | 1 |
| Trust Theory | 1 |

Focusing on models, the study results demonstrate that the Expectation Confirmation Model is the most frequently used model (32 studies), followed by the Technology Acceptance Model (15 studies) and then the Unified Theory of Acceptance and Use of Technology (4 studies). Table 6 highlights the models used and number of papers.

Table 6: Models

| Model | Number of studies |
|---|---|
| Expectation Confirmation Model | 32 |
| Technology Acceptance Model | 15 |
| Unified Theory of Acceptance and Use of Technology | 7 |
| Cognitive Model | 1 |
| Self-Determination Model | 1 |
| Triandis Model | 1 |
| Information System Continuance Model | 1 |
| Model of Goal-Directed Behaviour | 1 |
| Five Factor Model of Personality | 1 |
| Hofstede's Model of National Culture | 1 |
| Hofstede's Five Cultural Values | 1 |
| Task Technology Fit | 1 |

The data results indicate that the DeLone and McLean Information System (IS) success model is the only used framework rather than a theory or model. This framework was used in ten post-adoption studies.

Table 7: Snapshot of results

| Author | Theory/Model/ Framework | Dependant Variable | Independent/Moderator Variables | IT Artefact | Publication | Year | Source of Data |
|---|---|---|---|---|---|---|---|
| Agrifoglio, Black, Metallo and Ferrara (2012) | The Technology Acceptance Model (TAM) | IS Continuance Intention | Perceived ease of use, perceived usefulness, enjoyment and playfulness | Twitter | The Journal of Computer Information Systems | 2012 | Cross-sectional survey of 380 Twitter users. |
| Bhattacherjee (2001) | Expectation Confirmation Theory (ECT) | IS Continuance Intention | Confirmation, satisfaction and perceived usefulness | Online banking platform | MIS Quarterly | 2001 | Cross-sectional survey of 122 online banking users. |
| Bhattacherjee and Premkumar (2004) | ECT and TAM | Usage Intention | Attitude, disconfirmation, usefulness and satisfaction | Computer-based training software and rapid application development software | MIS Quarterly | 2004 | 3 time-period survey of 54 students and 2 time-period surveys of 77 students. |

#### *2.10.4.2 Publication Sources*

Table 37 in Appendix D indicates that a majority of studies were published in journals. Approximately 93 percent of the studies were published in a journal. The remainder of research was published as conferences papers (5 studies).

#### *2.10.4.3 Dependent Variable*

Table 37 in Appendix D shows that continued use intention is the most frequent used dependent variable. This variable was used in roughly 82 percent of the research. Continued use behaviour was only used in 12 studies.

#### *2.10.4.4 Qualitative Synthesis*

The results of this review demonstrate that research on continued use is increasing. The first relevant study reviewed occurred in 2001 and since this study, the number of studies on continued use is expanding in the consecutive years. Researchers mostly used Expectation

Confirmation Theory (ECT), ECT it was used in 11 of the 67 review studies. The most commonly used dependent variable in the reviewed studies was continued use intention. 55 of the 67 review studies used continued use intention as the dependent variable.

The aim of this SLR was to identify the theories, models, and frameworks that have been used to explain continued use and continued use intention. Based on SLR results, various theories, models, and frameworks that have underpinned continued use and continued use intention research were identified. Researchers are now more aware on theoretical lenses that can be used to predict continued use and continued use behaviour. Results demonstrate that ECT is the most commonly used theory in continued use post-adoption research. This is consistent with Hossain & Quaddus (2012). They suggest that ECT is a much-used theory in post-adoption research. Future studies could use ECT as a basis of their theoretical underpinning.

The results also indicate that the TAM is still one of the key models used in continued use and continued use intention studies despite TAM having been developed for intention to use. Bhattacherjee and Barfar (2011) argue that TAM may be more tailored for acceptance than continued use. This is because it was originally created to focus on the technology adoption and its use in post-adoption context may result in spurious correlations. The results of this SLR show that only 17 theories have been used to explore continued use and continued use intention. This presents an opportunity for researchers to investigate what other theories may be appropriate to explain continued use and continued use intention. The results also indicate that limited research on continued use and continued use intention has focused on Trust theory. Only one study which focuses on Trust theory was identified.

The results of this review showed the combination of theoretical lenses that can be used to explore continued use and continued use intention. Researchers can now readily identify what combination of lenses have already been used to investigate continued use and look into extending or testing the lenses. Researchers could also test the theoretical combinations in different settings to the review studies.

Besides researchers who focus on continued use and continued use intention, stakeholders who are involved in technology development and usage could use the SLR results. These stakeholders could use the results to understand the factors that shape continued use. They could focus on developing technology taking into consideration these factors. Stakeholders could also influence the continued use process by centering their post-adoption efforts on factors which are more suited to predict continued use.

A shortcoming of the existing studies on continued use and continued use intention is that much of the research used students as study participants. Approximately, 33 percent of the review studies used students as respondents. The use of students is commonly linked with convenience sampling. This sort of sampling may limit the generalizability of the study results to the population (Bhattacherjee, 2012). This presents an opportunity for future research to focus on more appropriate respondents when examining continued use and continued use intention research.

The study results show that few studies have been performed on e-government services continued use. Much still needs to be learnt regarding the continued use of technology within the e-government context. The reason for this is it is still a relatively under studied area with limited studies having been undertaken focusing on e-government services as the technology artefact of interest. Continued use of e-government services among residents is central to the success of e-government initiatives focused on residents and long term viability of the service. This is because continued use of e-government services potentially benefits both residents and governments from the e-government service capabilities (Rehman & Esichaikul, 2011). Therefore, additional research is needed to examine and evaluate e-government services empirically and theoretically to advance our understanding of continued use within an e-government setting.

### 2.10.5 *Research Question 2 Results*

Table 8 provides a snapshot of the results. All the actual results are available in Appendix D.

Table 8: Snapshot of results

| Author | Theory/Model/Framework | Focus | Major Findings | Country | Publication | Publication year | Source of Data |
|---|---|---|---|---|---|---|---|
| Allahawiah and Alsaraireh (2014) | None | This paper looks at identifying e-government services, the uses and practices of e-government in Jordan. | Stakeholders' dealings in the digital society can be supported and simplified through the strategic goal management of e-government. Customers' needs that are in sync with their aspirations and the mechanism to access electronic services through various channels may be simplified by management of e-government. This will be considered one of the external objectives of e-government. | Jordan | Economics, Management, and Financial Markets | 2014 | Survey |
| Alomari, Sandhu and Woods (2013) | Rogers, 1983 Relative advantage | This study investigates how citizens interact and connect with regards to the use and adoption of e-government. | It is important to consider factors that influence resistance to change when exploring adoption of e-government within a social community. Factors such as cultural themes, social themes, word of mouth appeared as resistance to change in the Middle East. | Jordan | Transforming Government: People, Process and Policy | 2013 | Interviews |

#### *2.10.5.1 Publication Sources*

A number of the studies on e-government were conference papers. There was a total of twelve conference papers on e-government services. The second highest number of publications was from the Information Technology for Development that had five studies. This was followed by publications from the European Journal of Information Systems (2 studies) and Transforming Government: People, Process and Policy Journal (2 studies). Table 9 highlights the journal sources and the number of studies.

Table 9: Journals

| Publication Source | Number of studies |
|---|---|
| Information Technology for Development | 5 |
| European Journal of Information Systems | 2 |
| Transforming Government: People, Process and Policy Journal | 2 |
| Journal of Contemporary Management Research | 1 |
| Information Systems E-Bus Management | 1 |
| Information Systems Frontier | 1 |
| Information Systems Journal | 1 |
| Information Technology & People | 1 |
| Iranian Journal of Public Health | 1 |
| Journal of E-Governance | 1 |
| Journal of Global Information Management | 1 |
| Public Administration and Development | 1 |
| The Information Society | 1 |
| The Pakistan Development Review | 1 |
| Economics, Management, and Financial Markets | 1 |

#### *2.10.5.2 Research Methods*

A number of the research articles were quantitative (23 studies) in nature. These were mostly surveys and questionnaires used in e-government services. A small sample of these were qualitative in nature in the form of interviews. The qualitative studies comprised of seven studies. There were only three studies that combined quantitative and qualitative approaches. These studies made use of questionnaires and follow up semi-structured interviews.

#### *2.10.5.3 Country*

India provided the highest number of studies in e-government research where five studies where used. This was followed by Bangladesh, Pakistan and South Africa with a contribution of three studies each. China, Iran, Jordan and Nigeria had two studies representing each country. Sri Lanka had two studies. The following countries only had one study reflect Bhutan, Brazil, Dubai, Malaysia, Nepal, Oman and Taiwan. There was one study across various Asian countries that are Pakistan, India, Sri Lanka, Philippines and Thailand. There was another study that focused on both Thailand and Indonesia.

#### *2.10.5.4 Theoretical Lenses*

The theories, models and frameworks used in this study regarding e-government services are highlighted in table 38 in Appendix D. Known theories, models or a combination of theoretical basis where used by a number of researchers to explore e-government services. The results show that the most common model was the Technology Acceptance Model (4 studies). The rest of the research showed one study used the Bureaucratic budget maximization model, Model for electronic delivery of public citizens, Utility Based Computing model, a multiple linear regression model, Conceptual model for e-government adoption, User centric IT/IS evaluation model based on perceived usefulness, perceived ease of use and perceived fit and a model of the factors affecting the decision of municipal councils of less developed countries. One study referenced a model for understanding the relationship between service quality dimensions and demographic variables; and the willingness to use e-government services.

From a theoretical perspective, study results show that at least one of the following theories was used, Kernel theory, Relative advantage theory, Theory of acceptance and use of technology, Theory and methods for software engineering performance: measurement, modelling and prediction, Actor network theory, Rawl's moral theory and lastly Social power theory.

The Readiness Assessment Framework was used in one study. Another study used a framework of citizens' adoption of e-government services. These were the only two frameworks referenced in the studies.

#### *2.10.5.5 Publication Year*

A number of the studies where for the period 2010 to 2016 (22 studies). Of these studies the highest number was from 2014 that had five studies. This was followed by 2011 and 2013 with four studies in each of those years. The third highest was the period between 2012 and 2015 that had three studies each. The lowest number of studies was two studies from 2010 and one study from 2016. The period 2005 to 2009 had eleven studies. The highest number of studies came from 2009 that had four studies. This was followed by studies from 2008 comprising of three studies. In the year 2007, only two studies were used. The lowest number of studies where from 2005 and 2006 with one study each.

#### *2.10.5.6 Qualitative Synthesis*

The results of this review shows that research on continued use is increasing. Researchers mostly used TAM and it was used in four of the 33 review studies. This presents an opportunity for researchers to investigate what other theoretical lenses could be used to examine e-government services. The most commonly used methodology in the reviewed studies was the quantitative approach. 23 of the 33 review studies used quantitative methods.

The study results show that there is a lack of studies that focus on e-government services beyond the acceptance phase. Additional studies are needed to look at and assess e-government services continued use. Seven studies out of the 33 focus on the management of e-government services. These studies also speak to the benefits of e-government services in the various countries were the studies took place.

Citizen engagement is a key aspect raised in a number of studies. 10 of the 33 studies looked at citizen engagement as central to the use of e-government service. Some of the studies looked at limitations of access to e-government service. Three of the 33 studies looked at the use of mobile technology as an option for enhancing participation. Of these three studies, concerns were also raised regarding participation of groups due to their lack of skills in using online services. Three out of the 33 studies focused on trust in government in which two of these three studies looked at integrity and institutional trust in government. For these studies, trust in government was low. One of these 3 studies looked at trustworthiness with regards to fair elections.

Another platform that could be used for citizen engagement was the use of social media. There was only one study out of the thirty three studies that focused on the use of social media in driving e-government adoption in developing countries. Social media as a form of encouraging the use and acceptance of e-government services is another area for further research. This study also emphasised the need for trust as it influenced continued use of e-government service even through social media channels.

A number of the studies note that developing countries are faced with unique challenges that impact the adoption of e-government service. For instance residents' cultural beliefs and values were also indicated as important in driving adoption of e-government service. Five of the 33 studies emphasised the need for incorporating the local context as part of the e-government service. This could be in the form of local languages and local information as this positively influenced residents' use of the service. From these studies, literacy was raised as one of the challenges impacting the use of e-government services. Some of these challenges may be explored further through the use of qualitative research methods to come up with solutions that are relevant to the context. For this SLR, a number of these studies focused on residents in which 69.7% of the studies where based on quantitative methods.

## 2.11 Conclusion

This systematic literature review focused on the studies which have been conducted on continued use, continued use intention and e-government services. It first looked at the theories, models and frameworks which have been used in continued use and continued use intention research. After which it focused on e-government services in developing countries. The review also identified gaps in prior studies. It was found that although prior studies have used ECT and theory on trust, ECT and Trust theory have never been used together with an emphasis on the various trust dimensions. Furthermore, such a combination has never been used within an e-government development country environment. This presents an opportunity for the present study to contribute to the body of knowledge on continued use and continued use intention.

The next chapter looks at the theoretical development for this study. It highlights theories which were assessed for the current study.

# 3 CANDIDATE THEORIES

## 3.1 Introduction

The section focuses on the theories assessed for the current study. It provides a background on each of the theories. In addition, it provides insight on why the assessed theories were either selected or excluded from the present study.

## 3.2 Theories Assessed

When examining competing theories to help understand the continued use phenomenon, a few theories stand out. These include, Diffusion of Innovation (DOI) Theory, Learning Theory, Social Exchange Theory, Social Cognitive Theory, Commitment Trust Theory, Expectation Confirmation Theory and Trust Theory. These theories were identified during the SLR in Chapter 2.

### 3.2.1 *Diffusion of Innovation (DOI) Theory*

The DOI theory seeks to explain the process by which a new technology or idea spreads within a social system. This theory suggests that four factors affect the diffusion of a new idea, namely the innovation itself, time, communication channels and social systems (Rogers, 1983). Rogers modelled an innovation process surrounding new technologies in order to explain the initial adoption and post adoption behaviours of individuals. This process was categorised into five consecutive stages that are: 1) knowledge, 2) persuasion, 3) decision, 4) implementation and 5) confirmation (Wejnert, 2002). When focusing on continued use, the confirmation phase is of importance as this is where residents either reinforce or reverse a decision to continue use or discontinue use of a technology (Karahanna, Straub & Chervany, 1999). However, DOI theory does not have an emphasis on an individual's attitude and individual attitude may have an impact

on their technology continued use behaviour (Bhattacherjee & Barfar, 2011). The DOI theory does not specify how individuals' attitude towards a technology leads them to either accept, reject or reinforce the use of the technology and how the characteristics of the technology have an effect on the acceptance, rejection or reinforcement of use of the technology (Karahanna et al, 1999). Although the DOI theory is an established theory (Nan, Zmud & Yetgin, 2013), there is a lack of support for its use within post acceptance specifically within the continued use intention context (Bhattacherjee & Barfar, 2011). The DOI theory has been used more widely in contexts that relate to acceptance and adoption rather (Szymczyk & Kaminski, 2014) than continued use intention (Barnes & Bohringer, 2011). This suggests that DOI theory may be more applicable to contexts where the dependent variable is acceptance. Furthermore, the DOI theory is more suited to settings that involve organisational technology diffusion decisions (Tully, 2015; Karahanna et al., 1999) rather than settings that relate to individual level technology diffusion (Barnes & Bohringer, 2011). The current study focuses on individual level technology decisions, particularly resident technology decisions and not organisational level technology decisions. Based on the limitations stated the DOI theory has been excluded from the present study.

### 3.2.2 *Learning Theory*

Learning Theory enables the understanding of habit development. Habits can be defined as automatic responses to cues that result from learned actions (Ajzen, 2002). Thus central to learning theory research is the study of habit and its role in predicting behaviour. Habit plays a significant role in understanding continued use as it influences whether or not residents' are likely to adopt new technology (Limayem, Hirt & Cheung, 2007). Learning theorists suggest that overtime continued use of technology is influenced by an automatic tendency of individuals to use technology in instances where initial use of technology has created that habit (Novak, Hoffman & Yung, 2000). Where an individual's behaviour becomes less automatic, habit has a negative influence on continued use of technology resulting in a decrease in the use of technology (Lankton, Wilson & Mao, 2010). Research on usage has extensively focused on the

influence of habit on continued use intention by using Learning theory (Barnes & Bohringer, 2011; Bhattacherjee, & Barfar, 2011, Bhattacherjee & Lin, 2015, Lankton et al., 2010; Limayem, et al., 2007). Therefore, this type of research may be oversubscribed and there may be no room for further exploration on the effect of habit on continued used intention. Learning theory proposes that within a stable context past behaviour has an effect on future responses (Limayem, et al., 2007). However, the context may not always necessarily be stable. This may be the case within the context of the current study. Therefore, the present study excludes learning theory.

### 3.2.3 *Social Exchange Theory*

The Social Exchange Theory (SET) creates a sociological and psychological framework for explaining social behaviour (Homans, 1958). Core to SET is the notion that social change and stability occur through a process of negotiated exchanges among individuals (Emerson, 1976). SET has its founding in the disciplines of sociology, psychology and economics (Cook, Cheshire, Rise & Nakagawa, 2013) and theorises that relationships between people are created by 1) using subjective cost benefit analyses and 2) comparing social alternatives (Hu, Kettinger & Poston, 2015). SET focuses on human interactions within the setting of a social group (Homans, 1958; Emerson, 1976). It may be inappropriate to use SET within the current study as it may lead to a misapplication of SET. The present study focuses on interaction between residents and the government. Using SET within this context may violate an underlying premise of SET from a human interaction perspective. This is because the government is a non-human entity and this form of interaction may not be fully catered for by SET. This may result in spurious correlations. For this reason, the current study excludes SET.

### 3.2.4 *Social Cognitive Theory*

Social Cognitive Theory (SCT) is widely used in psychology and education (Compeau & Higgins, 1995). This theory is founded on the concepts of social learning and social behaviour (Bandura, 1988). At its core, SCT posits that environment factors, cognitive factors and behaviour are mutually determined (Compeau & Higgins, 1995). SCT creates an overall framework for comprehending an individual's behaviour by incorporating a number of distinct processes, ideas and concepts (Bandura, 1988). SCT has a limitation in that it does not consider the unique learning abilities of individuals. An individual's learning ability is subjective in nature and it may be difficult to quantify and measure (Carillo, 2010). Another limitation of SCT is that not all social learning can be directly observed. This may result in a difficulty in quantifying the influence of social cognition on development (Lightsey, 1999). Bhattacherjee and Lin (2015) suggest that SCT is suited for contexts that involve first time use and the acceptance of technology. Using SCT within the continued use intention context may result in its misapplication as this context goes beyond acceptance and is within the post-adoption phase of a technology. In addition, residents unique learning abilities may impact how continued use intention is shaped and as discussed above SCT does adequately cater for learning ability uniqueness. Based on these reasons, the present study excludes SCT.

### 3.2.5 *Commitment Trust Theory*

Commitment Trust Theory proposes that trust and commitment are important elements for developing and maintaining successful relationships (Morgan and Hunt, 1994). Trust is essential in establishing long-term loyalty, and exchange parties should regard it as central to its relationships with other parties (MacMillan, Money, Money & Downing, 2005). Commitment is likely to result from trust. Morgan and Hunt (1994) advocate that trust leads to higher levels of commitment thereby suggesting that trust is central to all relationships particularly those where there are relational exchanges between firms and various parties. In instances where trust and commitment are combined, the results include higher efficiency, productivity and effectiveness

(Morgan & Hunt, 1994). Morgan and Hunt (1994) argue that Commitment Trust Theory can be applied for all relational exchanges that involve customers, employees or suppliers. The Commitment Trust Theory focuses on relationship marketing within an organisational settings and exchanges between business entities (Mukherjee & Nath, 2007). This theory initially focused on an organisational level unit of analysis (MacMillan et al., 2005). Therefore, the current study does not include Commitment Trust Theory.

## 3.3 Theoretical Foundation

### 3.3.1 *Expectation Confirmation Theory*

ECT is a theory that focuses on consumer satisfaction and repurchase behaviour (Oliver, 1980). This theory is underpinned by the Cognitive Dissonance Theory (Oliver, 1977; Oliver, 1980) and is an established and much-used theory in psychology and marketing literature (Bhattacherjee, 2001; Hossain & Quaddus, 2012).

ECT creates a framework for understanding human repurchase behaviour by incorporating constructs relating to satisfaction, confirmation and expectations (Oliver, 1980, Oliver, Balakrishnan & Barry, 1994). ECT has been applied to diverse fields that include education (Liao, Chen & Yen, 2007), information technology (Premkumar & Bhattacherjee, 2008) and public policy (Ryzin, 2004).

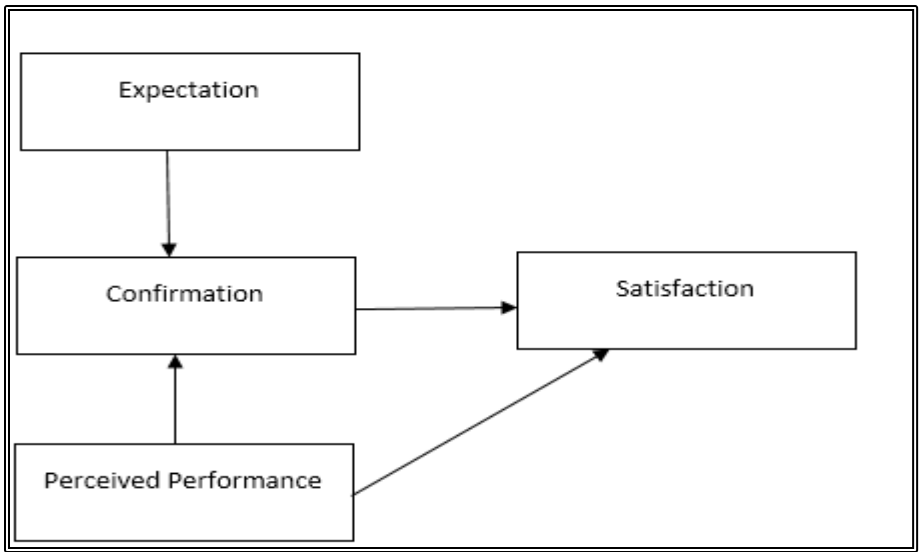
At its core, ECT proposes that satisfaction is determined by prior expectations and confirmation (Oliver, 1980). Satisfaction is a key factor which influences repurchase intention (Oliver et al., 1994). Product repurchase intention is likened to technology continued use intention (Premkumar & Bhattacherjee, 2008). This is because both intentions occur after an initial decision namely, acceptance within the technology context and purchase within the product context (Bhattacherjee, 2001). Secondly, initial use experience of the product or technology has an effect on repurchase intention and continued use intention. In addition, both intentions may result in the

reversal of the initial decision (Hossain & Quaddus, 2012). Satisfaction is fundamental to building and retaining loyal consumers on a long-term basis (Bhattacherjee, 2001, Hossain & Quaddus, 2012) as consumers are more likely to be loyal if they are satisfied with the services provided by an organisation (Anderson & Sullivan, 1993). For example, within the e-government context residents are more likely to be loyal users of an e-government service if they are satisfied with it.

Research on expectation-confirmation suggests that satisfaction is derived from the size and direction of disconfirmation (Venkatesh & Goyal, 2010). Consumers are satisfied in instances where there is positive disconfirmation whereas where there is negative disconfirmation, they are dissatisfied (Yi, 1993). For example within the e-government context, if residents' performance beliefs of e-government services are greater than their expectations positive disconfirmation occurs. This leads to satisfaction due to residents' e-government service performance beliefs exceeding their expectations of e-government services. Initially, Oliver (1980) hypothesised that prior expectations and disconfirmation were the only factors that influenced satisfaction. However, Churchill and Surprenant's (1982) study indicated that actual performance in the form of experience had an independent effect on satisfaction apart from its impact caused by disconfirmation.

Oliver theorises that there is a process through which consumers reach repurchase intentions (Oliver et al., 1994). First, prior to purchasing a specific product or service, consumers create an initial expectation. Consumers then accept and use that product or service, after which they form perceptions about its performance based on their initial consumption (Oliver & Burke, 1999). They then compare the perceived performance with their initial expectation and determine the degree to which their expectation has been confirmed. Based on their confirmation level and expectation, consumers are either satisfied or dissatisfied (Oliver & Burke, 1999). If consumers are satisfied they will form a repurchase intention whereas if they are dissatisfied they will discontinue using the product or service (Spreng, MacKenzie & Olshavsky, 1996). Figure 1 illustrates the Expectation Confirmation Theory.

Figure 1: Expectation Confirmation Theory




(Adapted from Oliver (1981))

Although ECT is widely used in information systems studies, it has a number of limitations. Firstly, ECT does not take into consideration the potential changes in a consumer's expectation after their consumption experience as well as the impact these changes have on subsequent cognitive processes (Bhattacherjee, 2001; Bhattacherjee & Premkumar, 2004). Another consideration is that initial research on ECT revealed different and conflicting conceptualisations of the satisfaction construct such as viewing satisfaction, attitude and emotion as synonymous since all three constructs affect a consumer's experience. Satisfaction can be argued as separate from attitude for example, even though a consumer has a positive attitude regarding a product or service, the consumer may still feel dissatisfied if the product is below expectation (Hossain & Quaddus, 2012). Lastly, expectation conceptualisation differs across ECT studies. For instance, some studies focus on operationalising expectation through anticipated performance by defining expectation in terms of pre-consumption beliefs about overall performance of products or services (Westbrook & Reilly, 1983). Other studies describe expectation as beliefs regarding the level of product or service attributes and operationalise it from either an individual's belief perspective or the synopsis of such beliefs (Oliver & Linda, 1981; Spreng et al., 1996).

While ECT is the leading theory used to explain continued use, the current research justifies its use because of the following (Bhattacherjee & Barfar, 2011). Firstly, ECT has a key emphasis on satisfaction and this factor is proposed as a determinant that may have an influence on technology post acceptance behaviour (Bhattacherjee, 2001). Satisfaction embodies the conscious and rational elements of continued use behaviour. Secondly, ECT's simplicity makes it a powerful tool to explain a broad array of phenomena for instance the technology continued use intention by users or investigating a consumer satisfaction with a product or service (Jiang & Klien, 2009). Within the current study, ECT will be used to obtain a deeper understanding on the influence of satisfaction on e-government service continued use intention. ECT also provides a basis for associating expectations with post adoption beliefs (Bhattacherjee, & Barfar, 2011). A majority of studies that focus on continued use intention have used ECT as one of their theoretical foundations. ECT is viewed a reasonable starting point for building on the area of continued use intention (Bhattacherjee, 2001). This is because ECT can be used to simulate the important decision process that rational users go through when deciding to continue using a technology. This study also aims to do the same by incorporating the use of ECT. ECT has served as the primary theoretical grounding for technology continued usage studies for approximately a decade (Bhattacherjee & Lin, 2015).

### 3.3.2 *Trust Theory*

Another candidate theory is Trust theory. Trust's role and importance are widely accepted within the Information Systems discipline (Dimoka, 2010). Trust is defined as the willingness of one party to be vulnerable to the actions of another based on the expectation that the other party will perform a predictable action irrespective of monitoring (Belanche et al., 2014). Within trust theory, a trustor is an individual who places trust within another party. This party can be referred to as the trustee. Thus a trustor relies on the actions of the trustee (McKnight, Choudhury & Kacmar, 2002). Trust is central in any business interaction as it reduces the uncertainty that is created by depending on others (Gefen, 2000). According to Gefen and Straub (2003), the social

environment in which businesses can operate is created by trust. Trust makes individuals feel assured because it enables them to understand the social environment in which they live and interact (McKnight & Chervany, 2001). This makes trust critical for any business transaction, especially services provided online as it reduces the complexity and uncertainty that may arise from unpredictable behaviour (Gefen, 2000). For instance, in e-commerce, there is inherent uncertainty resulting from the need to depend on others based on different types of e-commerce interactions and the resulting possibilities of opportunistic behaviour, for example, where vendors do not appropriately reveal risks or unpredictable behaviour (Gefen & Straub, 2003).

Trust is considerably more important particularly regarding online transactions than transacting face to face because it is less verifiable and less controllable within an online setting (Gefen & Straub, 2003). Consumers have to trust that e-vendors will not violate consumer privacy through unauthorized tracking of transactions or unauthorized use of credit card and purchase information (Gefen & Straub, 2003). Within the context of this study, trust is essential in establishing long-term loyalty, and governments should regard it as central to its interactions with residents (MacMillan et al., 2005). Results from a study by MacMillan et al. (2005) suggest that trust was a significant factor associated with long-term use and motivation. This is consistent with the study results by Vatanasombut, Igbaria, Stylianou and Rodgers (2008) who found that trust was crucial to technology continued use intention.

Research suggests that trust is a multidimensional concept (McKnight & Chervany, 2001). The different trust dimensions are highlighted in Table 10. There is merit in differentiating between specific trust beliefs (Gefen & Reychav, 2013). For instance, distinguishing between trust and distrust. This is because each belief may be statistically unique and have different effects on behaviour (Dimoka, 2010). Trust may be regarded as having a positive valence since it focuses on positive emotional reactions such as hope, confidence and assurance. On the other hand, distrust may be regarded as based on a negative valence due to its focus on negative emotions such as suspicion, wariness and fear (Benamati, Serva & Fuller, 2006). Based on the notion that trust is multidimensional, it may be argued that trust and distrust simplify decision-making

processes. This is because trust increases simplicity by compelling individuals to take actions that exposes them to risk whereas distrust increases simplicity by compelling individuals to take protective action to reduce risk (Benamati et al., 2006).

Table 10: Trust Dimensions

| Concept | Dimension | Source |
|---|---|---|
| Trust | Distrust | (Gefen, Benbasat & Pavlou, 2008; Dimoka, 2010) |
| | Mistrust | (Marsh & Dibben, 2005) |
| | Trust in an entity | (Turel et al., 2008; Gefen & Straub, 2003) |
| | Trust in an information technology artefact | (Paravastu, Gefen & Creason, 2014) |

Some researchers have distinguished between trust in an entity and trust in an IT artefact as another dimension of trust. For example, Turel, Yuan and Connelly (2008), suggest that 1) trust between users and the e-customer service and 2) interpersonal trust between the involved parties should be taken into account. Trust between users and the e-customer service provider ensures that users trust that the service provider does not engage in harmful opportunistic behaviours.

Research indicates that trust has an influence on technology continued use intention (Vatanasombut et al., 2008). There is however, uncertainty on how trust influences continued use intention (Belanche et al., 2014). Trust theory within the present study provides an alternative perspective on the factors that may influence continued use intention besides factors relating to satisfaction. Through Trust theory, an explanation of continued use intention that centres on trust is provided. Using an alternative perspective such as Trust theory that requires greater empirical focus (Belanche et al., 2014) enables a better understanding of continued use intention. The reason for this is that using different theoretical perspectives may result in the development of theories that are more encompassing. Trust comprises dimensions that include distrust (Dimoka, 2010), mistrust (Marsh & Dibben, 2005), trust in an entity (Gefen & Straub, 2003) and trust in an information technology artefact (Paravastu et al., 2014). Trust within the current study is broken down into three dimensions namely trust in government, trust in e-government services and

distrust. This multidimensional approach may help advance the understanding of the influence of trust on continued use intention. This is because it will be possible to identify the relative significance of factors relating to the different trust dimension on continued use intention and how the trust dimensions may influence each other. The study provides a setting through which the different trust dimensions can be explored. An example of this is that the e-government context enables the distinguishing between trust in e-government services and trust in the government. This is because the e-government service is viewed as a technology artefact that is distinct from the provider of the service (Paravastu et al., 2014). Within the e-government context, trust is important because it gives residents control or an understanding of their social environment. Due to the social complexity of the environment residents live and interact in, it is difficult to fully understand, or know what to expect from other individuals or exchange parties as they are independent and have different behaviours, intentions and may not be predictable, rational or controlled. Individuals are then caught in between an overwhelming social uncertainty and a social environment they cannot comprehend. This forces the individuals to trust others (Gefen & Straub, 2003).

## 3.4 Conclusion

This chapter focused on the theories assessed for the present study. It provided insight on why the assessed theories were either selected or excluded from the current study. The next chapter provides the study's literature review.

# 4 RESEARCH MODEL AND HYPOTHESES

## 4.1 Introduction

This chapter focuses on prior studies on technology continued use intention. It firstly focuses on technology continued use intention. It then looks at technology use. After which it focuses on the variables derived from ECT and Trust theory. In addition, it focuses on control variables and other types of usage. The conceptual model is presented on figure 2 on page 71.

## 4.2 Continue Use Intention

Bhattacherjee (2001) describes technology continued use intention as an individual's intention to continue using a technology. Research suggests that an individual's behaviour has its basis in planned and reasoned action from their conscious intention regarding that behaviour (Bhattacherjee & Lin, 2014). Such reasoned behaviour is at the core of technology continued use (Bhattacherjee, 2001). Rational individuals are likely to continue using a technology if they have positive technology continued use intentions. Technology continued use intention deals with an individual's beliefs and attitudes towards a technology's characteristics and performance (Hossain & Quaddus, 2012). An individual will have intention to continue using a technology after developing expectations on the technology (Chen, Liu & Lin, 2013). The use of continued use intention is quite consistent within information systems research (Hossain & Quaddus, 2012). However, there is no agreement on the determinants of continued use intention and their relationships and definitions.

The determinants that drive continued use intention is a key question that is still current in information systems research (Bhattacherjee & Lin, 2014). According to the Expectation Confirmation Model (ECM), satisfaction primarily influences continued use intention (Sorebo, Halvari, Gulli & Kristiansen, 2009). Individuals are likely to intend to continue using a

technology if they are satisfied with its use after initial trial (Bhattacherjee, 2001; Cho, Cheng & Hung, 2009). ECM also suggests that the degree of confirmation and perceptions on usefulness have an effect on the continued use intention. It has been found that beliefs regarding ease of use and usefulness have an effect on continued use intention. However, the effect of ease of use on continued use intention diminishes in the long term. This is because individuals may have become familiar with using a technology and acclimatized to using it (Karahanna et al., 1999). Using a technology initially requires overcoming learning barriers because technology that is viewed as difficult to use is less likely to be adopted by individuals. However after overcoming the initial learning barriers, technology use is no longer constrained by learning barriers and ease of use no longer have a significant effect on continued use intention. Perceptions relating to usefulness have a continuing influence on an individual's continued use intention. This is because an individual is unlikely to continue using a technology unless it carries on providing benefits (Bhattacherjee, 2001). Bhattacherjee and Lin (2014) also suggest that an individual is likely to develop positive intentions towards technology continued use if they believe an individual they view as important approve of their technology continued use. Continued use intention is the dependent variable of the study.

Different researchers have named the terms "continued use intention" to reflect the continued use of technology after initial adoption in various ways. These different representations of continued use intention measure the same thing as "continued use intention'. For instance, "continuance intention" (Barnes, 2011; Chiu and Wang, 2008), "continued information technology usage intention" (Thong, Hong & Tam, 2006), "continued usage intention" (Lwoga & Komba, 2015), "intention to continue use" (Xu, Lin & Chan, 2012), "continued intention to use" (Hoehle, Zhang & Venkatesh, 2015) and "intention to continuously use" (Chiang, 2013).

## 4.3 E-government service use

Technology use is an important dependent variable in information systems research and has been widely investigated (Davis, 1989; Venkatesh & Bala, 2008; Venkatesh at al., 2003). Use refers to the actual extent of use of a technology by an individual (Jeyaraj, Rottman & Lacity, 2006). Similarly, Roger's (1994) through his implementation phase describes use as when an individual puts a technology to use. Use is an objective measure that is usually obtained by using a technology's log (Davis, 1989). Research suggests that there is a chronological order of stages that leads to use. These stages comprise (i) initial knowledge of technology, (ii) establishing favourable or unfavourable attitudes toward it, (iii) deciding to adopt or reject it, (iv) using the technology then lastly (v) striving to reinforce the adoption decision made (Rogers, 1994). The use of a technology may change an individual's needs, attitudes and perceptions on the use of the technology (Karahanna et al., 1999). As a result an individual's beliefs after the use of a technology may be different to the beliefs that led to initial adoption (Venkatesh & Bala, 2008).

The use of a technology is influenced by an individual's attitudes and beliefs, the technology's perceived characteristics, and communication an individual receives on the technology from their social environment (Karahanna et al., 1999). In order for use to occur, technology adoption needs to have occurred (Rogers, 1994; Venkatesh et al., 2003). The salient factors that influence use are more rationally oriented. For instance, a technology's ability to facilitate and improve an individual's job performance (Venkatesh et al., 2003). The non-task characteristics of a technology may have little influence when deciding whether to continue using the technology (Karahanna et al., 1999). Individuals may rationalize their use behaviour by focusing on the positive information to reinforce their past adoption decision such as their beliefs on usefulness (Davis, 1989; Venkatesh & Bala, 2008). Studies have found that beliefs on usefulness and ease of use significantly influence use (Davis, 1989; Venkatesh & Bala, 2008).

An individual's evaluation of the utility provided by a technology results in usage. Individuals are likely to intend to continue to use a technology from which they obtain benefits from

(Agarwal & Prasad, 1997). As current usage is an indicator of utility, an individual's current use of a technology may influence their intention to continue using it. Within the e-government context, a resident's current use of an e-government service may influence their intention to continue using it. Thus the following hypothesis:

*Hypothesis 1: E-government service use positively influences continued use intention.*

The next section derives the hypotheses based on ECT.

## 4.4 Satisfaction Determinants

Table 11 highlights the definitions for perceived performance, expectations, confirmation and satisfaction.

Table 11: Variable Definitions

| # | Independent Variable | Definition |
|---|---|---|
| 1 | Perceived Performance | Perceived performance is an individual's beliefs regarding the performance of specific product or service (Spreng, MacKenzie & Olshavsk, 1996). |
| 2 | Expectations | Expectations may be regarded, as the attributes that an individual believes will be linked to a product or service (Oliver, 1980). |
| 3 | Confirmation | Confirmation refers to the judgements that an individual makes regarding a product, service or technology artefact by comparing the judgements to original expectations (Oliver, 1980). |
| 4 | Satisfaction | Satisfaction is the "summary psychological state resulting when the emotion surrounding disconfirmed expectations is coupled with the consumer's prior feelings about the consumption experience" (Oliver, 1981: 29). |

### 4.4.1 *Perceived Performance*

Perceived performance has been found to be a strong predictor of satisfaction (Spreng, 1999). Churchill and Surprenant (1982) argue that an increase in product performance is one of the ways to increase the satisfaction with a product or service. This is because consumers are more likely to be satisfied with a product or service if it performs well (Tse & Wilton, 1988). Research suggests that perceived performance has a direct positive influence on confirmation and

satisfaction (Hsieh, Kuo, Yang & Lin, 2010; Oliver, 1980). According to ECT, individuals evaluate their perceived performance of a product or service against their expectations of the product or service. This is used to determine the degree to which their expectations are confirmed (Oliver, 1980). If perceived performance is greater than expectations, it results in a positive confirmation level (Hsieh et al., 2010).

Perceived performance within the e-government context is a resident's belief regarding the performance of an e-government service. If the government improves e-government services, for instance by providing better content or higher levels of interactivity, the residents' perceived performance is likely to increase. Higher levels of perceived performance of an e-government service may result in performance exceeding or meeting expectations, leading to a greater confirmation and thus higher satisfaction. Therefore the following hypotheses:

*Hypothesis 2a: The perceived performance of an e-government service positively influences confirmation.*

*Hypothesis 2b: The perceived performance of an e-government service positively influences satisfaction.*

Research proposes that performance beliefs have a positive direct effect on continued use intention. An individual is more likely to continue using a technology that they obtain benefits from using (Bhattacherjee, 2001). If a resident has the belief that they are benefiting from use of a specific e-government service, they are more likely to continue using it. Thus the following hypothesis:

*Hypothesis 2c: The perceived performance of an e-government service positively influences continued use intention.*

Reeves and Nass (1996) suggest that individuals apply sociological rules in interacting with technology because they treat technology artefacts as social actors. Specifically the

trustworthiness beliefs of ability, integrity and benevolence as proposed by Mayer, Davis and Schoorman (1995) to be significant factors that lead to organisational trust, have been found to be applicable within the e-government domain (Al-Khattab, Al-Shalabi, Al-Rawad, Al-Khattab & Hamad, 2015). Perceived performance is similar to "ability" within the interpersonal trust context (Paravastu et al., 2014). Within the context of an information technology artefact, the artefact should do what it is expected to do.

If an information technology artefact performs as expected this should increase the overall trust an individual has in it. However, if it has not met expectations, individuals will be unwilling to depend on it (Paravastu et al., 2014). Therefore the following hypothesis:

*Hypothesis 2d: The perceived performance of an e-government service positively influences trust in e-government services.*

In addition, perceived performance has an indirect effect on satisfaction through a mediating association with confirmation (Oliver et al., 1994). In order to explore this within the e-government context the following hypothesis was proposed:

*Hypothesis 2e: The perceived performance of an e-government service mediates the effect of confirmation on satisfaction.*

### 4.4.2 *Expectations*

In the e-government context, expectations refer to the characteristics that a resident will predict to be associated to an e-government service. The influence of expectations on the eventual success of a product or service has been recognised within marketing research (Hossain & Quaddus, 2012). Expectations create a reference frame which an individual can use to make a comparative evaluation (Churchill & Surprenant, 1982; Oliver, 1981). Greater than expected outcomes are rated above this point of reference whereas poorer than expected outcomes are rated below (Oliver et al., 1994). According to Oliver (1980) post-purchase evaluations are

influenced by expectations. Hossain and Quaddus (2012) suggest that an individual's expectations are determined by the product or service itself, characteristics relating to the individual and the context (Hossain & Quaddus, 2012). The extent to which a product or service meets, exceeds or is below an individual's expectations influences post acceptance decisions such as continued use (Oliver, 1980).

ECT theorises that expectations have a direct negative effect on confirmation beliefs (Oliver, 1981). In the context of e-government, resident expectations will have a negative effect on confirmation if residents have relatively high expectations of an e-government service and the performance of the e-government service is below their expectations. This results in disconfirmation. For example, if residents expect e-government services to be highly responsive when they navigate within them, they are inclined to conclude that the performance is below their expectations if they occasionally have performance lags. This consequently may have a negative effect on confirmation and lead to disconfirmation. Thus the following hypothesis:

*Hypothesis 3: Residents' positive expectations of not up to standard e-government services negatively influence confirmation.*

### 4.4.3 *Confirmation*

Confirmation has an inverse relationship with expectations and perceived performance has a direct relationship with it (Bhattacherjee, 2001). The confirmation phase of the expectation confirmation process is viewed as a better than or worse than approach, where positive confirmation results when outcomes are better than expected, negative confirmation results when outcomes are poorer than expected and a somewhat minor confirmation occurs when outcomes match expectations (Oliver, 1980). In instances when a product or service artefact exceeds an individual's initial expectation, the confirmation is positive resulting in satisfaction and may lead to increased purchases (Oliver et al., 1994). Thus, a lower expectation and higher performance results in greater confirmation that subsequently leads to a positive influence on customer

satisfaction and continued use behaviour (Bhattacherjee, 2001). In contrast, a higher expectation and low performance leads to disconfirmation, dissatisfaction and may lead to an individual ceasing to use a product of service since there is a low confirmation resulting in a negative influence on customer satisfaction and continued use (Oliver, 1981). Simple confirmation may have little affective influence on satisfaction (Oliver et al., 1994). This is because outcomes are merely equivalent to expectations (Hsieh et al., 2010).

Research on local e-government portals has found that positive confirmation is a significant predictor of residents' satisfaction with e-government portals (Piehler, Wirtz & Daiser, 2016). When residents' performance beliefs of e-government services exceed their expectation level, positive confirmation results. This occurs, for instance, when information valuable to residents has been structured in such a manner that it can be easily understood without sacrificing understanding. As such, positive confirmation is expected to magnify residents' affective responses to their e-government service usage experiences. When residents' performance beliefs of e-government services are below their expectation level, confirmation becomes negative. This happens, for example, when e-government service functionality has been designed in a way that sacrifices usability from a resident perspective. If confirmation is negative it is expected to adversely affect residents' affective responses to their e-government service usage experiences. This leads to the following hypotheses:

*Hypothesis 4a: Residents' extent of confirmation positively influences satisfaction with e-government services.*

### 4.4.4 *Satisfaction*

Delivering satisfaction to consumers and obtaining profits in return is emphasised within marketing literature. Consequently based on satisfaction, improved quality of life is expected based on satisfaction. Hence, customer satisfaction is essential to ensuring various needs of consumers, business and society (Yi, 1993). An improvement in satisfaction may correspond

with increases in consumer loyalty (Anderson & Sullivan, 1993). In the e-government context, satisfaction refers to a resident's positive emotional state resulting from the difference between expectations and performance beliefs of an e-government service when performance beliefs match or exceed expectations. According to Ortiz de Guinea and Markus (2009) and Kim and Malhotra, (2005) satisfaction has a direct effect on continued use intention. Across empirical tests on ECT, satisfaction was found to be a strong predictor of technology continued use intention (Hossain & Quaddus, 2012). Research suggests that the level of satisfaction is determined by comparing an individual's performance related beliefs of a specific product or service with their expectation level (Oliver et al., 1994). Increases in satisfaction may lead to increases in the extent of usage of a technology. Residents with high satisfaction will be more responsive to the use of e-government services when their expectations are exceeded. This may result in residents using the e-government services. This leads to the following hypothesis:

*Hypothesis 5a: Satisfaction positively influences e-government service use.*

Bhattacherjee (2001) suggests that satisfaction has an effect on technology continued use intention. Valaei and Baroto's (2017) study that focused on government Facebook page continued use intention found that satisfaction has a significant direct effect on the continued use intention. Similarly, Jiang and Ji's (2015) study on e-government portals also found that a resident's satisfaction with an e-government portal determines their continued use intention.

Individuals tend to rely more on their actual experiences such as those captured by satisfaction and this may be more so when they intend to continue using a technology (Bhattacherjee & Lin, 2014). This is because satisfaction is an affect and can either result in a positive, negative or indifferent feeling regarding a technology (Bhattacherjee, 2001). The polarity of the affect then influences an individual's intention to continue using the technology. If a resident is satisfied (positive feeling) with an e-government service, they are likely to intend to continue using it. Therefore the following hypothesis:

*Hypothesis 5b: Satisfaction positively influences continued use intention.*

The next section derives the hypotheses based on Trust theory.

## 4.5 Trust Determinants

Table 12 highlights the definitions for trust in government, distrust, trust in e-government services and perceived risk.

Table 12: Variable Definitions

| # | Independent Variable | Definition |
|---|---|---|
| 1 | Trust in Government | "A cognition about the trustee that stems from the belief that the action of the trustee may be relied upon, without explicit guarantee to achieve a goal in a risky situation" (Turel, Yuan & Connelly, 2008: 125) |
| 2 | Distrust | Distrust can be defined as the negative expectation regarding a trustee acting in the best interest of a trustor (Lewicki, McAllister & Bies, 1998; Ou & Sia; 2010). |
| 3 | Trust in E-government Services | The willingness to depend on a software artefact (Paravastu, Gefen & Creason, 2014) |
| 4 | Perceived Risk | Perceived risk is defined as an individual's subjective expectation of suffering a loss in pursuit of a desired outcome (Belanger & Carter, 2008). |

### 4.5.1 *Trust in Government*

Gefen and Reychav (2013) define trust as a willingness to rely on the trusted party to fulfil future obligations despite the risk that this trusted party might take unnecessary advantage of the situation. Defined broadly, trust is the notion that other individuals or entities will react in a predictable manner (Rotter, 1971). Trust is important because it gives individuals a sense of control or in some way helps them interpret and interact with the environment they live in (Gefen & Straub, 2003).Within the e-government context, trust may be regarded as the willingness to rely on the government to fulfil future obligations. A relationship with an exchange party has more worth when an exchange partner can be relied upon (Gefen & Reychav, 2013). The reason for this is that having an exchange partner that can be trusted means an individual can be more confident concerning their reliance on this partner doing the right thing (Gefen, 2000). Turel and Gefen (2013), argue that trust not only leads to the preservation of current relationships, it also caters to the development and enhancement of services that are revealed through increased

service usage by individuals. Thus, trust contributes to relationship improvements based on increased service use (Turel et al., 2008). Given that there is no guarantee against opportunistic behaviour by an exchange party, trust becomes an essential part of transacting online (Gefen, 2000).

Research suggests that increased dependability to a specific online vendor may be positively influenced by trust (Gefen, 2002). The higher the trust, the more likely the residents will be less skeptic of the e-government service and use it. Residents may also expect the government to do the right thing regarding e-government services. Thus the following hypothesis:

*Hypothesis 6a: Trust in government positively influences e-government service use.*

Research suggests that trust leads to satisfaction in a relationship between exchange parties. Previous research on interpersonal trust and trust among organisations revealed that trust was always a crucial aspect in determining satisfaction and equivalent outcomes (Gefen et al., 2003). If a resident trusts their governments, they are likely to be satisfied with the services that they provide. Based on the trust that residents have in the government, the residents have a belief and expectation that the government through provision of e-government services is acting in their best interests. These residents are likely to have a positive attitude towards the e-government services and are likely to be satisfied by them. Thus the following hypothesis.

*Hypothesis 6b: Trust in government positively influences satisfaction.*

Within an e-commerce setting individuals are forced to handle the social complexity associated with interacting with organisations (Gefen & Straub, 2003). Consequently, individuals must endeavour to make decisions ruling out potential behaviour that an organisation might engage in, especially unethical ones (Gefen, 2000). Legal frameworks take into account illegal behaviours rather than unethical or undesirable behaviours, faced with this an individual must trust the electronic service provider, just as in physical settings. An individual's trust in the provider may influence their intention to continue using the service (Gefen & Straub, 2003). Within the e-

government context a resident's trust in government may affect their intention to continue using e-government services. Thus the following hypothesis:

*Hypothesis 6c: Trust in government positively influences continued use intention*

### 4.5.2 *Trust in E-government Services*

Previous research has focused on the IT artefact as an enabler of online transactions, and this has also revealed that the IT artefact is critical in stimulating consumer trust (Vance et al., 2008). This suggests that IT artefacts influence consumer trust. Belanche et al., (2014) suggest that due to the asymmetric, complex relationship between residents' and governmental agencies, trust in e-government services is required to overcome uncertainty and vulnerability perceptions. This is because residents seldom have knowledge of the information recorded when it is shared among different public agencies. According to Johnson, Bardhi, and Dunn (2008) trust in technology is a consequence of an individual's evaluation of beliefs based on their usage experience of a technology. Within the e-government context, prior usage of an e-government service has an influence on whether residents use it. The reason for this is if they have a positive experience using e-government services, they will develop trust in the e-government services and may continue using it (Johnson & Grayson, 2005). Therefore the following hypothesis:

*Hypothesis 7a: Trust in e-government services positively influences e-government service use.*

Studies suggest that trust in e-government services influences perceived risk (Belanger & Carter, 2008). If residents trust an e-government service they are less likely to perceive the e-government service as risky (Warkentin, Gefen, Pavlou & Rose, 2002). In order to examine this within the present study the following hypothesis is proposed:

*Hypothesis 7b: Trust in e-government services negatively influences the perceived risk.*

Trust in an IT artefact aids consumers in overcoming their uncertainty and risk perceptions (Turel et al., 2008). This is especially important when an individual interacts with a technology they are not familiar with (Belanger & Carter, 2008). Trust in an IT artefact diminishes behavioural uncertainty and risks related with the likelihood that a service provider might behave opportunistically. If an individual has trust in an IT artefact they will have a belief that the IT artefact will behave as expected, decreasing the interaction complexity (Pavlou, 2003; Belanger & Carter, 2008). If a resident trusts an e-government service they may perceive it as none risky and that it may not result in any uncertainty or harm to them. These residents may have an intention to continue using the e-government service in the future. Therefore the following hypothesis:

*Hypothesis 7c: Trust in e-government services positively influences continued use intention.*

Within the e-commerce setting trust has been found to correlate with satisfaction. It is argued that the association between overall trust and satisfaction extends to IT artefacts (Gefen, 2002). Individuals tend to treat objects which are inanimate as if they are human. If an individual is willing to rely on an IT artefact there is a possibility that this individual will be satisfied by it. However, if an individual is not willing to rely on an artefact then they are really expected to not be satisfied by it (Paravastu et al., 2014). Thus the following hypothesis:

*Hypothesis 7d: Trust in e-government services positively influences satisfaction.*

### 4.5.3 *Distrust*

Distrust reflects a trustor's expectation concerning a trustee's harmful opportunistic conduct and adverse motives. The trustee in the present study's context is the government entity that provides e-government services for residents to perform online transactions. Distrust is devised either from breaches resulting from social violations or technical inability. Distrust has been negatively associated with transacting online, cooperative behaviour and loyalty. Research suggests that

trust and distrust are independent but associated factors (Lewicki et al., 1998; Benamati et al., 2006). High distrust is not necessarily equivalent to low trust. McKnight and Chervany (2001) argue that distrust has its foundation in fear and worry and that these emotions may describe an individual's feeling regarding transacting online. In contrast, trust is based on positive emotional reactions towards others, for instance reactions such as confidence and assurance (Benamati et al., 2006).

When individuals are faced with expected negative eventualities and are influenced by the negative emotions associated with distrust, individuals may minimise their use of online applications or cease usage completely (McKnight & Chervany, 2001). This is because distrust leaves individuals in a state of suspended judgement and the expectation of undesirable consequences leads to behaviour that focuses on minimising those consequences (Benamati et al., 2006).

Distrust in the e-government context is the resident expectation that the government will not act in the best interest of the resident. If residents distrust the government, they are likely to not use e-government services. This is because residents may expect negative outcomes from the government by using the e-government service and this may result in behaviour that leads to reducing those outcomes such as ceasing to use the e-government service. The residents may have high expectations of negative outcomes. Therefore the following hypothesis:

*Hypothesis 8a: Distrust in government negatively influences e-government service use.*

Individuals who are high in distrust are likely to be sceptic, wary and watchful (Lewicki et al., 1998). Residents high in distrust may have a belief that the services provided may not be of an appropriate quality, are sceptical of their governments and expect negative consequences from its using the services. Consequently, these residents are likely not to be satisfied with the services provided by their government. Thus the following hypothesis:

*Hypothesis 8b: Distrust in government negatively influences satisfaction.*

If residents distrust their government they may not intend to use an e-government service within the long term. This is because residents may expect a negative result if they use the e-government service. Due to their distrust these residents may perceive the government as opportunistic and not acting in their best interest. Therefore the following hypothesis:

*Hypothesis 8c: Distrust in government negatively influences continued use intention.*

### 4.5.4 *Perceived Risk*

Within the e-government context, perceived risk refers to a resident's subjective expectation of suffering a loss from using e-government services. Given that trust is a direct determinant of perceived risk, where risk is present, trust may exist since a decrease in perceived risk occurs where there is trust (Warkentin, et al., 2002). Risk plays an important role in explaining an individual's online behaviour. The internet brings with it uncertainty in the potential for suffering losses from transacting online (Gefen, Rao & Tractinsky, 2003). An individual may transact online based on their belief in the likelihood of negative outcomes (Belanger & Carter, 2008).

If residents believe that using an e-government service may result in a loss they will more likely cease using the specific e-government service. This belief may also affect residents' intention to continue using the e-government service. Therefore the following hypotheses:

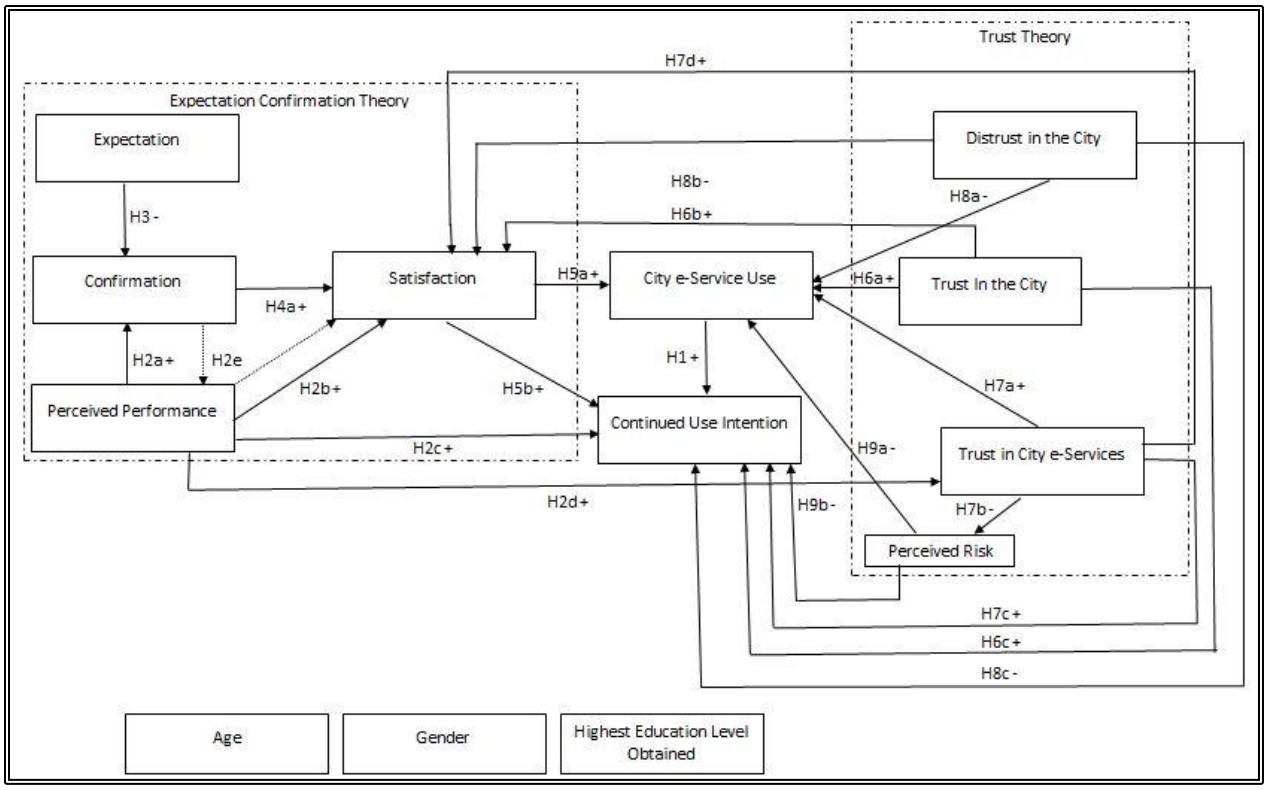
*Hypothesis 9a: Perceived risk negatively influences e-government service use.*

*Hypothesis 9b: Perceived risk negatively influences continued use intention.* .

## 4.6 Conceptual Model

Figure 2 illustrates the conceptual model. It highlights the satisfaction and trust determinants that influence resident e-government continued use intention. The model comprises control variables in terms of age, gender, highest educational level obtained.

Figure 2 : Conceptual Model




*(Adapted from Oliver (1981))*

## 4.7 Control Variables

Control variables are variables that are not essential to explaining a dependent variable, but they may have an impact on the dependent variable (Bhattacherjee, 2012). If left uncontrolled these variables can thus have an effect on study results (Bailey, 1994). The control variables identified from literature for this e-government service study are age, gender, and highest educational level obtained. These variables are discussed within the present sub-section. In addition, justification for the selection of each of the variables is provided.

### 4.7.1 *Age*

Research has long mentioned that age may influence individual-level technology behaviour (Morris, Venkatesh & Ackerman, 2005). Age differences may influence individuals' attitude towards technology. Younger individuals may be more accustomed to information technology as they are exposed to it at an earlier age, while older individuals may not be accustomed to the use of technology and may prefer traditional means to perform tasks (Morris & Venkatesh, 2000). Within the e-government service environment, the age of e-government service users may have an effect on their e-government service continued use intention. Thus, age has been included as a control variable in this study.

### 4.7.2 *Gender*

Technical domains and skills are separated between sexes, forming masculinities and femininities (Bem, 1981; Venkatesh & Morris, 2000). It is assumed that males have a natural liking for technology whereas females dislike or fear it. Males and females may translate and process information using different socially created cognitive structures and these structures in turn, shape and determine an individual's beliefs (Bem, 1981). Consequently, individuals are inclined to make decisions that reveal inherent biases in their beliefs and actions (Venkatesh & Morris, 2000).

An individual's gender may influence their perception and post adoption behaviour (Gefen & Straub, 1997). This is because gender differences may result in individuals having dissimilar factors that have a significant influence on their technology usage behaviour (Morris et al., 2005). For instance, Gefen and Straub (1997) found that males and females differ in their perceptions of email. Similarly, Venkatesh and Morris (2000) found that males' technology usage behaviour was more significantly influenced by beliefs of usefulness whereas, females' technology usage behaviour was more significantly influenced by subjective norms and their

beliefs on ease of use. In order to explore this within the context of e-government, gender has been included as a control variable.

### 4.7.3 *Highest Educational Level*

Research suggests that educational level may influence technology post adoption decisions (Krueger, 1993). Education is associated with an individual's ability to learn and their capabilities. This may influence their beliefs regarding a technology and its usage (Agarwal & Prasad, 1999). A higher education level may positively influence an individual's ability to learn (Agarwal & Prasad, 1999).

Highly educated residents may be more likely to intend to continue using an e-government service than residents with less education may. Educated residents may have a comparative advantage understanding e-government services.

## 4.8 Conclusion

This chapter highlighted the determinants that influence e-government service continued use intention. It initially focused on technology continued use intention. It then focused on usage and the determinants that influence e-government service continued use intention, these determinants were derived from ECT and Trust theory. In addition, it focused on control variables and other types of usage. After reviewing the technology continued use intention literature, hypotheses to predict e-government service continued use intention were derived.

Table 13 highlights the hypotheses for the current e-government study.

Table 13: Summary of Hypotheses

| Summary of Hypotheses | |
|---|---|
| Hypothesis 1 | *E-government service use positively influences continued use intention.* |
| Hypothesis 2a | *The perceived performance of an e-government service positively influences confirmation.* |
| Hypothesis 2b | *The perceived performance of an e-government service positively influences satisfaction.* |
| Hypothesis 2c | *The perceived performance of an e-government service positively influences continued use intention.* |
| Hypothesis 2d | *The perceived performance of an e-government service positively influences trust in e-government services.* |
| Hypothesis 2e | *The perceived performance of an e-government service mediates the effect of confirmation on satisfaction.* |
| Hypothesis 3 | *Residents' positive expectations of not up to standard e-government services negatively influence confirmation.* |
| Hypothesis 4a | *Residents' extent of confirmation positively influences satisfaction with e-government services.* |
| Hypothesis 5a | *Satisfaction positively influences e-government service use.* |
| Hypothesis 5b | *Satisfaction positively influences continued use intention.* |
| Hypothesis 6a | *Trust in government positively influences e-government service use.* |
| Hypothesis 6b | *Trust in government positively influences satisfaction.* |
| Hypothesis 6c | *Trust in government positively influences continued use intention.* |

| | |
|---|---|
| Hypothesis 7a | *Trust in e-government services positively influences e-government service use.* |
| Hypothesis 7b | *Trust in e-government services negatively influences the perceived risk.* |
| Hypothesis 7c | *Trust in e-government services positively influences continued use intention.* |
| Hypothesis 7d | *Trust in e-government services positively influences satisfaction.* |
| Hypothesis 8a | *Distrust in government negatively influences e-government service use.* |
| Hypothesis 8b | *Distrust in government negatively influences satisfaction.* |
| Hypothesis 8c | *Distrust in government negatively influences continued use intention.* |
| Hypothesis 9a | *Perceived risk negatively influences e-government service use.* |
| Hypothesis 9b | *Perceived risk negatively influences continued use intention.* |

# 5 OTHER TYPES OF USAGE

## 5.1 Introduction

In order to comprehend and distinguish continued use intention from other types of usage, the current research synthesised literature on three other prominent types of usage. This review discusses prior studies on these three types of usage. It firstly focuses on intention to use. It then looks at continued use. After which it focuses on the discontinuance.

## 5.2 Intention to Use

Although it is complicated to measure an individual's eventual technology use while implementing a technology, one can measure an individual's behavioural intention to use the technology (Mathieson, 1991). Research proposes that intention to perform a behaviour is a predictor of actual behaviour (Sheppard, Hartwick & Warshaw, 1988). Technology adoption studies do not commonly define intention, it is as though its meaning is self-explanatory (Igbaria, Zinatelli, Cragg & Cavaye, 1997; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000). Warshaw and Davis (1985: 214) define behavioural intention as 'the degree to which a person has formulated conscious plans to perform or not perform some specific future behaviour'. Behavioural intention is a self-prediction of individuals' future behaviour. If individuals consciously believe that they will perform a particular behaviour they are more likely to perform it (Sheppard et al., 1988).

The intention to use a technology artefact is theorised as a determinant of an individual's acceptance of the artefact (Szajna, 1996). The Theory of Reasoned Action posits that an individual's attitude towards a behaviour and the social influence to perform the behaviour influence intention (Ajzen & Madden, 1986). In contrast, the Technology Acceptance Model theorises that an individual's beliefs regarding the ease of use and usefulness of a technology

influence intention (Davis, 1989; Venkatesh & Bala; 2008). Intention has been used as a mediating and dependent variable in technology adoption research (Koufarisa, 2002; Rai & Patnayakuni, 1996). Davis, Bagozzi and Warshaw (1989) suggest that a strong link exists between behavioural intention and behaviour performance. The higher the intention to perform a behaviour the more likely individuals will make a greater effort to perform the actual behaviour (Ajzen & Madden, 1986).

## 5.3 Continued Use

Continued use refers to the sustained use of a technology over a long term period (Venkatesh & Goyal, 2010). It is also commonly referred to as continuance (Bhattacherjee, 2001). Initial acceptance of technology by users is only a first phase (Kim, 2009). Technology implementation may only be considered as a success if a significant number of users move beyond initial adoption and use the technology on a continued basis (Limayem et al., 2007).

Turel, Serenko and Giles (2011) argue that an individual's use of technology is driven in part by reasoned-action considerations regardless of the usage stage. This is based on the premise that the continued use of technology is primarily based on intentional behaviour that is determined by conscious decisions to act (Ortiz de Guinea & Marcus, 2009). Therefore, the continued use of technology is viewed as a series of decisions to continue using the technology (Bhattacherjee, 2001). These decisions involve two key inputs that are, rational calculus and affective or emotional responses (Ortiz de Guinea & Marcus, 2009). Rational calculus is constructed on perceptions of ease of use and usefulness, expectations derived from past experience and various beliefs (Bhattacherjee, 2001; Venkatesh, Brown, Maruping & Bala, 2008). Affective or emotional responses to use technology include factors such as satisfaction or reports of cognitive absorption (Agarwal & Karahanna, 2000; Kim, Chan & Chan; 2007). If an individual uses a technology on an ongoing basis, it is likely that preceding evaluations and behaviours are

internalised. These internalisations are assumed to play an important role in regulating their subsequent behaviour (Kim, 2009).

While initial user acceptance is important, productivity benefits usually increase in the sustained use stage (Kim & Malhotra, 2005; Venkatesh et al., 2003). It is possible for users to form positive initial judgements about a technology. These judgements however, may be modified over time and may result in them not continuing to use the technology. Therefore, there could be little or no long term productivity gains if the users cease using a technology after initial acceptance. As a result, broadening understanding of initial acceptance and subsequent continued use is of relevance to researchers and practitioners (Venkatesh & Goyal, 2010).

## 5.4 Discontinuance

Although much research has focused on the early adoption and continued use of technology there is little known on technology discontinuance (Turel, 2015; Maier, Laumer, Weinert & Weitzel, 2015). Rogers (1994) describes discontinuance as an individual's decision to reject a technology after adoption. Discontinuance occurs when daily practical coping actions are not feasible or become challenging. Discontinuance is predominantly relevant when individuals have freedom in making choices (Maier et al., 2015). According to Rogers (1994) there are two types of discontinuance namely replacement and disenchantment. Replacement discontinuance refers to when an individual decides to reject a technology in order to adopt a superior technology that supersedes it. Disenchantment discontinuance refers to when an individual decides to reject a technology as an outcome of dissatisfaction with its performance.

Discontinuance represents the often omitted component of a technology's life cycle from inception to termination (Furneaux & Wade, 2011; Turel, 2015). Discontinuance is relevant in the termination phase of a technology's lifecycle after adoption and usage (Maier et al., 2015). After initial adoption an individual can either decide to continue using a technology or stop using it. An individual can also decide to adopt a technology after making a prior decision to reject it

(Rogers, 1994). Individuals may discontinue to use a technology because they are dissatisfied with it or have replaced it with an improved technology (Rogers, 1994; Parthasarathy & Bhattacherjee, 1998). Bhattacherjee (2001) suggests that disconfirmation increases dissatisfaction and discontinuance. Turel (2015) argues that although continuance and discontinuance decisions are related, they are distinct concepts and not opposite poles of the same concept. This is because they can exist independently and may not always have a negative correlation. Evidence suggests that habit and satisfaction diminish discontinuance (Turel, 2015). Discontinuance is especially important in circumstances individuals consider problematic such as when they are stressed by using a technology (Turel, 2015). Discontinuous usage intentions and changing behaviour may arise in situations where individuals intend to avoid stressful situations from using a technology (Maier et al., 2015).

## 5.5 Conclusion

This review highlighted the other types of usage. It initially focused on technology intention to use. It then focused on continued use and discontinuance.

# 6 RESEARCH METHODOLOGY

## 6.1 Introduction

This chapter outlines the research approach taken in the present study and the method used for data collection and analysis. It firstly looks at the research paradigm, research method and research design, after which it focuses on the study's population and sampling strategy. It then discusses the research instrument, unit of analysis, process for data collection, data analysis and interpretation. This chapter also addresses the study's limitations, validity, reliability and ethical considerations.

## 6.2 Research paradigm

### 6.2.1 *Positivism*

Punch (2006) describes positivism as a social research approach that centres on separating facts from values, the discovery of general laws, and involves an empiricist commitment to quantitative methods and naturalism. According to Comte and Bridges (1865), positivism aims to generalise an individual's scientific notions and to bring about systemization to social life. Within the positivist paradigm, reality comprises what can be taken in and interpreted by the senses, for example what can be touched, felt or seen. According to positivism, reality and the researcher are separate and reality must be examined using scientific investigation (Gray, 2009). Positivism has its foundation in physical science (Mukherji & Albon, 2009). The positivist paradigm views the world as having rigid worldwide laws and implies that everything that takes place around us can be explained through knowledge of these laws (Hughes, 2001). Natural laws can be understood through observations and recording phenomena around us in a methodical manner and then determining the underlying principle that caused the phenomena to occur (Mukherji & Albon, 2009). Positivists make sense of a phenomenon by using empirical data

(Gray, 2009). Positivists tend to use numerical data as a form of the empirical data because they perceive it as objective, when used in testing a hypothesis or theory the political and moral values of the researcher have no effect on hypothesis or theory falsity (Bailey, 1994).

However, positivism has received criticism in that it has a mechanical perspective on nature as it defines life in quantifiable terms instead of internal experiences (Cohen, Manion & Morrison, 2007). This paradigm also does not take into consideration beliefs of freedom, choice and individuality (Cohen et al., 2007). In addition, positivism has received criticism in terms of falsifiability of truths (Punch, 2006).

### 6.2.2 *Interpretivism*

The interpretive paradigm on the other hand looks at exploring the world from an individual and subjective perspective (Gray, 2009). Individuals actively create their social world and are intentional and creative in how they act (Cohen et al., 2007). The interpretive paradigm has the notion that people and occurrences are unique and highly non-generalisable. In addition, this paradigm prefers detailed descriptions of events that they see as fully representing the complexity of a situation. The interpretive paradigm makes sense of phenomena by using textual and linguistic data (Bailey, 1994). Using this paradigm the e-government service continued use intention phenomenon would be unique for each individual resident and non-generalisable. The present study does not use the interpretive paradigm. The reason is that in interpretivism, reality is subjective and multiple realities could exist and there could be more than one structured technique of retrieving these realities (Gray, 2009). Knowledge perceived through this paradigm is socially constructed and based on subjective interpretations. Interpretivism is generally associated with a qualitative method of inquiry (Bhattacherjee, 2012).

### 6.2.3 *Post-positivism*

As stated in section 6.2.1, positivism has some limitations. Consequently, post-positivism is a modification of positivism which was created to address positivism's limitation, namely that it is difficult to verify the elusory concept called "truth"[8]. Post-positivism suggests that human knowledge is founded on a set of propositions that can only be disproven and thus are not conclusively supported (Gray, 2009). These propositions may only be disproven through observations (Bhattacherjee, 2012). Post-positivists argue that you cannot fully explain reality since an individual's perception of reality is biased and influenced by their subjectivity. Post-positivists believe that reality should be approximated as far as possible (Houghton, Hunter & Meskell, 2012). Post-positivists endeavour on representing reality as best as possible instead of finding the truth. Similar to positivism, post-positivism has an emphasis on objectivity and focuses on scientific approaches (Gray, 2009). Post-positivists acknowledge that it may be nearly impossible to be completely objective because theories, knowledge, context and a researcher's beliefs can have an effect on observations (Letourneau & Allen, 1999). However, post-positivists pursue objectivity by considering the influence of biases on observations. Post-positivists have the notion that research can never be certain. The post-positivist paradigm is open to both the quantitative and qualitative research methods (Houghton et al., 2012). The research paradigm used in the current study is the post-positivism paradigm and the methods used are quantitative. Post-positivists acknowledge that research results provide an estimation of the truth rather than the truth itself (Letourneau & Allen, 1999). This paradigm enables the study to focus on the reliability of the findings and how well they predict for the e-government continued use intention phenomenon rather than certainty and ultimate truth. Within this study, this paradigm focuses on

[8]Philosophers have for centuries tried to grasp the concept of truth. The fact that these questions are still addressed today suggests that truth is complex and open to interpretation. For example, to some philosophers truth comprises an association of correspondence between an individual's beliefs, theories and an independent world (Kuukkanen, 2007). In comparison, other philosophers have a view of truth based on the notion of consensus and argue that truth is whatever a group agrees (Kirkham, 1992). Moreover, some philosophers suggest that truth is concerned with taking action and performing an act of accepting or agreeing with a statement than making a statement on a statement (Kirkham, 1992). Recently a fuzzy logic and natural language approach has been used to define truth values, referred to as linguistic truth values for instance, using values such as quite true, very true and almost true (Zadeh, 2013).

testing e-government hypotheses by using observations. The present study seeks to be objective and consider the possibility of biases.

## 6.3 Research Method

The current study follows a post-positivist quantitative method to address the hypotheses identified. The reason for selecting the quantitative research method is that it is descriptive and measures the association between independent and dependent variables (Bhattacherjee, 2012; Lapan, Quartaroli & Riemer, 2011). In this way, the use of quantitative research will measure the relationship between satisfaction and trust determinants and continued use intention. The quantitative method uses numerical data to explain the e-government continued use intention phenomenon. The use of numerical data enables objectivity to be maximised to a certain extent. This is because the researcher's subjectivity on observations is minimised due to the mathematical nature of the data. The quantitative approach was also appropriate as it may enable the study to be generalised to the population of e-government service users, the more the size of the sample approaches that of the population under study. In addition, the present study is deductive in nature. E-government service hypotheses are developed based on theory. Data is collected to test the hypotheses. Thus, the study will move from theory to data and back to theory once the data was analysed.

## 6.4 Research Design

The research design for the current study is explanatory. This type of design centres on addressing why a phenomenon has occurred and involves the development of causal explanations (Gray, 2009). The use of explanatory research within the present study seeks to understand and explain the correlation between satisfaction and trust factors, and e-government services continued use intention. Descriptive research will not be used as it does not provide an explanation for what caused a phenomenon to occur but describes what happened in detail

(Bailey, 1994). A good description incites the explanation of a phenomenon (Gray, 2009). Descriptive research is usually a precursor to explanatory research (Kothari, 2004). Exploratory research will not be used within this study because the study's research problem is well defined and the study seeks to explain the e-government services continued use intention phenomenon whereas exploratory research does not seek to provide conclusive evidence

### 6.4.1 *Research Instrument*

The current research uses a structured questionnaire. This type of questionnaire has questions formulated in advance and the researcher uses the same sequence to write the questions (Lapan et al., 2011). The researcher used paper-based surveys. Survey advantages and disadvantages as discussed by numerous researchers such as Bhattacherjee (2012), Lapan et al. (2011) and Nueman (1997) are summarised as:

Advantages:

- Surveys are easy to construct and manage.
- Surveys are less time consuming to create in comparison to other data collection approaches.
- Paper based surveys enable researchers to gain access to individuals even in the hard to reach locations. For instance, places where there is no internet or internet access is limited.

Disadvantages:

- Data reliability is dependent on respondents giving honest and accurate feedback. There could be situations where a respondent does not feel encouraged to give honest and accurate feedback and this will influence the study's results.
- Respondents may interpret questions differently and this could result in unreliable responses.
- The data captured could have errors due to respondents not completing the entire questionnaire.

## 6.5 Population and sample

### 6.5.1 *Population*

A study population is a well-defined grouping of individuals or objects that are the main focus of a scientific enquiry (Kothari, 2004). This study focuses on the e-Siyakhokha service which is a transactional e-government service provided by the City of Ekurhuleni. Appendix E is a copy of the cities assessed for the present research. The e-Siyakhokha service enables residents to make payments to the Ekurhuleni Metropolitan Municipality. In addition, residents can lodge complaints and queries, and view their municipal account and payment histories (City of Ekurhuleni, 2015b). The population of this study consists of the residents of Ekurhuleni who are users of the e-Siyakhokha service. If the users have accepted and used the e-Siyakhokha service they will be familiar with transactional e-government services and may be moving towards post adoption. This study focuses on e-government service post-adoption and residents need to have used the e-government services in order for them to be surveyed. According to the City of Ekurhuleni (2015a) there are currently 121077 users on the e-Siyakhokha service.

Within the context of this study, the researcher will make generalisations to the population of users on the e-Siyakhokha service.

Residents of the City of Ekurhuleni who have not used the e-Siyakhokha service will be surveyed to capture data on their trust in government and distrust. This data could be used to advance the understanding on the association between residents not using the e-Siyakhokha service and, their trust in government and distrust. This data may also be used to compare trust in government and distrust between users and non-users.

### 6.5.2 *Sample and sampling method*

Determining a study's sample size should consider the population under inquiry, given that a sample represents the total population on which a study is based (Kothari, 2004). This is so that the researcher can calculate the minimum sample size needed to make statistical inferences and to detect an effect or pattern (Gorard, 2013). There are different ways to calculate sample size depending upon different considerations. A sample size calculator can be used to define the size of a sample. One such calculator is by Survey Monkey[9] and their calculator[10]considers the confidence level, confidence interval and population to determine how many individuals to survey (Survey Monkey, 2015). Another method used to calculate sample size is Yamane's (1967) sample size formula[11]. Hair, Black, Babbin and Anderson (2009) propose that an acceptable subject to independent variable ratio is 10:1 and at a minimum, a ratio of 5:1 may be used. Similarly, Gorsuch (1983) suggests that at a minimum subject to variable ratio a study should use is 5:1. Based on the population of 121077 users, a summary of the present study's sample sizes using the highlighted sample size methods is found in table 14.

Table 14: Summary of Sample Sizes

| Source | Sample Size |
|---|---|
| Survey Monkey (2015) | 383[12] |
| Yamane (1967) | 399[13] |
| Hair et al. (2009) | 360[14] |
| Gorsuch (1983) | 180[15] |

Given the divergent opinions on sample size calculation, the current researcher uses Yamane (1967) sample size calculation. This is because, the size of the required sample 1) provides a

[9]https://www.surveymonkey.com/mp/sample-size-calculator/
[10]Survey Monkey's calculator's formula is as follows: (z2*p(1-p)e2)/(1+((z2*p(1-p))/e2N)) where z-score and e is the Margin of error and N is the population size.
[11] Yamane's (1967) formula is as follows: Sample Size = n/1 + $(e)^2$*n. Where n is the population size and e is the precision level.
[12] A population of 121077 with a confidence level of 95% and confidence interval of 5% returns a sample size of 383
[13]A population of 121077 with a confidence level of 95% and confidence interval of 5% and a precision level of 0.05 returns a sample size of 399.
[14]10 * 36 = 360
[15]5 * 36 = 180

broader sample from which to collect data and 2) is still feasible in terms of cost and time. In addition, the researcher will be more likely to capture the variance in the population. The researcher will use a sample of 1500 potential respondents to ensure that there will be a minimum of at least 300[16] respondents. The current study uses an average response rate of 20% that is supported by Bhattacherjee (2012). The sample frame of 1500 is to ensure that the minimum required responses are obtained. Sample size is also dependent on the number of constructs. According to Hair et al. (2009), an increased sample size produces greater power for statistical tests based on the notion that sample size can affect the statistical test by either making it insensitive at small sample sizes or overly sensitive at large sample sizes.

Systematic random sampling is used within this study. Step one, the researcher will populate a list of the areas within Ekurhuleni. The places within Ekurhuleni will be obtained from the Statistics South Africa[17] website. For example, Germiston, Kempton Park and Boksburg are referred to as places within the present study. The term place and area were used interchangeably within the current study. Step two in order to ensure that residents are randomly selected a random number is assigned to each area on the list by using Psychic Science's (2015) random number generator[18]. The random integers will be generated between 1 and 10. Integers are able to appear as many times as necessary. Step three, the areas which are assigned an even number will be selected from the list as survey sites. Specific survey sites were locations within the vicinity of civic centres, municipal buildings and libraries of the areas. Appendix S comprises a map of Ekurhuleni and maps of the survey sites. In step four, a random number between 1 and 10 is generated using Psychic Science's (2015) number generator. The generated number will be used to determine the starting point for inviting potential respondents. The generated number is referred to as x. Step five, the x-th resident at a survey site will then be approached and invited to

[16] On completion of the study one of the examiners revealed that there was a discrepancy regarding the sample size. This was an error and the reference of a sample size of 399 should be ignored.
[17] http://www.statssa.gov.za/?page_id=1021&id=ekurhuleni-municipality
[18] http://www.psychicscience.org/random.aspx

participate in the study. For example, the x-th resident within the vicinity of a civic centre. In step six, a random number between 1 and 4 will be generated using the random number generator. This number is used to determine the survey invitation interval. The generated number is referred to as n. Step seven, every n-th resident will be approached and invited to participate in the study.

An example using the sampling protocol is highlighted below:

a) Places within Ekurhuleni are assigned random numbers using Psychic Science's number generator.
b) Areas within Ekurhuleni assigned even numbers are selected as survey sites.
c) The starting point number generated by Psychic Science's number generator is 9.
d) The ninth resident within a survey site is then invited to participate in the study.
e) The interval point number generated by Psychic Science's number generator is 2.
f) Every second resident is then approached and invited to participate in the study.

## 6.6 The research instrument

This study uses a close-ended structured questionnaire as the research instrument. The analysis and administration of structured questionnaires is minimally complex (Kothari, 2004). A 5-point Likert scale is used in the questionnaire. The Likert scale contains a scale asking the potential respondents to indicate their level of agreement where they indicated from 1 strongly disagree to 5 strongly agree (Crano & Brewer, 2002). The instrument is applied to the study's constructs specifically: perceived performance, expectations, confirmation, satisfaction, trust in government, distrust, trust in e-government services, perceived risk, e-government service use and continued use intention. The scale is adapted from existing instruments proposed by Bhattacherjee (2001), Bhattacherjee, Perols and Sanford (2008), Lankton and McKnight (2012), Paravastu et al. (2014), Pavlou and Gefen (2004), Ou and Sia (2010), Turel et al. (2008), Vance et al. (2008) and Yoon & Rolland (2015). An example of the study's research items is as follows,

Satisfaction (SAT) consists of items such as SAT1 (How do you feel about your overall experience of the City of Ekurhuleni online service: Very satisfied.) and SAT2 (How do you feel about your overall experience of the City of Ekurhuleni online service: Very pleased.). Please refer to Appendix G for all the scale items. The conceptual definitions, scale items and literature sources for e-government service use are highlighted in table 15. Table 16 illustrates the conceptual definition, scale items and literature source for perceived performance, expectations, confirmation, satisfaction, trust in government, distrust, trust in e-government services, perceived risk and continued use intention.

Table 15: Research Construct, Conceptual Definitions and Literature Sources

| # | Construct | Conceptual Definition | Item | Measurement | | | | | | | Literature Source |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **E-government Service use** | Using an IT (Bhattacherjee , Perols & Sanford, 2008) | **1.** | Number of times you currently use the City of Ekurhuleni online service per week: | 0 | 1-3 | 4-6 | 7-9 | 10-12 | Other: | (Bhattacherje, Perols & Sanford, 2008) |
| | | | **2.** | Which of the following City of Ekurhuleni online service functionalities do you use? :<br>rates payment □<br>municipal tax payment □<br>traffic fine payment □<br>utility statement viewing □<br>meter reading submitting □<br>personal information updating □<br>other □ | | | | | | | |
| | | | **3.** | Which government service requests do you currently process using the City of Ekurhuleni online service? :<br>paying rates □<br>paying municipal tax □<br>paying traffic fine □<br>viewing utility statements □<br>submitting meter readings □<br>updating personal information □<br>other □ | | | | | | | |
| | | Use of an IT by individual users (Yoon & Rolland, 2015) | **4.** | How many hours do you use the City of Ekurhuleni online service | 0-1 | 1–3 | 3–6 | 6–9 | 9–12 | Other: | (Yoon & Rolland, 2015) |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | every week? | | | | | | | |
| | | | **5.** | How frequently do you use the City of Ekurhuleni online service? | Never | Rarely | Occasionally | Frequently | Very Frequently | | |
| | | | | | 1 | 2 | 3 | 4 | 5 | | |

As highlighted above the present study adapts Bhattacherjee et al.'s (2008) and Yoon and Rolland's (2015) scales in order to measure use. These scales are similar to scales which have been used to measure use such as Venkatesh et al.'s (2011) use scale which consists of measurement items like (On average, how many hours do you use the system each week) and (How often do you use the system?). A cross-sectional design study is used and respondents only answered the survey once. As a result, respondents were only able to provide feedback on their current usage.

Table 16: Research Constructs, Conceptual Definitions and Literature Sources

| # | Construct | Conceptual Definition | Item | Measurement | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Literature Source |
|---|---|---|---|---|---|---|---|---|---|---|
| **2** | **Trust in Government** | "A cognition about the trustee that stems from the belief that the action of the trustee "may be relied upon, without explicit guarantee to achieve a goal in a risky situation" (Turel, Yuan & Connelly, 2008: 125) | **6.** | The City of Ekurhuleni government is trustworthy. | 1 | 2 | 3 | 4 | 5 | (Turel, Yuan & Connelly, 2008) |
| | | | **7.** | I trust that the City of Ekurhuleni government keeps my best interests in mind. | 1 | 2 | 3 | 4 | 5 | |
| | | | **8.** | The City of Ekurhuleni government keeps promises it makes to me. | 1 | 2 | 3 | 4 | 5 | |
| | | | **9.** | I believe in the information the City of Ekurhuleni government provides me. | 1 | 2 | 3 | 4 | 5 | |
| | | | **10.** | The City of Ekurhuleni government wants to be known as one that keeps commitments. | 1 | 2 | 3 | 4 | 5 | |
| **3** | **Distrust** | "Distrust is a negative- | **11.** | The City of Ekurhuleni government seems suspicious. | 1 | 2 | 3 | 4 | 5 | (Ou & Sia; 2010) |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | valent belief that leads to protective actions to reduce risk" (Ou &Sia; 2010: 914) | **12.** | The City of Ekurhuleni government seems distrustful. | 1 | 2 | 3 | 4 | 5 | |
| | | | **13.** | I feel sceptical about the City of Ekurhuleni government. | 1 | 2 | 3 | 4 | 5 | |
| | | | **14.** | I must be very watchful and wary when dealing with the City of Ekurhuleni government. | 1 | 2 | 3 | 4 | 5 | |
| **4** | **Trust in E-government Services** | The willingness to depend on a software artefact (Paravastu, Gefen & Creason, 2014) | **15.** | I trust that the City of Ekurhuleni online service will show my payment and statement history. | 1 | 2 | 3 | 4 | 5 | (Paravastu, Gefen & Creason, 2014) |
| | | | **16.** | I trust that the City of Ekurhuleni online service will process municipal payments I submit on it. | 1 | 2 | 3 | 4 | 5 | |
| | | | **17.** | I trust that the City of Ekurhuleni online service will submit meter readings I input on it. | 1 | 2 | 3 | 4 | 5 | |
| | | | **18.** | I trust that the City of Ekurhuleni online service will lodge queries I submit on it. | 1 | 2 | 3 | 4 | 5 | |
| **5** | **Perceived Risk** | Perceived risk is the subjective belief that there is some probability of suffering a loss in pursuit of a desired outcome (Pavlou & Gefen, 2004) | **19.** | There is a considerable risk involved in using the City of Ekurhuleni online service. | 1 | 2 | 3 | 4 | 5 | (Pavlou & Gefen, 2004) |
| | | | **20.** | There is a high potential for loss involved in using the City of Ekurhuleni online service. | 1 | 2 | 3 | 4 | 5 | |
| | | | **21.** | My decision to use the City of Ekurhuleni online service is risky. | 1 | 2 | 3 | 4 | 5 | |
| **6** | **Confirmation** | Users' perception of the congruence between expectation of technology use and its actual performance (Bhattacherjee, 2001) | **22.** | My experience with using the City of Ekurhuleni online service was better than what I expected. | 1 | 2 | 3 | 4 | 5 | (Bhattacherjee, 2001) |
| | | | **23.** | The service level provided by the City of Ekurhuleni online service was better than what I expected. | 1 | 2 | 3 | 4 | 5 | |
| | | | **24.** | Overall, most of my expectations from using the City of Ekurhuleni online service were confirmed. | 1 | 2 | 3 | 4 | 5 | |
| **7** | **Continued Use Intention** | "Users intention to continue using a given IT" (Bhattacherjee, Perols & | **25.** | I intend to continue using the City of Ekurhuleni online service. | 1 | 2 | 3 | 4 | 5 | (Bhattacherjee, Perols& Sanford, 2008) |
| | | | **26.** | I intend to continue using the City of Ekurhuleni online service for processing more municipal services. | 1 | 2 | 3 | 4 | 5 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Sanford, 2008: 17) | **27.** | I intend to continue using the City of Ekurhuleni online service for more of my transactions with the City of Ekurhuleni. | 1 | 2 | 3 | 4 | 5 | |
| **8** | **Satisfaction** | Users' affect with (feelings about) prior technology use (Bhattacherjee, 2001) | How do you feel about your overall experience of the City of Ekurhuleni online service use: (Question 23-26) | | | | | | | (Bhattacherjee, 2001) |
| | | | **28.** | Very satisfied. | 1 | 2 | 3 | 4 | 5 | |
| | | | **29.** | Very pleased. | 1 | 2 | 3 | 4 | 5 | |
| | | | **30.** | Very contented. | 1 | 2 | 3 | 4 | 5 | |
| | | | **31.** | Absolutely delighted. | 1 | 2 | 3 | 4 | 5 | |
| **9** | **Expectation** | "Expectations are one's pre-usage beliefs about how a technology will perform based upon certain attributes of the technology" (Lankton& McKnight, 2012: 90) | Based on my experience so far, I expect that the City of Ekurhuleni online service will : (Question 32-35) | | | | | | | (Lankton& McKnight, 2012) |
| | | | **32.** | save me time for the functions in Question 2. | 1 | 2 | 3 | 4 | 5 | |
| | | | **33.** | be convenient for the functions in Question 2. | 1 | 2 | 3 | 4 | 5 | |
| | | | **34.** | enhance my effectiveness for the functions in Question 2. | 1 | 2 | 3 | 4 | 5 | |
| | | | **35.** | be useful for the functions in Question 2. | 1 | 2 | 3 | 4 | 5 | |
| **10** | **Perceived Performance** | "Perceived Performance refers to how individuals think a technology performed during the usage experience, and is measured with items referring to this past usage period" (Lankton& McKnight, 2012: 89) | Based on your experience with the City of Ekurhuleni online service, it: (Question 36-39) | | | | | | | (Lankton& McKnight, 2012) |
| | | | **36.** | saved me time for the functions in Question 2. | 1 | 2 | 3 | 4 | 5 | |
| | | | **37.** | was convenient for the functions in Question 2. | 1 | 2 | 3 | 4 | 5 | |
| | | | **38.** | enhanced my effectiveness for the function in Question 2. | 1 | 2 | 3 | 4 | 5 | |
| | | | **39.** | was useful for the functions in Question 2. | 1 | 2 | 3 | 4 | 5 | |

## 6.7 Unit of analysis

Residents of Ekurhuleni are surveyed to identify the factors that influence their e-government service continued use intention. The unit of analysis of this study is the individual.

## 6.8 Procedure for data collection

The research uses paper-based surveys to collect data from potential respondents from Ekurhuleni. The researcher will approach potential respondents according to the study's sampling method. The survey's contents will be then explained to potential respondents. The researcher will assess whether the potential respondents conformed to the target population criteria. Potential respondents will be invited to participate in the study. If potential respondents agree to partake in the study, they will be provided with the study survey and an opportunity to complete it (See Appendices F and G). If potential respondents have not used e-government services they will answer the first and last sections of the survey, if respondents have used the e-government services they will complete the entire survey.

## 6.9 Data analysis and interpretation

Since the current study uses a quantitative method, descriptive and inferential statistics are used to conduct data analysis. Descriptive statistics are used to describe the study's variables by using statistics such as means and frequencies (Bhattacherjee, 2012). Inferential statistics such as regression analysis are used to test hypotheses and explain associations between the study's variables such as the relationship between satisfaction and continued use intention (Bhattacherjee, 2012).

The present research will administer paper based surveys. Step one of the data analysis process is data capturing and formatting for SPSS. The data is converted into a SPSS supported format and

then imported into SPSS. Step two, involved initial screening. This is done to remove responses that consist of high amounts of missing data or have response biases.

Further data screening will take place as part of step three with an emphasis on outlier analysis by using standardised scores. Kurtosis and skewness scores are analysed to identify the study's variables distribution (Hair et al., 2009). Measurement items may need to be reverse coded to address negative phrasing. Afterwards descriptive statistics are used to describe the respondent profile.

Validity and reliability of the constructs is assessed as part of step four of the study's analysis process. Validity and reliability is examined by using inter-item correlation analysis, principal component factor analysis, Cronbach's alpha and the average variance extracted (Crano & Brewer, 2002). Step five, looks at the assumptions that should be considered before using any statistical techniques. Normality analysis of the study's constructs is performed by using 1) kurtosis and skewness z-values, 2) the Shapiro Wilk's test and 3) examining graphical plots (Hair et al., 2009). Following normality analysis, assumptions specific to regression testing are assessed. This includes assumptions of: collinearity, linearity, heteroscedasticity and the normality of residuals.

Step six, focuses on hypothesis testing. Hypothesis testing is performed using Pearson's correlation analysis and multiple regression testing (Crano & Brewer, 2002). The correlation analysis will measure the strength of the relationship between each independent variable and continued use intention. Multiple regression testing is conducted to identify which independent variables has significant effects and can predict for continued use intention in the presence of other variables. Additionally, regression testing will be used to test for the mediational effect, in which perceived performance leads to satisfaction through confirmation.

The final step in the study's analysis process, step seven involves Partial Least Square (PLS) testing. This test is used to further understand the link between the study's independent variables and the dependent variable (Helland, 1990). PLS is also be used to identify the latent variables

which impact continued use intention. Factors that are found to be unimportant could be removed from a study's model. This may result in a more parsimonious model comprising determinants that have a significant influence on the continued use intention. PLS is especially useful in instances when the predicting for a dependent variable with a large set of independent variables (Abdi, 2003). This is the case with the present study, where there are nine independent variables versus one dependent variable. PLS preserves the asymmetry of the association between independent and dependent variables, whereas other methods such as multiple factor analysis do not (Abdi, 2003). PLS can also be used to examine the relationships between the study's independent variables (Helland, 1990). For instance examining the relationship between trust in e-government services, and perceived risk. Given the strengths and granularity of PLS, the present study used PLS within its analysis.

## 6.10 Limitations of the study

Some of the limitations of using surveys is that the design may be inflexible. The reason for this is the survey questions and the survey administration method may not be modified at any point during data collection (Lapan et al., 2011). The questionnaires also have structured closed ended questions in which respondents answer questions based on the survey provided responses.

A possible limitation is random differences arising from sample data and true population values may lead to sampling errors (Nueman, 1997). Some of the respondents may not know the reasons for their own behaviour when it comes to continued use intention as they complete the questionnaire. From this participant error, a respondent may select or guess a response on the response set without any understanding on why they selected the response.

Another possible limitation of the present study is the use of self-report data. Some respondents may report what positively reflects on their capabilities, skills, beliefs and knowledge or may report what they believe the researcher expects to see (Austin, Deary, Gibson, McGregor &

Dent, 1998). Another issue with using self-report techniques is that respondents may not accurately recall their past behaviour (Paulhus & Vazire, 2009).

## 6.11 Validity and reliability

Within this study, tests needed to be taken to ensure that instruments were valid and reliable. Validity and reliability are essential in ensuring the accuracy and adequacy of measurement methods in the present study (Bhattacherjee, 2012). The researcher could find that instruments that were valid are not necessarily reliable. A valid scale measures the construct it aims to measure and a reliable scale measures a construct in a consistent and precise manner (Cook & Beckman, 2006). Therefore, to ensure validity in this study, the research instruments adequately measured: perceived performance, expectations, confirmation, satisfaction, trust in government, distrust, trust in e-government services, perceived risk, e-government service use and continued use intention. For reliability, scale items should produce similar results every time they are used (Kothari, 2004).

This study used six types of validity to validate if instruments measured what they were supposed to measure. The types of validity examined were external validity, internal validity, construct validity, face validity, content validity, convergent and discriminant validity.

### 6.11.1 *External validity*

External validity assesses whether the observed relationships can be generalised from the sample of the population or to other individuals, time or contexts (Cook & Beckman, 2006). External validity for this study was achieved based on the number of respondents and the location of the residents who participated in the research. For example, the data collected for satisfaction and trust in government from the study could possibly be generalised to residents within Ekurhuleni. This is because the e-government study's sample could be representative of the population. To

ensure external validity the study was conducted at different sites and potential respondents were randomly selected and invited to participate in the study.

### 6.11.2 *Internal validity*

Internal validity refers to whether a study measures its intended factors and is truthful in its results (Golafshani, 2003). For this study, internal validity was ensured by measurement strictness in the constructs that the research aimed to measure (Lapan et al., 2011; Nueman, 1997). The study used pilot testing and pretesting to ensure internal validity. The tests were conducted using a sample set from the study's population. The research instrument was then updated based on the test feedback.

### 6.11.3 *Construct validity*

Within the present study, construct validity refers to the extent to which the study's scale items sufficiently represent the constructs which they intend to measure (Bhattacherjee, 2012). Construct validity in this study was used to assess the constructs design to ensure that the study's constructs such as confirmation or perceived performance had been adequately defined. The current study used face tests to test the construct validity of the study's measures. The constructs were updated based on the feedback received. The study's construct validity was assessed by using Principal Component Factor Analysis (PCFA). PCFA aims to explain the variance that exists between the current study's factors (Kothari, 2004). PCFA was used to identify which factors to retain in the present research.

### 6.11.4 *Face validity*

In this research, face validity ensured that measurement items on: perceived performance, expectations, confirmation, satisfaction, trust in government, distrust, trust in e-government services, perceived risk, e-government service use and continued use intention were

unambiguous and clear. Respondents were also able to comprehend each measures purpose clearly. The face validity of each construct was assessed by pretesting with Wits University Information Systems lecturers. The lecturers examined the research instrument to ensure that it was easy for respondents to understand. The questionnaire was adjusted based on the lecturers' feedback.

### 6.11.5 *Content Validity*

In the context of this study, content validity assesses the extent to which the study's measures reflect the constructs they measure (Bhattacherjee, 2012). The theoretical domain of each construct was defined. The current study used literature to define the theoretical domain of the constructs. This ensured that measurement items comprised indicators that could be used to sufficiently measure perceived performance, expectations, confirmation, satisfaction, trust in government, distrust, trust in e-government services, perceived risk, e-government service use and continued use intention. Lecturers within the Wits University Information Systems department were consulted in order to perform pre-tests to examine the content validity of each measurement scale. For example, on satisfaction, the pre-tests assessed whether the measures for satisfaction were representative of the satisfaction construct.

### 6.11.6 *Convergent and Discriminant Validity*

The closeness with which a measurement scale reflects the construct that it is supposed to measure is referred to as convergent validity while discriminant validity is the degree to which a measurement scale does not reflect and measure other constructs that it is not supposed to measure (Lapan et al., 2011). For instance, this study had similar constructs namely trust in government and trust in e-government servives. In order to establish convergent validity, the observed values of trust in government were compared with indicators from trust in city e-services in order to investigate whether there was a high correlation between the values of the

two constructs. If there was a low correlation between the trust in government and trust in city e-services constructs then this would demonstrate discriminant validity. The study's convergent and discriminant validity was examined using Principal Component Factor Analysis. In addition, Average Variance Extracted (AVE) was used to establish the research constructs convergent validity. Constructs with AVE scores of 0.5 and above could be considered to have convergent validity (Fornell & Larcker, 1981). The AVE threshold of 0.5 and above was adequate for this study.

### 6.11.7 *Reliability*

Reliability can be defined as the extent to which a construct's measure is dependable or consistent (Lapan et al., 2011; Nueman, 1997). If the study's satisfaction measure was used in a similar study, it was expected to produce similar results. Potential participants who have used e-government services were invited to participate in the study. In this way, the same data was collected across the various sites from residents who had used the same e-government services to ensure reliability (Golafshani, 2003). In addition, questionnaires were written concisely and did not contain jargon to increase the likelihood that participants completed the questionnaires accurately. The Cronbach alpha test was used to assess the internal consistency reliability of the study's constructs. Cronbach alpha analysis was performed on the constructs. If a construct had an alpha coefficient range below 0.7 it needed to be removed or modified. This ensured that the study used dependable and consistent constructs (Cronbach, 1951).

## 6.12 Ethics

It is important to conduct this study in an ethical way to ensure that participants do not incur harm during the research (Bailey, 1994). Research conducted in the mid-twentieth century which did not apply ethical principles resulted in harm to participants. For example within some studies research participants received treatments they had not agreed on and in some instances were

subjected to stressful situations (Gorard, 2013). Conforming to ethical standards potentially ensures that participants are not inflicted with damage as these standards consider the well-being of participants during the course of the research (Bailey, 1994). Secondly, there may be a conflict of interest between the research and the funders of the research. This is when the funders are interested more in the results of the research than the research itself and are interested in ensuring that the results will align with their biases. Should a conflict of interest arise, the researcher will follow the ethical principles prescribed by the University of Witwatersrand. Thirdly, prior research has been influenced by organisations and individuals to advance their personal motives. These organisations or individuals take part in activities that contravene the norms of scientific behaviour. For instance within a study a researcher may manipulate findings in order to hide the hypotheses that are unsupported to advance their private agenda. Within this study, ethical principles were adhered to in order not to protect the respondents from harm.

The researcher complies with the Wits University ethical requirements during the course of the study. This ensures that research participants ethical considerations are adhered to. The study's questionnaire was approved by the Wits University Research Ethics Committee, (Non-Medical), Protocol Number: H16/07/23. Appendix H is a copy of the ethics clearance certificate.

Permission is sought from the residents the survey will be provided to. Survey results were not associated to any of the study participants. This ensured potential respondents' anonymity and prevented them from being identified. Potential respondents will be provided with a survey participation letter, this aides in ensuring informed consent and voluntary participation in the research. The researcher will assured the respondents that the research will not result in harm or loss of benefit. Respondents are allowed to withdraw from the current research at any stage.

Unintended effects are known by the researchers but have a low probability where associated risks can be ignored. Holdrege (2015) writes that unintended effects are results that may not be intended. For instance, in medicine, results from medication may have side effects where these side effects are unintended (Hansson, 2011). In order to mitigate unintended consequences in this

study, the researcher will include measures to avoid negative consequences, in spite of the very low probability. This will be done by engaging with stakeholders to achieve consensus on the research scope and objectives.

Stacey and Stacey (2012) contend that unexpected effects are known to the researcher; however have no anticipated risks due to their zero probability of occurrence. Although unexpected implications have a zero probability the researcher disclosed and consulted with the university academic community to validate zero probability of occurrence for the e-government services study. The researcher will report all the research results whether positive or negative.

Unforeseen consequences are unknown to the researcher but could have been predicted. To mitigate these consequences, the researcher will consider possible negative effects along with associated probabilities and impacts (Stacey and Stacey, 2012). This is because unforeseen consequences have an unknown probability of occurring. Unforeseeable consequences could not have been reasonably identified by researchers. Unforeseeable consequences are similar to unforeseen consequences in that these have a vague probability (Stacey and Stacey, 2012). Within the context of this study, the researcher will remain open-minded to possible negative consequences and seek input on these from the Wits academic community to mitigate the unforeseeable effects. The researcher will be open-minded by depending on reliability and accuracy of the research results.

Lastly, data analysis and reporting of the study results will be accurately conducted. Bhattacherjee (2012) suggests that researchers have an ethical obligation to the scientific community on how data is analysed and reported in their study consequently any negative or unexpected findings are disclosed.

## 6.13 Conclusion

This chapter highlighted the study's methodology. It first looked at the research paradigm and research method. It then described the research design, population, study sample, research instrument and unit of analysis. It then addressed the data collection procedure, data analysis and interpretation. This chapter also focused on the study's limitations, validity, reliability and ethical considerations. The next chapter provides an analysis of the research findings.

# 7 DATA ANALYSIS

## 7.1 Introduction

This chapter outlines the results from the present study's data collection. It firstly focuses on the survey distribution and then discusses the data screening and cleaning processes, after which it highlights demographic information relating to the study's respondents. It provides a discussion on the sample in relation to the population. Principal Component Factor Analysis, Cronbach's alpha and average variance extracted were used to address validity and reliability. The relationships between the study's variables were assessed using correlation and regression analyses, and partial least squares. This enabled a confirmation of supported and unsupported hypotheses.

During pre-testing, it was suggested that the names of a subset of the study's constructs needed to be modified. The new names may more accurately reflect the constructs. The suggested names were as follows:

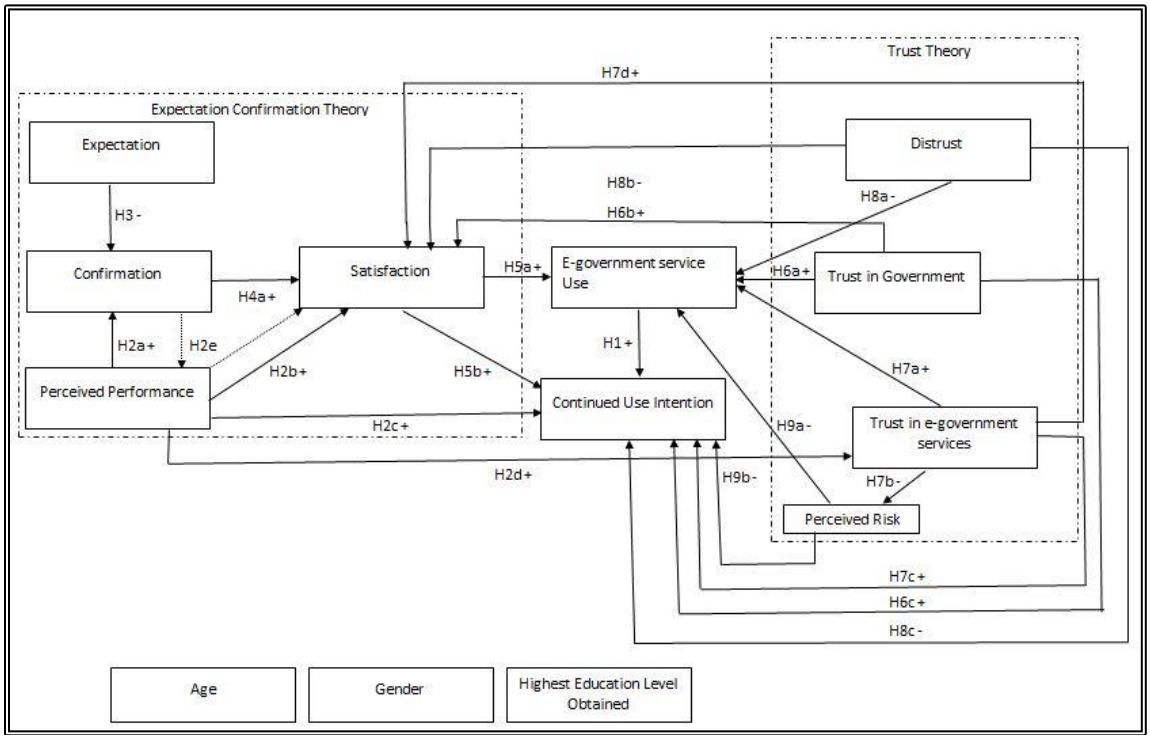
- Trust in the City
- Distrust in the City
- Trust in City e-Services
- City e-Service use

This necessitated an adjustment of the study's hypotheses and conceptual model. The updated hypotheses can be found in table 17. Figure 3 illustrates the updated conceptual model.

Table 17: Modified Hypotheses

| Summary of Hypotheses | |
|---|---|
| Hypothesis 1 | *City e-service use positively influences continued use intention.* |
| Hypothesis 2a | *The perceived performance of a city e-service positively influences confirmation.* |
| Hypothesis 2b | *The perceived performance of a city e-service positively influences satisfaction.* |
| Hypothesis 2c | *The perceived performance of a city e-service positively influences continued use intention.* |
| Hypothesis 2d | *The perceived performance of a city e-service positively influences trust in city e-services.* |
| Hypothesis 2e | *The perceived performance of a city e-service mediates the effect of confirmation on satisfaction.* |
| Hypothesis 4a | *Residents' extent of confirmation positively influences satisfaction with e-government services.* |
| Hypothesis 5a | *Satisfaction positively influences city e-service use.* |
| Hypothesis 6a | *Trust in the city positively influences city e-service use.* |
| Hypothesis 6b | *Trust in the city positively influences satisfaction.* |
| Hypothesis 6c | *Trust in the city positively influences continued use intention.* |
| Hypothesis 7a | *Trust in city e-services positively influences city e-service use.* |
| Hypothesis 7b | *Trust in city e-services negatively influences perceived risk.* |
| Hypothesis 7c | *Trust in city e-services positively influences continued use intention.* |
| Hypothesis 7d | *Trust in city e-services positively influences satisfaction.* |
| Hypothesis 8a | *Distrust in the city negatively influences city e-service use.* |
| Hypothesis 8b | *Distrust in the city negatively influences satisfaction.* |
| Hypothesis 8c | *Distrust in the city negatively influences continued use intention.* |
| Hypothesis 9a | *Perceived risk negatively influences city e-service use.* |

Figure 3: Adjusted Conceptual Model




(Adapted from Oliver (1981))

The research questionnaire was also adjusted to accommodate feedback that was received during pretesting. The feedback received during pilot testing did not require any modification to the study's survey.

## 7.2 Survey Distribution, Collection and Response Rate

The data collection for this study took place over a three-month period. Places within Ekurhuleni in Gauteng were assigned random numbers using Psychic Science's number generator. A copy of the random numbers generated can be found in Appendix I. The places assigned even numbers were selected as survey sites. This resulted in a list comprising nine survey sites and these are the places from which data was collected. Table 18 highlights the present study's survey sites. Appendix J is a copy of the survey schedule. The current study's questionnaire was distributed to

residents within these places. Consent was sought from each resident who agreed to participate in the study. Five hundred and twenty-one[19](521) responses were received during data collection, with a response rate of 34.73%[20]. This response rate was above the expected response rate of 33% for paper-based surveys as discussed in Nulty's (2008) study.

Table 18: Survey Sites

| # | Place |
|---|---|
| 1 | Boksburg |
| 2 | Brakpan |
| 3 | Daveyton |
| 4 | Geluksdal |
| 5 | Germiston |
| 6 | Kempton Park |
| 7 | Langaville |
| 8 | Springs |
| 9 | Tokoza |

## 7.3 Data Screening, Missing Values and Outliers

### 7.3.1 *High amount of missing data*

Out of the 521 responses received, 25 had a high amount of missing data (the respondents answered on average 34.19% of the questions). According to Hair at al. (2009) substituting or ignoring missing data for a questionnaire missing data higher than 10% will create a bias in the data and this will have an effect on the study's results. Based on this, 25 questionnaires were excluded from the data analysis.

[19]The data collected consisted of 227 responses from residents who have used the City of Ekurhuleni online service and 294 responses from residents who have not used the online service.
[20] 521/1500 *100=34.73333

### 7.3.2 *Partial amount of missing data*

Ten responses had a partial amount of missing data (the respondents answered on average 95.6% of the questions) and a mean replacement strategy was used to impute the missing data in these questionnaires (Hair et al., 2009).

### 7.3.3 *Demographic information*

Twenty-eight respondents did not answer any questions relating to demographic information. Another three respondents did not answer questions on their level of education. One respondent did not answer questions on their gender and level of education. Another respondent did not answer the question on his or her age. Therefore, 33 questionnaires[21] were excluded when populating the respondent profile. The demographic questions were crucial for conducting descriptive statistics on the respondent profile. The questionnaires missing demographic information were also excluded from the analysis to avoid any artificial misrepresentation of the current study's respondent profile. This left 496 surveys available for data analysis. These surveys comprised 203 responses from residents who have used the City of Ekurhuleni online service and 293 responses from residents who have not used the online service.

### 7.3.4 *Distribution Analysis*

Standardised scores for each questionnaire item were calculated to identify any outliers. Questionnaire responses with standardised scores exceeding ±3.0 on each of the items are distinctively different from the other observations and may need to be excluded from the study (Hair et al., 2009). Only three observations exceeded the outlier threshold on more than one variable. However, these observations were included in the study because they only exceeded the threshold on two variables and none of these variables was the study's dependent variable. Furthermore, the observations do not exceed the outlier threshold on a sufficient number of

[21] Comprised 2 responses from residents who have used the City of Ekurhuleni online service and 31 responses from residents who have not used the online service

variables for them to be regarded as unrepresentative of the population (Hair et al., 2009). Table 19 reports on the observations exceeding the outlier threshold.

The distribution of the study's variables was examined using Kurtosis and skewness values. Table 20 and 21 report on the distribution analysis. Table 20 provides data on residents who have used the City of Ekurhuleni online service and table 21 focuses on residents who have not used the service. Approximately 53.84% of the user questionnaire items were negatively skewed and 46.15% were positively skewed. USE1 had the highest level of skewness. USE1 also had the highest level of kurtosis. With the exception of TIC5, all the other non-user questionnaire items were negatively skewed. This indicates that the mean values recorded were unrepresentatively high. TIC2 had the highest level of skewness and TIC1 had the highest level of kurtosis. No surveys were excluded during distribution analysis.

Table 19: Outlier Detection Results

| Questionnaire Item | Cases with standardized values exceeding ±3 |
|---|---|
| USE1 | 60, 85, 129, 179, 195, 196, 216, 219 |
| USE4 | 38, 52, 63, 84, 173, 195, 196, 219 |
| EXP4 | 89 |
| PEP1 | 93 |

[22]

Table 20: Distribution Analysis

| Questionnaire Item | Mean | Standard Deviation | Variance | Skewness | Standard Error of Skewness | Kurtosis | Standard Error of Kurtosis |
|---|---|---|---|---|---|---|---|
| TIC1 | 3.12 | 0.904 | 0.818 | 0.170 | 0.171 | -0.495 | 0.340 |
| TIC2 | 3.35 | 0.857 | 0.735 | -0.230 | 0.171 | -0.402 | 0.340 |
| TIC3 | 3.25 | 0.874 | 0.763 | -0.108 | 0.171 | -0.609 | 0.340 |
| TIC4 | 3.25 | 0.878 | 0.771 | 0.073 | 0.171 | -0.428 | 0.340 |
| TIC5 | 3.25 | 0.839 | 0.704 | 0.005 | 0.171 | -0.042 | 0.340 |

[22] For coding of specific statements please refer to Appendix K

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| DIS1 | 3.01 | 0.862 | 0.742 | 0.121 | 0.171 | -0.221 | 0.340 |
| DIS2 | 3.05 | 0.900 | 0.809 | -0.056 | 0.171 | -0.374 | 0.340 |
| DIS3 | 3.19 | 0.799 | 0.638 | 0.121 | 0.171 | 0.005 | 0.340 |
| DIS4 | 3.25 | 0.789 | 0.622 | -0.101 | 0.171 | 0.502 | 0.340 |
| TES1 | 2.90 | 0.980 | 0.961 | 0.072 | 0.171 | -0.536 | 0.340 |
| TES2 | 3.39 | 0.821 | 0.675 | -0.181 | 0.171 | -0.381 | 0.340 |
| TES3 | 3.31 | 0.853 | 0.728 | -0.154 | 0.171 | -0.187 | 0.340 |
| TES4 | 3.34 | 0.884 | 0.781 | 0.176 | 0.171 | -0.666 | 0.340 |
| PER1 | 3.07 | 0.978 | 0.956 | -0.011 | 0.171 | -0.515 | 0.340 |
| PER2 | 3.00 | 0.867 | 0.752 | -0.138 | 0.171 | -0.055 | 0.340 |
| PER3 | 2.95 | 0.971 | 0.943 | 0.208 | 0.171 | -0.199 | 0.340 |
| CON1 | 3.14 | 0.796 | 0.634 | 0.103 | 0.171 | -0.111 | 0.340 |
| CON2 | 3.07 | 0.820 | 0.673 | 0.350 | 0.171 | 0.077 | 0.340 |
| CON3 | 3.06 | 0.800 | 0.640 | 0.186 | 0.171 | 0.425 | 0.340 |
| CU1 | 3.28 | 0.859 | 0.738 | -0.245 | 0.171 | -0.157 | 0.340 |
| CU2 | 3.31 | 0.806 | 0.649 | 0.078 | 0.171 | 0.358 | 0.340 |
| CU3 | 3.27 | 0.827 | 0.684 | -0.011 | 0.171 | 0.059 | 0.340 |
| USE1 | 2.33 | 0.931 | 0.867 | 2.589 | 0.171 | 7.589 | 0.340 |
| USE2 | 2.43 | 1.438 | 2.067 | 1.160 | 0.171 | 0.746 | 0.340 |
| USE3 | 2.43 | 1.451 | 2.106 | 1.176 | 0.171 | 0.744 | 0.340 |
| USE4 | 2.05 | 1.093 | 1.196 | 1.875 | 0.171 | 4.654 | 0.340 |
| USE5 | 2.71 | 0.788 | 0.621 | 0.248 | 0.171 | -0.202 | 0.340 |
| SAT1 | 3.35 | 0.889 | 0.791 | -0.274 | 0.171 | -0.213 | 0.340 |
| SAT2 | 3.57 | 0.906 | 0.821 | -0.482 | 0.171 | 0.082 | 0.340 |
| SAT3 | 3.57 | 0.878 | 0.772 | -0.360 | 0.171 | 0.438 | 0.340 |
| SAT4 | 3.47 | 0.886 | 0.785 | -0.047 | 0.171 | -0.122 | 0.340 |
| EXP1 | 3.59 | 0.830 | 0.689 | 0.063 | 0.171 | -0.588 | 0.340 |
| EXP2 | 3.55 | 0.896 | 0.803 | -0.032 | 0.171 | -0.743 | 0.340 |
| EXP3 | 3.65 | 0.913 | 0.834 | -0.221 | 0.171 | -0.553 | 0.340 |
| EXP4 | 3.69 | 0.829 | 0.688 | -0.049 | 0.171 | -0.348 | 0.340 |
| PEP1 | 3.59 | 0.854 | 0.729 | -0.200 | 0.171 | -0.322 | 0.340 |
| PEP2 | 3.63 | 0.909 | 0.826 | -0.204 | 0.171 | -0.362 | 0.340 |
| PEP3 | 3.65 | 0.943 | 0.890 | -0.433 | 0.171 | -0.064 | 0.340 |
| PEP4 | 3.73 | 0.856 | 0.733 | -0.112 | 0.171 | -0.682 | 0.340 |

Table 21: Distribution Analysis

| Questionnaire Item | Mean | Standard Deviation | Variance | Skewness | Standard Error of Skewness | Kurtosis | Standard Error of Kurtosis |
|---|---|---|---|---|---|---|---|
| TIC1 | 2.91 | .927 | .859 | -.166 | .142 | -.640 | 0.284 |
| TIC2 | 3.12 | 1.007 | 1.014 | -0.336 | 0.142 | -0.589 | 0.284 |
| TIC3 | 3.09 | 0.917 | 0.841 | -0.123 | 0.142 | -0.156 | 0.284 |
| TIC4 | 3.19 | 0.976 | 0.952 | -0.220 | 0.142 | -0.408 | 0.284 |
| TIC5 | 3.14 | 0.922 | 0.849 | 0.081 | 0.142 | -0.255 | 0.284 |
| DIS1 | 2.80 | 0.930 | 0.865 | -0.059 | 0.142 | -0.557 | 0.284 |
| DIS2 | 2.68 | 0.914 | 0.835 | -0.025 | 0.142 | 0.419 | 0.284 |
| DIS3 | 2.88 | 0.858 | 0.736 | -0.129 | 0.142 | -0.026 | 0.284 |
| DIS4 | 2.98 | 0.850 | 0.722 | -0.157 | 0.142 | 0.453 | 0.284 |

## 7.4 Respondent Profile

This subsection presents and discusses the descriptive data that was collected regarding the respondents.

### 7.4.1 *Age*

The current subsection addresses the respondent age profile. It first focuses on data about residents who have used the Ekurhuleni online service and then on residents who have not used the service. Table 22 highlights data on users and table 23 data about non-users.

Table 22: Respondent Age Groups for Users

| | Frequency | Percent |
|---|---|---|
| 20 – 24 years | 20 | 10.0 |
| 25 - 29 years | 89 | 44.3 |
| 30 - 34 years | 54 | 26.9 |
| 35 - 39 years | 18 | 9.0 |
| 40 - 44 years | 5 | 2.5 |
| 45 - 49 years | 6 | 3.0 |
| 50 - 54 years | 2 | 1.0 |
| Prefer not to specify age | 7 | 3.5 |
| Total | 201 | 100.0 |

Table 22 shows that roughly, 27% of the respondents were between 30-34 years old and 44% were between 25-29 years old. The majority of respondents were between the ages of 25-29. This is consistent with Ekurhuleni, where most residents are between the ages of 25-29 (Statistics South Africa, 2011e). The 30-34 years age group had the second highest number of respondents. This age group is the third highest age group of Ekurhuleni. In the present study, the third highest age group was the 20-24 years age group. This age group is the second highest age group of Ekurhuleni (Statistics South Africa, 2011e). The age group inconsistency may be a result of the study's survey being distributed to fewer residents between the ages of 20-24 than those between the ages of 30-34. According to the Parliament of the Republic of South Africa (1996), a youth is any individual between the ages of 14-35. Ekurhuleni has a high youth unemployment rate, approximately 37% of the youth are unemployed (Statistics South Africa, 2011e). The majority of unemployed youth in Ekurhuleni may have been between the ages of 30-34, as a result, these residents could have been more accessible compared to residents between the ages of 20-24. Given that the 20-24 age group is the highest number of enrolments in higher education institutions in South Africa (Council on Higher Education South Africa, 2016). Most residents between the ages of 20-24 may have also been enrolled at higher education institutions and not easily accessible due to academic commitments. This could have affected the study's age distribution. A further 7% of the respondents were aged 40 years and older (based on an aggregation of the applicable age groups). Residents aged 40 and above constitute a small percentage of the population of Ekurhuleni (Statistics South Africa, 2011e). From the majority age range of 25-29, the number of respondents per age group decreases as the age range increases. This is consistent with Ekurhuleni, where the number of residents per age group decreases as the age group increases (Statistics South Africa, 2011e). Between the age groups of 40-44 and 45-49, the respondent frequency increased by one. Four percent of the respondents preferred not to specify their ages.

Table 23: Respondent Age Groups for Non-Users

| | Frequency | Percent |
|---|---|---|
| 20 – 24 years | 51 | 19.5 |
| 25 - 29 years | 89 | 34.0 |
| 30 - 34 years | 65 | 24.8 |
| 35 - 39 years | 33 | 12.6 |
| 40 - 44 years | 8 | 3.1 |
| 45 - 49 years | 8 | 3.1 |
| 50 - 54 years | 3 | 1.1 |
| Prefer not to specify age | 5 | 1.9 |
| Total | 262 | 100.0 |

Table 23 shows that approximately 25% of the respondents were between 30-34 years old and 34% were between 25 and 29 years old. Similarly, to the age group distribution for users, the 30-34 years age group had the second highest number of respondents and the 20-24 years age group the third highest. The difference in the age distribution to that of Ekurhuleni may also be a result of the study's questionnaire being distributed to fewer residents between the ages of 20-24 than those between the ages of 30-34. The potential reasons for this were addressed in the paragraph above which focuses on users. A further 7% of the respondents were aged 40 years and older (based on an aggregation of the applicable age groups). From the majority age group of 25-29, the number of respondents per age group decreases as the age range increases. This is similar to Ekurhuleni where the majority age range is also the 25-29 age group and the residents per age group also decreases as the age group increases (Statistics South Africa, 2011e). Between the age ranges of 40-44 and 45-49, the respondent frequency does not vary. Two percent of the respondents preferred not to specify their ages.

### 7.4.2 *Gender*

Figures 4 and 5 are pie charts used to provide a graphical representation of the respondents' gender. Figure 4 centres on data on users and figure 5 data on non-users. Figure 4 illustrates that most of the responding residents were male (60%) and 40% were female. Figure 5 also shows that most of the responding residents were male (53%). Forty-seven percent of the respondents were female. 0.4% of respondents preferred not to specify their gender. Ekurhuleni has a higher percentage of males in comparison to females, the data for users and non-users roughly depicts this (Statistics South Africa, 2011e). 51.2% of the population in Ekurhuleni are males and 48.8% are females (Statistics South Africa, 2011e).

Figure 4: Respondent Gender Users

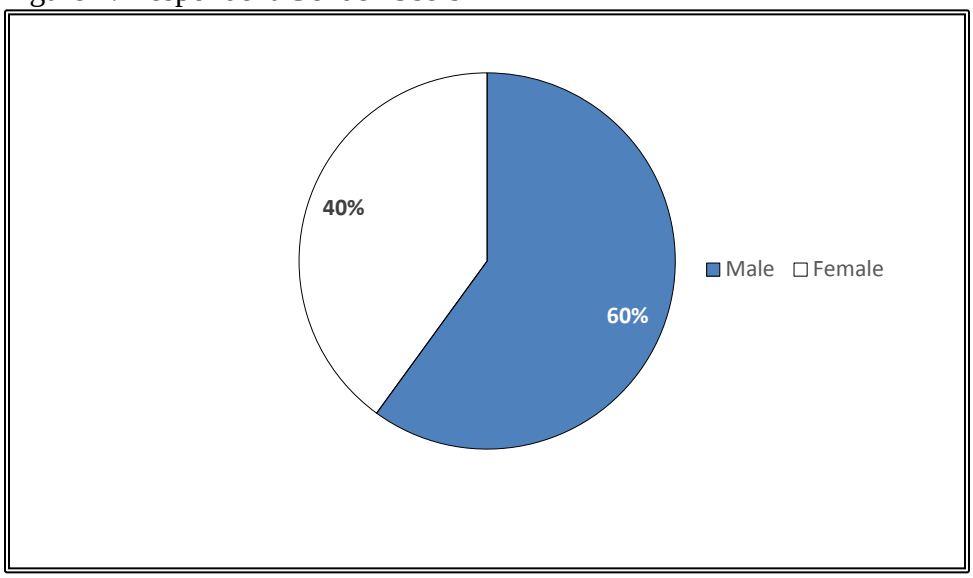
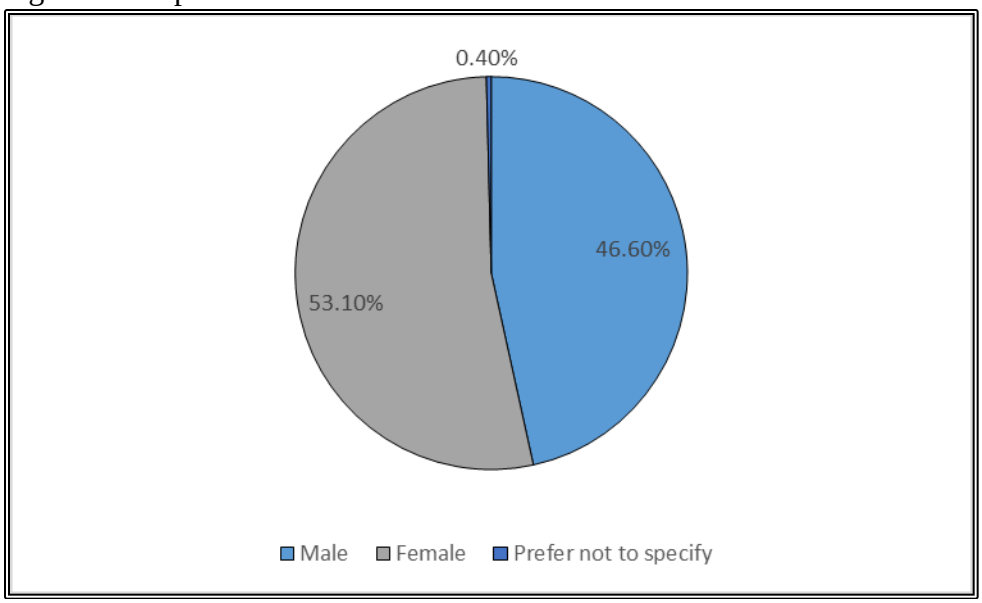


Figure 5: Respondent Gender Non-Users




### 7.4.3 *Education level*

Table 24 shows that a majority of the responding online service users reported that they had some tertiary education at a university level (27.9%). Approximately 5% had a postgraduate qualification and 24% had an undergraduate qualification. 38.3% of the respondents recorded that they had a high school level of education. Within Ekurhuleni, secondary education is the highest level of education, 51.7 % of the residents of Ekurhuleni have attended high school (Statistics South Africa, 2011e). Similarly, within the current study aggregated together high school education is the highest level of education. A low percentage (3.8%) of Ekurhuleni residents had some form of higher education (Statistics South Africa, 2011e). In the present study, roughly 58.8% of the residents had some form of higher education. The aims of education consist of the process through which individuals obtain an understanding of a subject, so that they may establish priorities, create independent opinions and discuss the subject. Education centres on the development of mental power and ability, thus relating to the attitude of individuals' (VanDerHeiden, Pohl, Mansor & VanGenderen, 2015). Since education influences an individual's attitude this may be the case within the context of the present study. Residents

with a higher level of education could have had a positive attitude towards participating in the study and were thus more willing to take part in the study.

Table 25 highlights that a majority of the responding non-users reported that they had some tertiary education at a university level (29.4%). Aggregated together high school education (45.4%) is the highest education level. This is similar to Ekurhuleni, where secondary education is the highest education (Statistics South Africa, 2011e). Roughly, 4% had a postgraduate qualification and 18% had an undergraduate qualification. 28.6% of the respondents recorded that they had a matric level high school education. Unlike in Ekurhuleni the study had a high percentage of residents with some form of higher education. This is because residents with a higher level of education may have been more interested and willing to partake in the present study. The potential reason for this was addressed in the paragraph above.

Table 24: Respondent Education Level Users

| | Frequency | Percent |
|---|---|---|
| Some high school | 30 | 14.9 |
| High school (matric) | 47 | 23.4 |
| Some tertiary university | 56 | 27.9 |
| Bachelor's degree | 52 | 25.9 |
| Postgraduate degree | 10 | 5.0 |
| Prefer not to specify | 6 | 3.0 |
| Total | 201 | 100.0 |

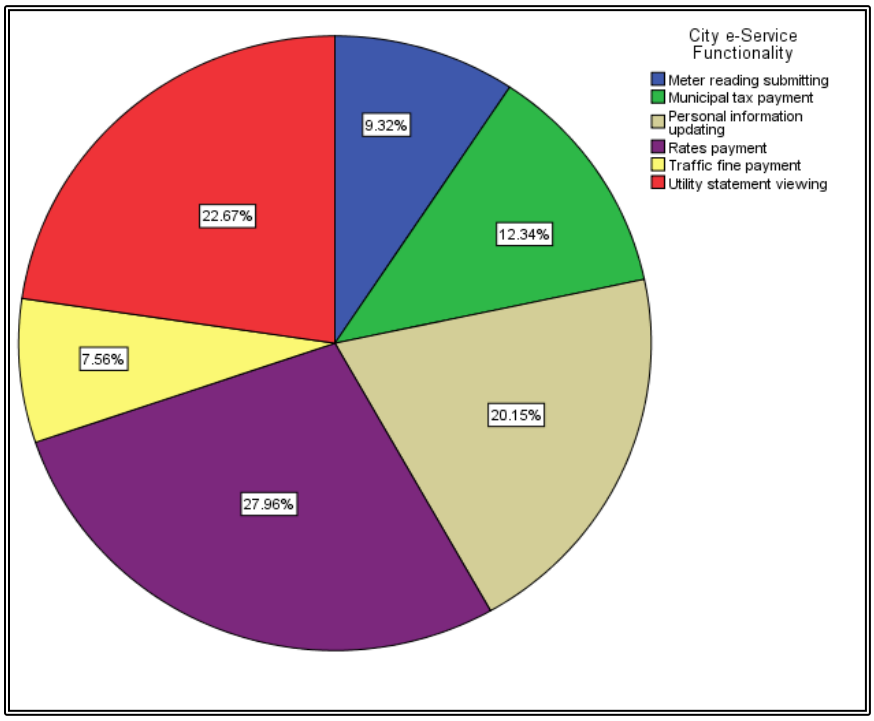
Table 25: Respondent Education Level Non-Users

| | Frequency | Percent |
|---|---|---|
| Some high school | 44 | 16.8 |
| High school (matric) | 75 | 28.6 |
| Some tertiary university | 77 | 29.4 |
| Bachelor's degree | 48 | 18.3 |
| Postgraduate degree | 11 | 4.2 |
| Prefer not to specify | 7 | 2.7 |
| Total | 262 | 100.0 |

### 7.4.4 *City e-Services Used*

Figure 6 is a pie chart used to provide a graphical representation of the city e-services used by respondents. Figure 6 illustrates that residents mostly used city e-services to pay for rates (almost 27%). Figure 6 also shows that utility statement viewing was the second most used city e-service functionality. Traffic fine payment (8%) was the least used city e-service functionality. Data on the city e-services usage was not available from the City of Ekurhuleni.

Figure 6: City e-Services Used




### 7.4.5 *t-Test Trust in the City*

An independent sample t-Test was performed to compare the trust in the city variable between users and non-users of the Ekurhuleni online service. Prior to t-Testing, normality analysis was conducted. Appendix N is a copy of the normality analysis. It was found that trust in the city slightly differed from a normal distribution.

Centring on the t-test results, the mean for users was roughly 3.244 whilst the mean for non-users is approximately 3.091. This difference was found not to be statistically significant. T-test results can be found in Appendix L. The data for users and non-users could not be combined because this may have skewed the study results. Non-users only completed a small portion of the study's questionnaire. They only completed survey items relating to trust in city, distrust in the city and demographic information.

### 7.4.6 *t-Test Distrust in the City*

An independent sample t-Test was also conducted to compare the distrust in the city variable between users and non-users of the Ekurhuleni online service. Prior to t-Testing normality analysis was performed. Appendix N is a copy of the normality analysis. It was found that distrust in the city slightly differed from a normal distribution.

Focusing on the t-test results, the mean for users is roughly 3.123 whilst the mean for non-users is approximately 2.835. This difference is statistically significant, with a t-value of 4.919 and a significance level of 0.001%. This means residents distrust varies between users and non-users of city e-services. Users and non-users are distinct when it comes to distrust.. T-test results can be found in Appendix L.

## 7.5 Inter-Item Correlation Analysis

An inter-item correlation matrix was used to assess the internal consistency of the study's constructs measurement items. The scale items for distrust, trust in city e-services, perceived risk confirmation, continued use intention, satisfaction, expectations and perceived performance had a high correlation with their respective scale items. This suggests that the items measured the underlying construct they intended to measure and therefore had convergent validity. When looking at the trust in the city items, the majority of scales items correlated highly with each other, except TIC1 and TIC3 which did not correlate with each other. The majority of items for

usage had low correlations with each other. The measurement items correlated at least 0.3 with at least one other scale item.

## 7.6 Validity and Reliability

It was important to evaluate the validity and reliability of the present study's measures as a lack of either validity or reliability would influence the precision of the study's results (Bailey, 1994). Prior to testing the model, Principal Component Factor Analysis (PCFA) was performed using SPSS. During PCFA three possible solutions were discovered namely Solution A, B and C. In order to find the best possible solution for the present study, the solutions were evaluated against each other using the PCFA results and assessing the reliability of the solutions' measures using Cronbach's alpha. Solution C was chosen as the most appropriate solution. Appendix M is a copy of the solution evaluation.

Although the study had ten defined factors, SPSS extracted a seven-component solution. This solution accounted for a majority (62.833) of the variance in the data. The EXP and PEP measurement items loaded highly onto a single component. Therefore, the two variables were combined to create a new factor referred to as 'performance beliefs[23]'. The distrust and perceived risk items also loaded highly onto one component. As a result, a new variable joining the distrust in the city and perceived risk variables was created. This variable is referred to as 'distrust in the city and perceived risk'. The justification for creating the two new variables namely: 'performance beliefs' and 'distrust in the city and perceived risk' can be found in Chapter 7 section 7.3.3. The confirmation variable was dropped because its measurement items loaded highly onto the dependent variable and loaded highly onto more than one factor. This made the variable difficult to interpret. Table 25 reports on the results of the PCFA. Convergent validity was illustrated by items which intended to measure a single construct converging. Each item

[23] PEB was the coding used for the 'performance beliefs' variable.

except SAT3 (.598), CUI1 (.536) and TES4 (.577) had a loading above 0.60 on its component. The measurement items not loading higher than 0.45 on any other component confirmed discriminant validity.

The reliability of the study's measures was assessed using Cronbach's alpha and the Average Variance Extracted (AVE). The value of a construct's Cronbach's alpha should be **above** 0.7 as this indicates an acceptable internal consistency (Cronbach, 1951). Nunnally (1978) recommends a more modest alpha range and suggests that an acceptable alpha should be **at least** 0.7 or above. The study's scores ranged from 0.538 to 0.893 for Cronbach's alpha. Trust in the city and city e-service use had Cronbach alpha scores below 0.7, and therefore study results obtained using these factors while hypothesis testing needed to be considered with caution. Another reliability measure, AVE had scores ranging from 0.414 to 0.694. Fornell and Larcker (1981) suggest that a construct's acceptable AVE threshold is 0.5 and above. The majority of constructs had AVE scores equivalent or above 0.5, which suggests that constructs are internally consistent. Table 26 reports the reliability scores.

Table 26: Principal Component Factor Analysis and Scale Reliability

| | Component | | | | | | |
|---|---|---|---|---|---|---|---|
| | Performance Beliefs (Expectations (EXP) and Perceived Performance (PEP)) | Distrust in the City (DIS) and Perceived Risk (PER) | Trust in City e-Services (TES) | Continued Use Intention (CUI) | Satisfaction (SAT) | City e-Service Use (USE) | Trust in the City (TIC) |
| TIC1 | | | | | | | .729 |
| TIC4 | | | | | | | .756 |
| DIS1 | | .689 | | | | | |
| DIS2 | | .736 | | | | | |
| DIS3 | | .670 | | | | | |
| PER1 | | .672 | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PER2 | | .727 | | | | | |
| PER3 | | .712 | | | | | |
| TES1 | | | .783 | | | | |
| TES2 | | | .638 | | | | |
| TES4 | | | .577 | | | | |
| USE1 | | | | | | .831 | |
| USE4 | | | | | | .835 | |
| SAT1 | | | | | .772 | | |
| SAT2 | | | | | .640 | | |
| SAT3 | | | | | .540 | | |
| EXP1 | .714 | | | | | | |
| EXP2 | .687 | | | | | | |
| EXP3 | .782 | | | | | | |
| PEP1 | .716 | | | | | | |
| PEP2 | .758 | | | | | | |
| PEP3 | .740 | | | | | | |
| PEP4 | .730 | | | | | | |
| CUI1 | | | | .536 | | | |
| CUI2 | | | | .699 | | | |
| CUI3 | | | | .682 | | | |
| Cronbach's Alpha | 0.893 | 0.796 | 0.659 | .656 | 0.734 | 0.616 | 0.538 |
| *Cronbach's Alpha | 0.9 | 0.8 | 0.7 | 0.7 | 0.7 | 0.6 | 0.5 |
| Average Variance Extracted | 0.537 | 0.492 | 0.451 | 0.414 | 0.432 | 0.694 | 0.551 |
| *Average Variance Extracted | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.7 | 0.6 |

Dropped Items: TIC2, TIC3, TIC5, TES3, DIS4, EXP4, CON1, CON2, CON3, USE2, USE3, USE5 and SAT4

* Computed to 2 significant figures

Composite scores for the each variable were then calculated by summing up the items for the variable weighted equally divided by the number of items for the variable. For example, the composite score for City e-Service Use was calculated as follows: Composite Score = (USE1+USE4) /2.

## 7.7 Testing for Normality

Refer to Appendix O for detail on the normality analysis.

## 7.8 Multiple Regression Assumptions

The current study needed to consider four assumptions before performing a multiple regression test namely, assumptions of: collinearity, linearity, heteroscedasticity and the normality of residuals. These assumptions were tested prior to hypothesis and regression testing. Appendix Q is a copy of the assumption violation analysis. Satisfied as to the normality of the distribution, hypotheses could be tested.

## 7.9 Hypothesis Testing

Hypothesis testing was used to test hypotheses relating to the relationships between the study's variables. Pearson Correlation analysis and Multiple Regression analysis was conducted as a part of the study's hypothesis testing. Pearson Correlation analysis is about measuring the strength of an association between two factors and was used to assess the strength of the relationship between each independent variable and the dependent variable. This technique was used to assess the strength of the relationship between the following variables:

- satisfaction and trust in the city
- satisfaction and trust in city e-services
- satisfaction and city e-service use

- satisfaction and the 'performance beliefs' variable
- satisfaction and the 'distrust in the city and perceived risk' variable
- city e-service use and trust in the city
- city e-service use and trust in city e-services
- city e-service use and the 'distrust in the city and perceived risk' variable
- trust in city e-services and the 'distrust in the city and perceived risk' variable
- trust in city e-services and the 'performance beliefs' variable

This was the first analysis conducted to test the study's hypotheses. After running a correlation analysis, multiple regression analysis was performed. Multiple regression analysis was used to assess whether the study's independent variables could predict the unknown value for the dependent variable (Hair et al., 2009).

Thirteen hypotheses were dropped prior to hypothesis testing. This was a result of items loading highly on individual components during PCFA. Table 27 highlights the dropped hypotheses.

Table 27: Dropped Hypotheses

| Summary of Dropped Hypotheses | |
|---|---|
| Hypothesis 2a | *The perceived performance of a city e-service positively influences confirmation.* |
| Hypothesis 2b | *The perceived performance of a city e-service positively influences satisfaction.* |
| Hypothesis 2c | *The perceived performance of a city e-service positively influences continued use intention.* |
| Hypothesis 2d | *The perceived performance of a city e-service positively influences trust in city e-services.* |
| Hypothesis 2e | *The perceived performance of an e-government service mediates the effect of confirmation on satisfaction.* |
| Hypothesis 3 | *Residents' positive expectations of not up to standard e-government services negatively influence confirmation.* |
| Hypothesis 4a | *Residents' extent of confirmation positively influences satisfaction with e-government services.* |
| Hypothesis 7b | *Trust in city e-services negatively influences perceived risk.* |
| Hypothesis 8a | *Distrust in the city negatively influences city e-service use.* |
| Hypothesis 8b | *Distrust in the city negatively influences satisfaction.* |
| Hypothesis 8c | *Distrust in the city negatively influences continued use intention.* |
| Hypothesis 9a | *Perceived risk negatively influences city e-service use.* |
| Hypothesis 9b | *Perceived risk negatively influences continued use intention.* |

The following hypotheses that included the new 'performance beliefs' and 'distrust and perceived risk' variables were proposed:

Hypothesis 2a: The performance beliefs of a city e-service positively influence satisfaction.

Hypothesis 2b: The performance beliefs of a city e- service positively influence continued use intention.

Hypothesis 2c: The performance beliefs of a city e-service positively influence trust in city e-services.

Hypothesis 7b: Trust in city e-services negatively influences distrust in the city and perceived risk.

Hypothesis 8a: Distrust in the city and perceived risk negatively influence city e-service use.

Hypothesis 8b. Distrust in the city and perceived risk negatively influence satisfaction.

Hypothesis 8c: Distrust in the city and perceived risk negatively influence continued use intention.

### 7.9.1 *Correlation Analysis*

Table 28 reports the results of the correlation analysis. The table displays the hypotheses that were supported and those not supported as indicated by their significance (p value). Hypotheses that were supported and had a significant correlation between the independent variable and dependent variables, had a p value below 0.01 or 0.05.

Table 28: Correlation Analysis

| Dependent Variable | Independent Variable | Hypothesis (H) | Pearson correlation coefficient |
|---|---|---|---|
| Continued Use Intention | Performance Beliefs | Hypothesis 2b: The performance beliefs of a city e-service positively influence continued use intention. | 0.435** |
| Continued Use Intention | Satisfaction | Hypothesis 5b: Satisfaction positively influences continued use intention. | 0.375** |
| Continued Use Intention | Trust in the City | Hypothesis 6c: Trust in the city positively influences continued use intention. | 0.393** |

| | | | |
|---|---|---|---|
| Continued Use Intention | Trust in City e-Services | Hypothesis 7c: Trust in city e-services positively influences continued use intention. | 0.494** |
| Continued Use Intention | Distrust in the City and Perceived Risk | Hypothesis 8c: Distrust in the city and perceived risk negatively influence continued use intention. | 0.996 |
| Continued Use Intention | City e-Service Use | Hypothesis 1: City e-service use positively influences continued use intention. | -0.81 |
| City e-Service Use | Satisfaction | Hypothesis 5a: Satisfaction positively influences city e-service use. | -0.31 |
| City e-Service Use | Trust in the City | Hypothesis 6a: Trust in the city positively influences city e-service use. | -0.018 |
| City e-Service Use | Trust in City e-Services | Hypothesis 7a: Trust in city e-services positively influences city e-service use. | -0.157* |
| City e-Service Use | Distrust in the City and Perceived Risk | Hypothesis 8a: Distrust in the city and perceived risk negatively influence city e-service use. | -0.043 |
| Satisfaction | Trust in the City | Hypothesis 6b: Trust in the city positively influences satisfaction. | 0.220** |
| Satisfaction | Trust in City e-Services | Hypothesis 7d: Trust in city e-services positively influences satisfaction. | 0.259** |
| Satisfaction | Distrust in the City and Perceived Risk | Hypothesis 8b: Distrust in the city and perceived risk negatively influence satisfaction. | 0.106 |
| Satisfaction | Performance Beliefs | Hypothesis 2a: The performance beliefs of a city e-service positively influence satisfaction. | 0.633** |
| Trust in City e-Services | Performance Beliefs | Hypothesis 2c: The performance beliefs of a city e-service positively influence trust in city e-services. | 0.431** |
| Distrust in the City and Perceived Risk | Trust in City e-Services | Hypothesis 7b: Trust in city e-services negatively influences distrust in the city and perceived risk. | -0.076 |

**. Correlation is significant at the 0.01 level
*. Correlation is significant at the 0.05 level

### 7.9.2 *Regression Analysis*

A multiple regression analysis was conducted in order to assess the combined influence of performance beliefs, satisfaction, trust in the city, city e-service use, 'distrust in the city and

perceived risk' and trust in city e-services on continued use intention. Table 29 presents the results of the regression analysis. The model explained approximately 32% of the variance in continued use intention. Trust in the city, satisfaction and trust in city e-services were found to have significant effects on continued use intention. The 'trust in city e-services' variable had the greatest effect on continued use intention.

Table 29: Regression Analysis

| Independent Variables | Unstandardized Coefficients | | Standardized Coefficients | T Value | Significance |
|---|---|---|---|---|---|
| | Beta | Standard Error | Beta | | |
| Trust in the City | .143 | .058 | .165 | 2.481 | .014* |
| Distrust in the City and Perceived Risk | .002 | .059 | .002 | .040 | .968 |
| Trust in City e-Services | .295 | .064 | .320 | 4.600 | .000*** |
| Satisfaction | .158 | .067 | .178 | 2.366 | .019* |
| City e-Service Use | -.007 | .044 | -.010 | -.170 | .865 |
| Performance Beliefs | .097 | .065 | .123 | 1.502 | .135 |
| Adjusted $R^2$=0.324; p<0.001 | | | | | |

(***p<0.001;**p<0.01; *p<0.05)

*Dependent Variable: Continued Use Intention

The study's model had control variables such as age, gender and level of education. A hierarchical regression test was performed to identify the significance of the controls on continued use intention. Prior to regression testing two cases, missing control variable data[24] were addressed by using the mean replacement strategy. In the model that only comprised control variables, level of education was found to be significant. In the overall model which

[24] One respondent did not answer questions on their gender and level of education. Another respondent did not answer the question on his or her age.

comprised both independent and control variables, the effect of the control variables was not significant. The trust in city e-services variable was found to be the most significant predictor of continued use intention.

### 7.9.3 *PLS Data Analysis and Results*

Partial least squares were used to empirically assess the present study's theoretical model. PLS is a structural equation modelling technique that can simultaneously test the association between indicators and their respective constructs and the association between constructs (the structural model) (Helland, 1990). This modelling technique creates weights to formative constructs from their corresponding indicators, loadings from reflective constructs to their respective indicators, regression coefficients between constructs and multiple determination coefficients for dependent variables. PLS caters for small sample sizes and makes less strict assumptions regarding data distribution. Small sample sizes do not always meet assumptions of homogeneity and normality (Garson, 2016). In PLS, the link between indicators and their corresponding construct can be modelled either as reflective or formative. Reflective indicators are known as effect indicators and are one-dimensional and expected to measure the same underlying phenomenon. Reflective indicators should also correlate with each other. Formative indicators are the causes of an underlying construct and represent different dimensions of the construct (Barclay, Thompson & Higgins, 1995). Trust in the city, trust in city e-services, city e-service use, 'performance beliefs', 'distrust in the city and perceived risk', satisfaction and continued use intention are reflective constructs with two, three, two, seven, six, three and three indicators, respectively the scale items corresponding to the study's seven constructs were modelled as reflective indicators for their corresponding constructs. Table 30 presents a summary of the constructs used in the PLS analysis.

Table 30: Constructs and number of indicators

| Construct | Type | Number of Indicators |
|---|---|---|
| Trust in the City | Reflective | 2 |
| Trust in City e-Services | Reflective | 3 |
| City e-Service use | Reflective | 2 |
| Performance Beliefs | Reflective | 7 |
| Distrust in the City and Perceived Risk | Reflective | 6 |
| Satisfaction | Reflective | 3 |
| Continued Use Intention | Reflective | 3 |

When using reflective indicators, two important elements of the measurement model need to be assessed namely convergent and discriminant validity. Convergent validity can be evaluated by examining an indicator's reliability, composite reliability and average variance extracted (Gefen, Straub & Boudreau, 2000). Table 31 highlights that all loadings except DIS1, DIS2 and DIS3 were above the 0.7 threshold (for their respective construct), suggesting good indicator reliability (Fornell & Larcker, 1981). Similarly, composite reliabilities were all greater than 0.7. All constructs except 'distrust in the city and perceived risk' met the AVE threshold of 0.5 and above. Significant tests were conducted using bootstrapping and a majority of the loadings were statistically significant. A majority of the present study's constructs correlated more strongly with their respective measures than with any other construct, this implied good convergent and discriminant validity.

Table 31: Loadings of Constructs

| Construct | Indicator | Loading |
|---|---|---|
| Trust in the City<br>Composite Reliability: 0.8079<br>AVE: 0.6792 | TIC1 | 0.7554 |
| | TIC2 | 0.8875 |
| Trust in City e-Services<br>Composite Reliability: 0.8103<br>AVE: 0.5880 | TES1 | 0.7248 |
| | TES2 | 0.7557 |
| | TES4 | 0.8171 |
| City e-Service use<br>Composite Reliability: 0.8356<br>AVE: 0.7187 | USE1 | 0.7824 |
| | USE4 | 0.9084 |
| Performance Beliefs<br>Composite Reliability: 0.9162<br>AVE: 0.6097 | EXP1 | 0.7435 |
| | EXP2 | 0.7767 |
| | EXP3 | 0.8117 |
| | PEP1 | 0.7987 |
| | PEP2 | 0.7831 |
| | PEP3 | 0.7744 |
| | PEP4 | 0.7760 |
| Distrust in the City and Perceived Risk<br>Composite Reliability: 0.8325<br>AVE: 0.4602 | DIS1 | 0.6644 |
| | DIS2 | 0.5861 |
| | DIS3 | 0.4678 |
| | PER1 | 0.8003 |
| | PER2 | 0.7145 |
| | PER3 | 0.7789 |
| Satisfaction<br>Composite Reliability: 0.8492<br>AVE: 0.6526 | SAT1 | 0.8131 |
| | SAT2 | 0.8321 |
| | SAT3 | 0.7775 |
| Continued Use Intention<br>Composite Reliability: 0.8141<br>AVE: 0.5939 | CUI1 | 0.7593 |
| | CUI2 | 0.8130 |
| | CUI3 | 0.7377 |

Figure 7: Structural Model

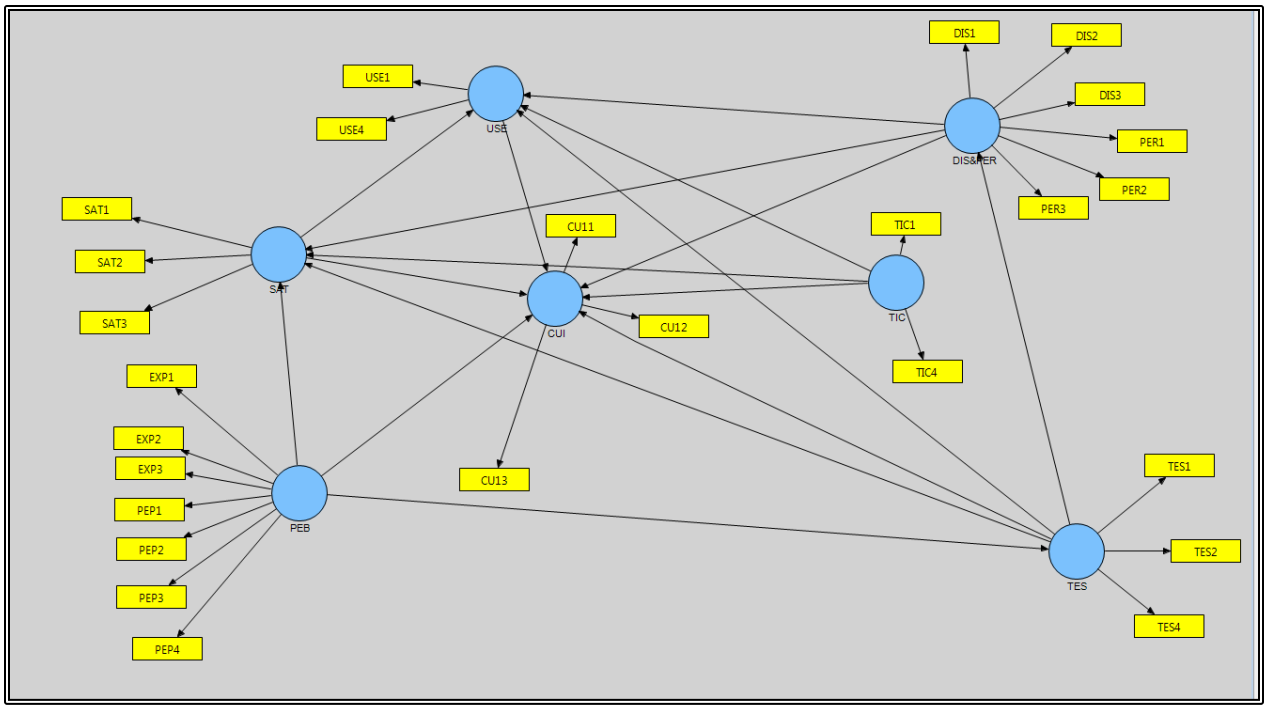



Figure 7 highlights the structural model. Table 72 in Appendix R presents the results of the partial least squares. Figure 8 and 9 present the result of the partial least squares. Figure 8 focuses on path coefficients and figure 9 on the t-value. Five hundred bootstrap samples were used to assess statistical significance. The model explained roughly 36% of the variance in continued use intention. Trust in the city, satisfaction, city e-service use, 'performance beliefs' and trust in city e-services were found to have significant effects on continued use intention. This provided empirical support for Hypotheses H2b, H5b, H6d and H7c. The 'trust in city e-services' variable had the greatest effect on the resident continued use intention. Satisfaction was significantly predicted by 'performance beliefs', supporting hypothesis H2a. Trust in city e-services was significantly predicted by 'performance beliefs', supporting hypothesis H2c.

Figure 8: Path Coefficients

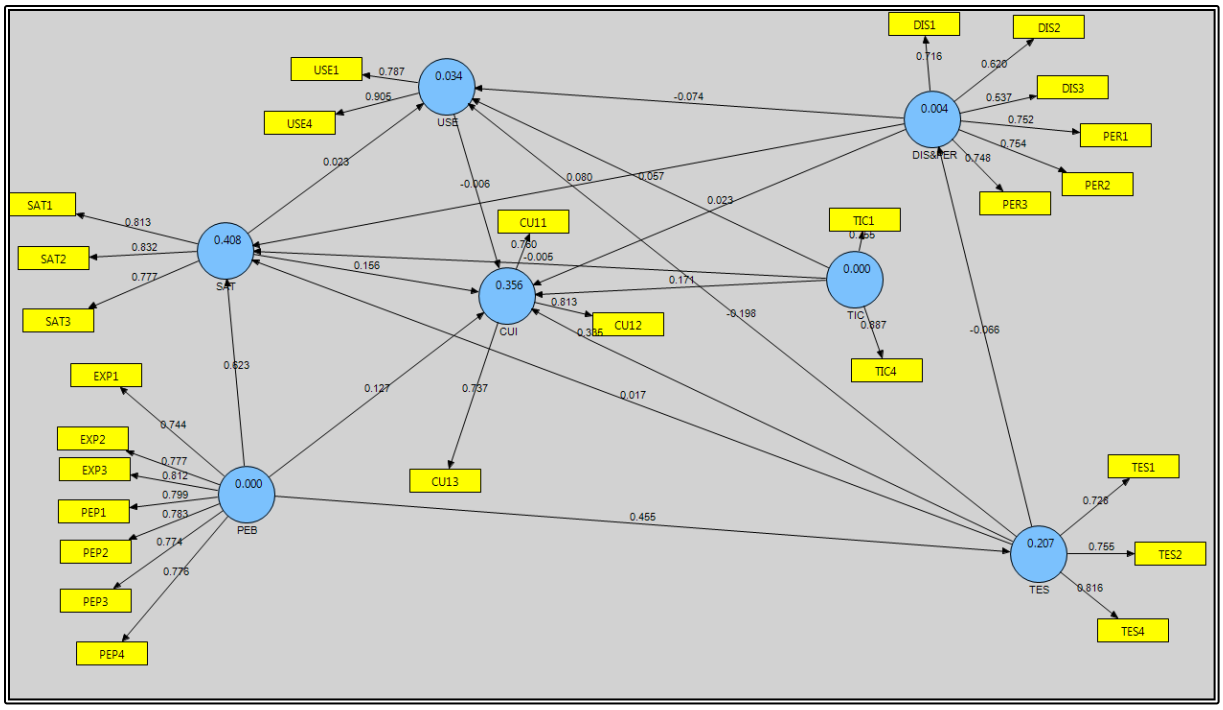
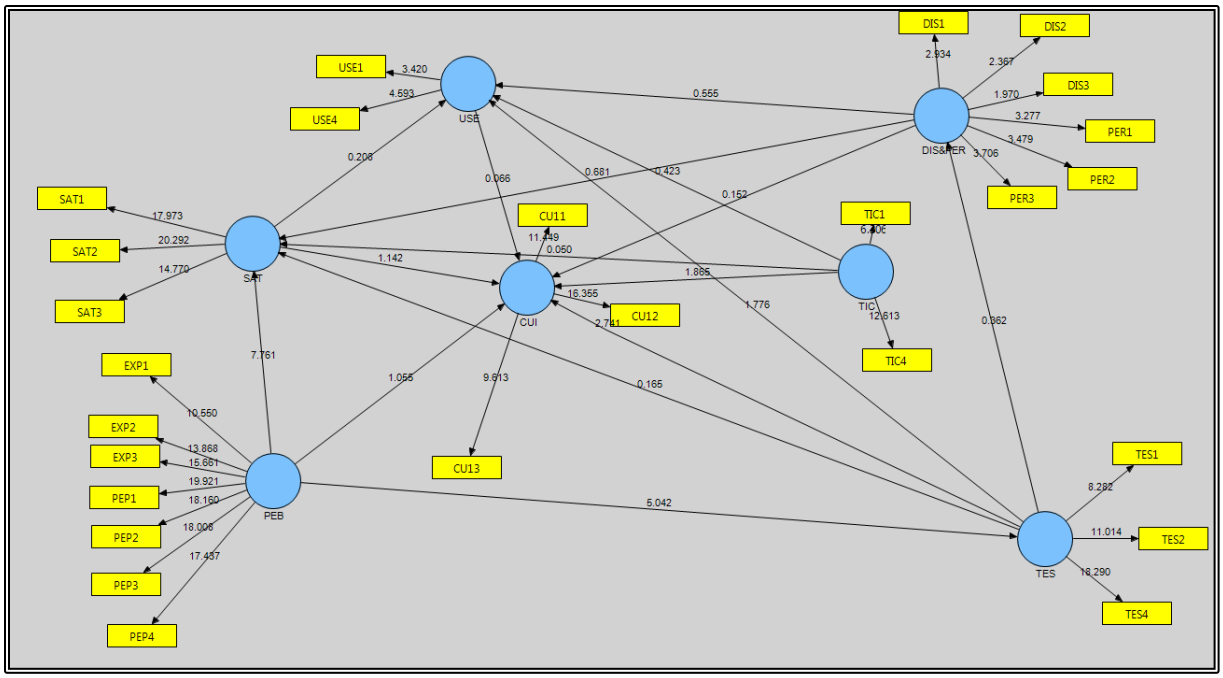


Figure 9: T-Values (500 samples)




## 7.10 Conclusion

This chapter focused on analysing the data collected during the study's data collection period. It initially looked at the survey distribution, data collection and response rates. It then focused on the data cleaning process, followed by descriptive statistics. The study's hypotheses were then tested and the results reported. The next chapter provides an interpretation of the study's results.

Table 32 highlights the hypotheses and results for this e-government study.

Table 32: Study Results

| Name | Hypothesis (H) | Result Coefficient Analysis | Result Regression | Result PLS |
|---|---|---|---|---|
| Hypothesis 1 | City e-service use positively influences continued use intention. | Rejected | Rejected | Rejected |
| Hypothesis 2a | The performance beliefs positively influence satisfaction. | Supported | Not applicable | Supported |
| Hypothesis 2b | The performance beliefs of an e-government service positively influence continued use intention. | Supported | Rejected | Supported |
| Hypothesis 2c | The performance beliefs of city e positively influence trust in city e-services. | Supported | Not applicable | Supported |
| Hypothesis 5a | Satisfaction positively influences city e-service use. | Rejected | Rejected | Rejected |
| Hypothesis 5b Intention | Satisfaction positively influences continued use intention. | Supported | Supported | Supported |
| Hypothesis 6a | Trust in the city positively influences city e-service use. | Rejected | Rejected | Rejected |
| Hypothesis 6b | Trust in the city positively influences satisfaction. | Supported | Not Applicable | Rejected |
| Hypothesis 6c | Trust in the city positively influences continued use intention. | Supported | Supported | Supported |
| Hypothesis 7a | Trust in city e-services positively influences city e-service use. | Rejected | Rejected | Rejected |
| Hypothesis 7b | Trust in city e-services negatively influences distrust in the city and perceived risk. | Rejected | Rejected | Rejected |
| Hypothesis 7c | Trust in city e-services positively influences continued use intention. | Supported | Supported | Supported |
| Hypothesis 7d | Trust in city e-services positively influences satisfaction. | Supported | Not Applicable | Rejected |
| Hypothesis 8a | Distrust in the city and perceived risk negatively influence city e-service use. | Rejected | Rejected | Rejected |
| Hypothesis 8b | Distrust in the city and perceived risk negatively influence satisfaction. | Rejected | Rejected | Rejected |
| Hypothesis 8c | Distrust in the city and perceived risk negatively influence | Rejected | Rejected | Rejected |

| | | | | |
|---|---|---|---|---|
| | continued use intention. | | | |

# 8 INTERPRETATION OF RESULTS

## 8.1 Introduction

This chapter provides an interpretation of the results reported in chapter 7. It reviews the supported and unsupported hypotheses in light of the literature from chapter 4 and the new literature sourced to substantiate the results. It first looks at the dependent variables and then the supported and unsupported hypotheses.

## 8.2 Dependent Variable

The dependent variable in this study is the continued use intention. This refers to a resident's intention to continue using a City e-service. It was suggested that a diverse set of factors may influence an individual's technology continued use intention (Bhattacherjee & Lin, 2015; Hoehle, Huff & Goode, 2012). This includes factors which are trust related (Chen & Li, 2016), emotional, experiential, utilitarian (Deng, Turner, Gehling & Prince, 2010) or habitual (Wilson & Lankton, 2013). This study examined the determinants that influence the resident city e-service continued use intention within Ekurhuleni in Gauteng. It had a particular focus on emotional and trust factors. The emotional-related factors examined were satisfaction, confirmation, performance beliefs. The trust factors explored were trust in the city, distrust in the city and perceived risk and trust in city e-services.

Prior to obtaining empirical evidence, it was proposed that 1) satisfaction, 2) performance beliefs, 3) trust in city e-services 4) trust in the city and 5) city e-service use have direct and positive relationships with continued use intention. Distrust and perceived risk were suggested to have direct and negative influences on continued use intention. After collecting empirical data, it was shown that within the e-government context the greatest influence of direct effects on continued use intention comes from trust in city e-services. The second greatest influence on

continued use intention derives from trust in the city. Interestingly, satisfaction had the third highest direct influence on continued use intention. This is because, in research satisfaction is suggested as a key predictor of continued use intention (Bhattacherjee, 2001; Basak & Calisir, 2015). The least significant influence on continued use intention comes from performance beliefs. Therefore, trust in city e-services, performance beliefs, trust in the city and satisfaction all play significant direct roles for continued use intention regarding City e-services. City e-service use and 'distrust and perceived risk' did not have significant effects on continued use intention.

The current study affirms Bhattacherjee's (2001) perspective on continued use intention. Continued use intention is viewed as a post-usage intention that is rooted in post use experiences. In the present study, beliefs that can be related either to pre-usage or to post-usage also determined continued use intention. The results demonstrate that constructs beyond ECT's satisfaction and perceived performance constructs are important in explaining continued use intention. This study measured continued use intention by asking residents about their intentions to continue using city e-services and to increase their intensity of city e-service use. This shaped our understanding of what elements of continued use intention are important to measure. It tested the validity and reliability of continued use intention instrument developed by Bhattacherjee et al. (2008), in an empirical study on e-government services.

The study extends the current theory base on continued use intention. Unifying ECT with trust theory is important because it shows that while continued use intention is in part the product of affective responses, continued use intention is also the product of trust. This highlights that in contrast to the underlying assumptions of ECT, it is not only satisfaction and perceived performance that lead directly to continued use intention.

Study results show that context emerged to be important when studying continued use intention. City e-services involve the exchange of personal information between residents and the government over the internet (Forlizzi, 2010). In this case, constructs derived from trust theory

were identified as more critical predictors of continued use intention than ECT's satisfaction construct.

## 8.3 Supported Hypotheses

This subsection first looks at trust in city e-services. It then looks at trust in government. After which it focuses on performance beliefs and then satisfaction.

Note: Within this chapter, Technology Trust (TT) refers to trust in an information technology artefact and City Trust (CT) refers to trust in an exchange party.

### 8.3.1 *Trust in City e-Services*

#### *7.3.1.1 Hypothesis 7c: Trust in city e-services positively influences continued use intention.*

Trust in an Information Technology (IT) artefact refers to an individual's willingness to depend on an IT artefact. It also refers to an individual's belief in the competence, dependability and security of an IT artefact they are using (Doney, Cannon & Mullen, 1998; Jang, Chang & Chen, 2015). Furthermore, trust in an IT is a representation of the human-to-technology trust relationship (Lankton, McKnight & Tripp, 2015). Trust in an IT in this study relates to a resident's willingness to depend on a city e-service. Studies have highlighted TT's significance in the development and advancement of e-government services (Belanche et al., 2014).

Following analysis of the data, the hypothesis on trust in city e-services and the continued use intention was supported. The results indicate that trust in city e-services positively influences a resident's city e-service continued use intention. This is consistent with the results of Hsu, Chou and Min's (2014) and Lankton, Mcknight and Thatcher's (2014) post-adoption studies. These studies also found that TT in an IT artefact had a positive effect on continued use intention. However, Teo et al. (2008) suggest that TT in an IT artefact is not a direct determinant of continued use intention but rather influences performance beliefs. An individual's perception of

the IT artefact's performance is formed based on the trusting beliefs of the individual towards the IT artefact. Hung, Yang and Hsieh (2012) argue that TT is an important cognition that influences the continued use of an IT artefact. It helps individuals rule out negative, yet potential, opportunistic behaviour and makes individuals more at ease regarding using an IT artefact. TT also augments favourable beliefs about an IT artefact such as its utility (Turel & Gefen, 2013).

Results from the current research imply that the IT artefact TT effect on continued use intention could be due to residents' beliefs regarding the reliability, integrity and predictability of the city e-service. If individuals trust more in an IT, they will have corresponding increases in trusting beliefs relating to reliability, helpfulness and functionality (Akter, Ray & D'Ambra, 2013). Residents may intend to continue using a city e-service if they believe it is reliable and secure. In addition, TT in the city e-service may aid residents in overcoming risk and uncertainty related beliefs (Turel et al., 2008). Uncertainty may arise due to either issues with the city e-service or a resident's lack of knowledge on the behaviour of the city e-service (Paravastu et al., 2014).

Residents' evaluation of the city e-services could also have led to the IT artefact TT effect. McKnight, Carter, Hatcher and Clay (2011) propose that TT in an IT artefact plays an important role in shaping an individual's technology related beliefs and behaviours. This is because it reflects an individual's evaluation of a technology's ability to deliver on what it is supposed to do. If residents have TT in a city e-service they would evaluate it as able to deliver on what it is supposed to do and could intend to continue using it. Residents intend to continue using city e-services while taking into consideration their TT in the e-services.

### 8.3.2 *Trust in the City*

#### *7.3.2.1 Hypothesis 6c: Trust in the city positively influences continued use intention.*

Trust is the 'confidence, dependence on the reliability, integrity, and truth of another party' (Chen & Chou, 2012:106). Within this study, Trust refers to the reliance on government to meet obligations. Residents may use city e-services if they believe that the government will meet its obligations. Trust is based on expectations of one about the other's behaviour (Chen & Chou,

2012). Research suggests that CT influences loyalty and continued use intention (Wu, Huang & Hsu, 2014).

Subsequent to data analysis, the hypothesis on the variable "trust in the city" influencing continued use intention was supported. The data shows that trust in the city positively influences continued use intention. This concurs with Chen, Jong and Lai's (2014) and Sun, Liu, Peng, Dong and Barnes's (2014) studies about CT influencing continued use intention. These studies highlight that CT positively influences continued use intention. A resident could intend to continue using a city e-service if they CT the government. Al-Maghrabi, Dennis and Halliday (2010) argue that CT is positively associated to performance beliefs and is not a direct determinant of continued use intention. They suggest that CT has an indirect effect on continued use intention. The current study, however, provides empirical evidence that supports Cheng et al. (2014) and Sun et al. (2014). CT should be built before an individual transacts with an IT artefact online. Transactions can only be made by an individual based on a certain degree of CT as there are potential risks associated with transacting online (Chen & Chou, 2012). This could be the case when it comes to resident's continued use of city e-services.

The results of this study indicate that the "trust in the city" effect on continued use intention could be a result of expected reliability and integrity. Related research suggests that expected reliability and integrity could result in CT and influence continued use intention (Akter et al., 2013). A resident's confidence in governments' reliability and integrity could influence continued use of city e-services. If residents' expectations are that the government can be relied upon to deliver its promises, then this could influence their intention to continued using a city e-service.

Residents' uncertainty beliefs could also have resulted in the "trust in the city" effect. Residents' inability to monitor the conduct of the government increases uncertainty on negative consequences and outcomes (Ridings, Gefen & Arinze, 2002). There is inherent uncertainty associated with online interactions such as the use of a city e-service and this makes CT a

necessity for successful resident and government online exchanges. This is because CT reduces residents' concerns regarding government opportunistic behaviour and uncertainty (Wu et al., 2014).

Given that CT centres on relying on an exchange party meeting its obligations, the government could be fulfilling its service obligations towards the residents guided by trusting beliefs. When the trusting beliefs are fulfilled, residents could show a more positive attitude towards the government. The degree of resident CT will have a direct relationship with the degree of continued use intention (Akter et al., 2013). The current study gives credibility to the assertion that CT in an exchange party predicts continued use intention.

### 8.3.3 *Performance beliefs*

#### *7.3.3.1 Hypothesis 2c: The performance beliefs of a city e-service positively influence trust in city e-services.*

The perceived performance and expectations measurement items converged on an individual component during factor analysis. This suggests that perceived performance and expectations may be measuring different aspects of the same construct. Expectations focus on an individual's pre-usage performance beliefs regarding a specific technology and perceived performance is about an individual's post-usage performance beliefs regarding the technology (Lankton & McKnight, 2012). Further literature on perceived performance and expectations was examined to understand the results. It was discovered that the nature of the research design may have had an effect on the residents' measurement of their expectations. The measurement of expectations and perceived performance may be more tailored to a longitudinal study design. Perceived performance and expectations would be measured separately. A first questionnaire would measure expectations and perceived performance would be measured in a second questionnaire (Lankton & Wilson, 2007; Chou, Lin, Woung & Tsai, 2012). The present study used a cross-sectional design and expectations and perceived performance were measured at the same time. Residents may have forgotten their initial expectations and when asked about their expectations

it may have been easier for residents to focus on their current performance. It was then decided to combine the perceived performance and expectations variables to create a new performance belief variable referred to as performance beliefs. Based on the data and further literature, the original hypotheses on expectations and perceived performance were dropped (Lankton & Wilson, 2007; Chou et al., 2012). New hypotheses relating to the performance beliefs factor were proposed.

Performance beliefs refer to an individual's beliefs pertaining to the performance of a specific good or service. Performance of a specific good or service is determined by an individual's experience with the good or service, or their beliefs about it (Spreng, 1999). Performance beliefs in this study relates to a resident's beliefs regarding the performance of a city e-service.

Following analysis of the data, the hypothesized link between performance beliefs and trust in city e-services was supported. The results demonstrate that performance beliefs positively influence a resident's trust in city e-services. This is consistent with Paravastu et al. (2014), who posit that performance beliefs have a positive impact on trust in a technology artefact. The present study's result is also consistent with Lankton et al.'s (2014) study that also found that performance positively influenced trust in technology. Momo and Ukpere (2012) suggest that trust in a technology artefact primarily results from an individual's cognitive assessment of performance beliefs. Sollner, Hoffmann, Hoffmann, Wacker and Leimeister (2012) contend that performance beliefs influence the formation of trust in a technology artefact. This is because it represents part of the technology characteristics of the artefact which could be used to assess its capability and reliability. According to Kivijarvi, Leppanen and Hallikainen (2013), trust in technology positively influences perceived performance. They argue that trust in technology is the grounding on which the effect of perceived performance on usage can be achieved. Results from the current study, however, highlight that performance beliefs have a significant and positive effect on trust in city e-services, evidenced further by Paravastu et al.'s (2014) study and Lankton et al.'s (2014) study.

Results from the current study could be based on residents' belief that the city e-service is able to perform its tasks as expected by the residents. An evaluation of performance as expected should result in an increase in the overall trust in the city e-service, that is the willingness of residents' to depend on the city e-service (Paravastu et al., 2014). If an individual has a positive experience with an IT artefact that means that the artefact has shown that it has trustworthy characteristics (Paravastu et al., 2014). If residents could have had positive experiences with the city e-service, this indicates that the city e-service is trustworthy and has trustworthy attributes. Based on this, residents could be more willing to depend on the city e-service and become vulnerable to it (Lankton et al., 2014).

With a technology artefact past behaviour may be a perfect predictor of its behaviour in the future. This is because an IT artefact is an inanimate object and is more predictable in its behaviour than individuals (Paravastu et al., 2014). If the city e-services worked well yesterday, there is little reason to be sceptic of its performance in the future. Residents are more likely to have trust in the city e-service.

#### *7.3.3.2 Hypothesis 2a: The performance beliefs of a city e-service positively influence satisfaction.*

The hypothesis that performance beliefs of an e-government services influence satisfaction was supported. The data indicates that performance beliefs positively influence satisfaction. This result is not only supported by the current research but also by the research of Deng (2014) and De Melo Pereira, Ramos, Gouvea and Da Costa (2015). The present study adds weight to the argument that perceived performance directly influences satisfaction. Residents are more satisfied when their positive expectations of using e-government services are met. Performance's influence on satisfaction can be especially significant for services or products that are innovative, technologically complex and involving. These three elements are characteristics of electronic services such as city e-services (Lankton & Wilson, 2007).

In the current research, the user's experience with the product/service or the user's perception about it could have resulted in the effect of performance beliefs on satisfaction. Deng (2014) suggests that performance beliefs are determined by the consumer's experience or perception about the product. Residents' performance beliefs regarding a city e-service are influenced by their experience of using that service. If a city e-service performs well, residents learn through experience and are more likely to be satisfied (Lankton & Wilson, 2007). Residents will be satisfied when the performance of the city e-service is favourable and dissatisfied when performance is unfavourable (Deng, 2014). The performance of the city e-services could have met the residents' e-service needs. When city e-services perform well by allowing residents to perform transactions with the government on it, the residents are satisfied with them (De Melo Pereira et al., 2015).

#### *7.3.3.3 Hypothesis 2b: The performance beliefs of a city e-service positively influence continued use intention.*

Following data analysis, the hypothesis on performance beliefs and continued use intention was supported. Data from the study demonstrates that performance beliefs positively influence a resident's city e-service continued use intention. As Chou et al.'s (2012) and Wu et al.'s (2014) studies show that performance beliefs have a positive direct effect on continued use intention. Lowry, Gaskin and Moody's (2015) study found little support for a direct association between performance beliefs and continued use intention. However, the present study provides empirical evidence that performance beliefs are a strong predictor of continued use intention. Performance beliefs reflect the quality and utility of an IT artefact (Roca, Chiu & Martinez, 2006). If an individual perceives that an IT artefact performs well they are more likely to continue using it.

This current study's result highlights that residents experience from using the city e-services shapes continued use intention. Hassenzahl, Diefenbach and Goritz (2010) indicate that user experience has an influence on an individual's technology usage. An individual who experiences positive interactions with an IT artefact is likely to be satisfied by it and intend to continue using

it (Morgan-Thomas & Veloutsou, 2013). Residents may only intend to continue using a city e-service that they experience a positive interaction with.

### 8.3.4 *Satisfaction*

#### *7.3.4.1 Hypothesis 5b: Satisfaction positively influences continued use intention.*

Satisfaction is an individual's evaluation of an affective response to their overall experience to a product or service (Chen & Chou, 2012). Satisfaction can either be positive (satisfied), negative (dissatisfied) or result in a feeling of indifference. In this study, satisfaction relates to a resident's positive emotional state or fulfilment response resulting from their overall experience to using e-government services. Research suggests that satisfaction is fundamental in influencing continued use intention (Lin, Chen & Fang, 2011).

The hypothesis about satisfaction influencing continued use intention was supported. The results show that satisfaction positively influences city e-service continued use intention. Previous research by Baker-Eveleth and Stone (2015), Hsu, Hsu, Wang and Chang (2016) and Uei, Tsai and Yang (2013) also found that satisfaction positively influences continued use intention. A resident may continue using a city e-service if they are satisfied by it. Lowry et al. (2015) concluded that continued use intention should be predicted by attitude post technology use, and usefulness. Attitude should be predicted by satisfaction and usefulness. The study gives empirical evidence that satisfaction has a significant effect on continued use intention. Researchers have long contended that pleasurable or satisfying experiences are more likely to be repeated. If individuals find the use of an IT artefact to be more satisfying they are more likely to continue using it (Lankton et al., 2014).

Results from the current research suggest that the satisfaction effect on continued use intention could be due to TT. According to Uei et al. (2013), TT may result in satisfaction and influence continued use intention. They argue that satisfaction is the mediating variable between TT and continued use intention. This is because if an individual is satisfied with using a technology artefact they are more likely to have greater TT in it. Lee (2010) proposes that individuals'

experience with a technology can lead to them being satisfied. Similarly, other research suggests that a user's experience using a technology determines satisfaction and satisfaction subsequently determines the intention to continue using the technology (De Melo Pereira et al., 2015). In this case, a user's experience is rooted in the evaluation and perception of the technology (Deng, 2014).

Users' satisfaction has a positive effect on continued use intentions in cases where the users experience greater satisfaction (Shiau, Huang & Shih, 2011). This will lead to a greater continued use intention. The more satisfactory an individual's experiences with a technology artefact are, the greater the likelihood they will return to keep using the artefact (Chen & Chou, 2012). If residents' satisfaction is positive due to their use of the city e-service, the residents are likely to continue using the city e-service when their experience from using the city e-service is favourable.

The results of this study could also be because of residents' evaluation of the city e-services quality and overall performance. If residents have a positive evaluation of the city e-services' quality and performance they are more likely to be satisfied by it. Satisfaction would lead to favourable outcomes such as the residents intending to continue using the city e-service (Akter et al., 2013).

## 8.4 Unsupported Hypotheses

This subsection first focuses on distrust in the city and perceived risk. It then looks at city e-service use. After which it focuses on satisfaction.

### 8.4.1 *Distrust in the City and Perceived Risk*

#### *7.4.1.1 Hypothesis 8d: Distrust in the city and perceived risk negatively influences continued use intention.*

Distrust is about an individual's negative expectation regarding another individual's conduct, reflecting a fear of, a tendency to attribute malicious intentions to, and a need to safeguard oneself from the effects of another individual's behaviour (Lewicki et al., 1998). Strong emotions such as fear of loss, doubt and paranoia characterise distrust. These emotions often initiate a human survival instinct (Lowry, Schuetzler, Giboney & Gregory, 2015). As individuals conduct transactions online, concerns of inherent risks have been observed for numerous users (Stafford & Turan, 2011). Perceived risk is about an individual's subjective expectation of suffering a loss while pursuing a desired outcome (Rana, Dwivedi, Williams & Weerakkody, 2015). In the current study, perceived risk reflects residents' beliefs of uncertainty and the expectation of adverse outcomes as a result of city e-services use. The scale items for distrust and perceived risk loaded highly on an individual component during factor analysis. These results suggest that the distrust and perceived risk constructs were not distinct factors. The definitions and scale items for distrust and perceived risk were revisited to assess the degree of similarity between distrust and perceived risk. Upon re-evaluation, it was discovered that the factors had highly similar conceptual definitions. This is illustrated by their definitions both having a strong emphasis on fear of loss and negative expectations (Lowry et al., 2015; Rana et al., 2015). In hindsight, it was decided to create a new variable combining the two factors, referred to as 'distrust and perceived risk'. As a result the original hypotheses on distrust and perceived risk were dropped. New hypotheses relating to the 'distrust and perceived risk' factor were proposed.

Empirical evidence on hypothesis 8d does not support that 'distrust in the city and perceived risk' has a significant effect on continued use intention. This concurs with Lin, Featherman and Sarker's (2016) study that looked at privacy risks, which also found that perceived risk had very little effect on continued use intention. However, the current study's result differs from results obtained by McKnight, Lankton, Nicolaou and Price (2017) and Reji Kumar and Sudharani Ravindran (2012) who found that negative trust factors influence continued use intention. Residents could have had a belief that using the city e-service was not a risky behaviour and would not lead to an unsatisfactory result. Therefore, transactions conducted using the City e-service may be perceived to go as expected (Mcknight et al., 2017). Residents could have not perceived the government as opportunistic. If residents had viewed the government as opportunistic, it would have made them less likely to intend to continue using the city e-service (Milan, Bebber, Toni & Eberle, 2015). This could have resulted in the effect of the 'distrust in government and perceived risk' factor not being significant.

#### *7.4.1.2 Hypothesis 8c: Distrust in in the city and perceived risk negatively influence satisfaction*

The hypothesis on the 'distrust in the city and perceived risk' factor and its effect on satisfaction was not supported by the empirical evidence. The results indicate that the 'distrust in the city and perceived risk' had no significant effect on satisfaction. This differs from results of studies that found that distrust (Kim, 2013) and perceived risk (Reji Kumar & Sudharani Ravindran, 2012) have negative relationships with satisfaction. This result could be because of a lack of discomfort and anxiety. Residents could not have had feelings of discomfort and anxiety resulting from beliefs on risks. These beliefs are likely to have a negative effect on performance beliefs of a technology and can have adverse effects on satisfaction (Reji Kumar & Sudharani Ravindran, 2012). Residents could also have not had a negative expectation of the government's conduct. This would have resulted in feelings of skepticism, fear and caution about potential risks of performing transactions using e-government services (Milan et al., 2015).

#### *7.4.1.3 Hypothesis 8a: Distrust in the city and perceived risk negatively influences city e-service use.*

Empirical evidence on hypothesis 8a does not support hypothesised the link between 'distrust in the city and perceived risk' and city e-service use. This result differs from results obtained by Kalaiarasi and Srividya (2012) who found that negative CT factors had a significant effect on use of an IT artefact. This result could be because of subjective expected losses. Kalaiarasi and Srividya (2012) suggest that if an individual perceives that using an IT artefact is free of risk then they will use it. Possible reasons could be that residents could have believed that it is not risky to deal with the government online. They did not need to take preventative measures against the negative effects of the government's conduct, which may have led to a reduction in the levels of usage (Kim, 2013). This resulted in the effect of the 'distrust in city and perceived risk' factor not being significant.

#### *7.4.1.4 Hypothesis 7b: Trust in city e-services negatively influences the distrust in the city and perceived risk.*

The hypothesis on trust in city e-services and its effect on the 'distrust in the city and perceived risk' factor was not supported by empirical evidence. The results demonstrate that the trust in City e-services did not have an effect on 'distrust in government and perceived risk'. This result may be because residents may have perceived that using the city e-service was not risky conduct and would not result in an unacceptable outcome. Therefore, transactions conducted using the City e-service may be perceived to go as expected (Mcknight et al., 2017). Residents may have also not viewed the government as opportunistic. If residents had a belief that the government was opportunistic, it would have made them more likely to distrust them and not trust the services they provided (Milan et al., 2015). This resulted in the effect of the trust in city e-services not being significant.

### 8.4.2 *City e-service use*

#### *7.4.2.1 Hypothesis 1: City e-service use positively influences continued use intention.*

Use can be defined as an individual's actual amount of use of a specific technology (Jeyaraj, Rottman & Lacity, 2006). The use of a technology may alter an individual's attitudes, needs and beliefs on the use of the technology (Karahanna et al., 1999). As a result, an individual's perceptions after the use of a technology may differ to the perceptions that resulted in initial acceptance (Venkatesh & Bala, 2008). City e-service use in the present study relates to a resident's current usage of a city e-service.

Contrary to expectations, empirical evidence on hypothesis 1 that relates to city e-service use and continued use intention was not supported. The results show that city e-service use does not have a significant effect on continued use intention. This result could be because of the utility provided by the city e-services. Wilson, Mao and Lankton (2010) in their habit strength study also have similar results which show that future use intention is not determined by current usage but by the individual's assessment of a technology's utility. This could be the case in the present study. The continued use intention of the city e-services is based on the utility evaluation obtained from using the city e-services rather than the current city e-service use. Residents would be more concerned with the efficiencies and benefits obtained from using the city e-services. The benefits obtained from using the city e-services would then influence their behaviour with respect to the city e-service (Schewe, 1976). This resulted in the effect of city e-service use not being significant.

#### *7.4.2.2 Hypothesis 5a: Satisfaction positively influences e-government service use.*

The hypothesis on the satisfaction and its effect on City e-service use was not supported by the study's data. The results indicate that the satisfaction had very little effect on city e-service use. This result concurs with Schewe's (1976) and Loh and Ong's (1998) studies which found no significant relationship between satisfaction and technology use. Bokhari (2005) proposes that the relationship between satisfaction and technology usage is not clear-cut. This is because in

some instances, satisfaction could influence usage and in others, usage could influence satisfaction. The study's results indicate that even when an individual is deciding whether to use a utilitarian system in an e-government setting, emotions such as satisfaction have little effect on their current usage decision.

A possible reason for this result is that beliefs relating to the benefits obtained from using the city e-services are of greater importance than the residents being satisfied from using the city e-services. Individuals may continue using an IT artefact they perceive as useful, even if they are dissatisfied with it (Bhattacherjee, 2001). This could have led to the effect of satisfaction not being significant. Another reason for this result is the presence of mandatory settings where residents have to use the city e-services (Schewe, 1976), as they could have no other means to access the specific government services. This could have overridden the influence of satisfaction on city e-service use. Residents could also want to confirm to the behaviour of other residents and this could also lead to the overshadowing of the effect of satisfaction on city e-service use (Schewe, 1976).

#### *7.4.2.3 Hypothesis 6a: Trust in the city positively influences city e-service use.*

Trust is a user's perceptions of the characteristics of service providers, their competency, integrity and benevolence (Lu, Wang & Hayes, 2012). Within the context of this study, residents' perceptions regarding government will influence the use of e-government services. It was hypothesized that trust in the city positively influences city e-service use.

Empirical evidence on hypothesis 6a that relates to trust in the city and city e-service use was not supported. Results highlight that "trust in the city" has no significant effect on city e-service use. This differs from results that suggest that CT is central to any exchange party interaction (Yu, Balaji & Khong, 2015). It also differs with Horsburgh, Goldfinch and Gauld's (2011) study, which claims that higher resident CT in government, relates to greater e-service use. However, this result concurs with Sweeney's (2007) study; that found no significant relationship between CT in government and e-government service use. Results show that this could be the case within

the context of the current research. Where residents use of a city e-service is not significantly influenced by their CT in the provider of the service (the government). Residents could be more concerned with the usability, convenience and ease of use of the city e-services (Kolsaker & Lee-Kelley, 2008) rather than their CT in the government (Sweeney, 2007). This could override the effect of "trust in the city" on city e-service use. Once residents have started using the city e-service they would mainly rely on the city e-service itself than the government as the provider of the service.

Trusting beliefs may have been especially important during residents' initial city e-service interactions with the government (Mayer et al., 1995). Later as residents interacted with the government, their trusting beliefs could have become less important. This is because the residents are more influenced by the nature of their interaction with the government itself (McKnight, Cummings & Chervany, 1998).

#### *7.4.2.4 Hypothesis 7a: Trust in e-government services positively influences e-government service use.*

The study's data does not support hypothesis 7a that relates to the association between trust in city e-services and city e-service use. The results indicate that trust in city e-services had very little effect on city e-service use. This differs with McKnight et al.'s (2011) study that posits that an individual will use more features of a specific technology if they have trust in it. Results from the current study could be because residents are drawn more by the city e-services' visual appeal, performance, quality and accuracy of content and functionality (Nam, 2014). This may overshadow the influence of trust in city e-services on city e-service use. This suggests that if residents' experience with using city e-services resulted in them believing that the e-services are dependable and competent, this would have no significant effect on their city e-service use behaviour.

Frequent use will leave users with the feeling of being in control where there are fewer uncertain risks and this could minimize the effect of trust in a technology artefact on use (Chang & Chou,

2012). Due to frequent city e-service use, residents could become more familiar with using them and have the perception that they are in control and using city e-services is less risky. This may have overriden the influence of trust in city e-services on city e-service use.

### 8.4.3 *Satisfaction*

#### *7.4.3.1 Hypothesis 6b: Trust in the city positively influences satisfaction*

Satisfaction is based on the cumulative feelings developed through multiple interactions with a service provider (Dlodlo, 2015). Within the context of this study, if residents CT the city, this influences whether or not they will be satisfied with city e-services. It was hypothesized that if residents CT the city, this will positively influence satisfaction.

Empirical evidence on hypothesis 6b that relates to trust in the city positively influencing satisfaction was not supported. Results demonstrate that trust in the city has no significant effect on satisfaction. The results differ with Chen and Chou's (2012) study, which suggest that CT in an exchange party has a positive influence on satisfaction. Residents could be more concerned that the city e-services meet their technology expectations and the city e-services actual performance rather than their expectations relating to the government (Welch, Hinnant & Moon, 2004). Residents could place a greater emphasis on the city e-service working effectively and their experience with using the City e-services. This implies that greater resident CT in city will not necessarily lead to greater satisfaction with the city e-services even though they perceive less risk (Chen & Chou, 2012). Empirical evidence shows that CT in an entity has little effect on an individual's overall evaluation of satisfaction with a service.

#### *7.4.3.2 Hypothesis 7d: Trust in city e-services positively influences satisfaction.*

The study's data does not support hypothesis 7d that relates to trust in city e-services significantly influencing satisfaction. Results highlight that trust in city e-services has no significant effect on a resident's evaluation of their satisfaction with city e-services. This result differs from Lu et al.'s (2012) study, which posits that TT in a technology artefact has a positive

effect on satisfaction. However, this result was consistent with Paravastu et al.'s (2014) study; they found no significant direct relationship between TT in a technology artefact and satisfaction. The current study gives evidence that supports Paravastu et al. (2014).

The results imply that while trust is an important element of human behaviour and also applies to IT artefacts that are used as representations for people, such as websites that are channels to an organisation (Lu et al., 2012), when trust is applied to IT artefacts which can not be clearly registered as representations of a company or entity it becomes less of an issue (Paravastu et al., 2014). In the e-government context, residents could have a notion that city e-services are not an obvious representation of the government, trust in the city e-service may not count in determining satisfaction. In the case of the city e-services, trustworthiness would be an indicator of quality in the past and significant in shaping satisfaction, but trust in city e-services, which centres on the present, would not. The reason for this result is that when trust relates to such IT artefacts, trustworthiness is a very strong determinant of the present result and thus also of satisfaction with the IT artefact. In the present, this influences whether the IT artefact can be trusted less significant (Paravastu et al., 2014).

## 8.5 Control Variables

Control variables are variables that are held constant to identify whether they affect the association between two other variables (Bailey, 1994). These variables might not be significant in explaining a dependent variable but may have an effect on the dependent variable and thus need to be controlled (Bhattacherjee, 2012). Control variables were included in this study because excluding control variables may result in misleading or erroneous conclusions about the relationships between the study's independent variables and the continued use intention (Miller & Yang, 2008). The control variables included in this study were age, gender and highest educational level obtained. Related research suggests that these variables may have an effect on continued use intention (Sun, Fang & Zou, 2016).

The results found that none of the control variables had a significant effect on continued use intention. Based on the results, this implies that the control variables do not influence the residents' intention to continue using city e-services and the relationship between the independent variables and continued use intention. The results of the study suggest that age did not influence the intention to continue using city e-services. This could be due to residents' attitude towards technology having an impact on their perceptions on continuing to use city e-services rather than their age influencing their beliefs (Jambulingam, 2013).

The results on gender suggest that a respondent's gender did not have a significant bearing on their continued use intention. This could be due to the males and females having similar technology skill levels. Residents may have equivalent competency in city e-services regardless of their gender (Jambulingam, 2013). The benefits and utility obtained from city e-services may be of great significance to residents (Lankton et al., 2014), regardless of gender residents will intend to continue using city e-services. The last control variable where the results suggested no effect on continued use intention was the highest educational level obtained. The results for this control variable suggest that it did not have an effect on continued use intention. This may be due to residents having experience with the use of similar technologies.

## 8.6 Conclusion

This chapter provided an interpretation of the results presented in chapter 6. It highlighted the supported and unsupported hypotheses based on the literature from chapter 4. Additional literature was sourced to substantiate the results. The next chapter provides the study's conclusion. This chapter summarises the overall findings in relation to resident intention to continue using city e-services.

# 9 CONCLUSION

## 9.1 Introduction

This chapter concludes the research. It first looks at the results from the research questions. It then focuses on the contribution to theory, contribution to practice, suggestion for future research and the study's limitations.

## 9.2 Results from the Research Questions

The study's research questions were addressed as follows:

1. Research question 1, which is about the relevant theories that can be used within the context of continued use intention, was addressed in the present study by conducting an SLR. This SLR focused on the theories, models and frameworks that have underpinned the study of continued use and continued use intention. The theories, models and frameworks that have underpinned the study of continued use and continued use intention were identified.
2. Research question 2 which is about how the relevant theories contribute to our better understanding of the continued use intention phenomenon was addressed in Chapter 3 which discussed candidate theories. Competing theories that help understand the continued use phenomenon were examined and discussed.
3. Research question 3 which is about how the development of a model that comprises factors that influence continued use intention contribute to our better understanding of continued use was addressed in Chapter 7. This chapter discussed the findings of the study and the effect of each factor on continued use intention.
4. Research question 4 which is about the relative explanatory power of the select theories in their explanation of continued use intention was also addressed in the Chapter 7. This

chapter discussed which factors derived from theory had the most significant influence on continued use intention and a ranking on the level of significance. This enables a comparison of factors derived from ECT and factors from Trust theory.

## 9.3 Contribution to Theory

This study contributes to the existing body of knowledge about e-government services and continued use intention. It does so by combining expectation confirmation theory with theory on trust. These research lenses do not only extend the model of continued use intention, but may also better reflect the actual context of a resident's city e-service continued intention, in which an individual's intention could be influenced by their beliefs regarding the technology performance, satisfaction, current use and trust. For instance, the research study results indicate that trust in city e-services had the greatest impact on the resident city e-service continued use intention. The results from the study also suggest that trust in an IT artefact influences continued use intention. This affirms the notion that continued use intention is predictable based on an individual's trust in an IT artefact (Lankton et al., 2014; Turel & Gefen, 2013).

The research study results also indicate that trust in the city had the second highest significant impact on the resident city e-service continued use intention. The results from the study suggest that Trust in an exchange party influences continued use intention. This confirms the belief that continued use intention is predictable based on an individual's Trust in an exchange party (Chen et al., 2014). In this study, satisfaction had a positive impact on resident city e-service continued use intention. This was shown to be true based on the fact that continued use intention is strongly influenced by satisfaction (Lin at al., 2011).

Perceived performance and expectations also influenced resident city e-service continued use intention. These factors were combined to form a variable referred to as performance beliefs. The results from the study suggest that performance related technology factors influence continued use intention.

An additional combined factor was "distrust and perceived risk". Both distrust and perceived risk have an underlying focus on the on fear of loss and negative expectations (Lowry et al., 2015; Rana et al., 2015). The last factor examined in this study was city e-service use. In this study, city e-service use did not have a positive impact on resident city e-service continued use intention.

The current research advances a theoretical model that aims to explain and predict continued use intention by combining ECT factors and three different trust dimensions. There are limited studies that explore continued use intention using ECT together with distinct trust dimensions. Specifically, the current study distinguishes between trust in an IT artefact, trust in an entity or exchange party and distrust. Evidence demonstrated that these three trust dimensions are distinct from each other. Evidence also showed that the proposed determinants of continued use intention could predict it. With the exceptions of 'distrust and perceived risk' and city e-service use which were found not to have significant effects on continued use intention. Performance beliefs also appeared to have a significant effect on satisfaction and trust in city e-services. The study results reinforce the importance of trust on residents' city e-service continued use intention. The study results also highlight the importance of context in the shaping of continued use intention.

This study appears to be the first of its kinds to create a systematic review that focuses on continued use, continued use intention and e-government services. The study provided a systematic synthesis on theories, models and frameworks that have underpinned the study of continued use, continued use intention and e-government services. The research also advances the understanding on studies that have found control variables not to be significant when studying continued use intention.

## 9.4 Contribution to Practice

City e-services are one of the core innovations that governments can use to improve the delivery of services to residents. These e-services support the flow and exchange of information between governments and consumers such as residents and businesses (Forlizzi, 2010). City e-services can be used to deliver diverse services to residents, for example the payment of municipal bills, voting on civic issues and obtaining specific government information. City e-services have a number of challenges and an outcome of this is their limited post-acceptance use. The resident intention to continue using city e-services is of interest to governments, because a city e-service may only be successful if residents continue to use it after initial acceptance as the benefits of the city e-service are usually only realised through prolonged use (Rehman & Esichaikul, 2011). Knowing what factors influence residents' intention to continue using city e-services provides the government with important information as to what elements of the city e-services they could focus on.

The study's findings show that residents will intend to continue using city e-services if they are satisfied from using them. Therefore, comprehending how to increase residents' level of satisfaction and thus keeping them intending to continue using city e-services was of importance. Residents' city e-services continued use intention may well be increased by reinforcing their satisfaction with the city e-services. The government could make an effort to improve the functions and services provided by the city e-services to satisfy residents' needs to the greatest possible extent. The government could also have educational campaigns which aim to educate residents on how to effectively use the city e-services. This could potentially increase the resident satisfaction with using the city e-services. As residents are aware on how to use the city e-services with less effort and have a better understanding of the city e-services (Lankton et al., 2014). The government could also show they are concerned with the needs of the residents by providing residents with mechanisms to provide feedback on their experience with using the city e-services. This feedback could also focus on areas the government could improve in the city e-service (De Melo Pereira et al., 2015).

The research results also indicate that residents will intend to continue using city e-services if they have trust in the specific e-service. The government could ensure that city e-service environments are safeguarded from security threats, by creating e-services that are easy to recognize. The e-services should display clear privacy statements and use a government domain name (Akter et al., 2013). Reliability may be indicated by the use of government contact pages, frequently asked question pages and resident testimonials (Turel et al., 2008). Residents may also feel safer online when the government participates in active information exchanges with them. The government could provide residents with City e-services that fulfil resident's requirements and needs, works perfectly, are always available and process transactions securely, as these are preconditions for trust in the services (Turel & Gefen, 2013). The government could communicate the benefits obtained from using city e-services to residents and have an emphasis on reliability and efficiency (Turel et al., 2008).

The study's findings show that residents will intend to continue using city e-services if they trust the provider of the e-services. The government needs to be transparent in its communication with the residents, have high service level quality and a skilled labour force to ensure that it is viewed as a trustworthy entity. The government could have marketing campaigns in order to convince residents that they have good intentions and are determined to provide much needed services (Akter et al., 2013). The government could have face to face interactions with residents as a means to facilitate transparency. The government could implement strategies that highlight and clarify to residents its underlying workings, providing detail on its operational structures, what, how and where resident information is stored and which personnel are responsible and accountable for specific tasks and activities. Such tactics could alleviate residents' skepticism towards the government (Sun et al., 2014).

The study's findings reveal that residents will intend to continue using city e-services if they perform well. The city e-service user interface must promote ease of use without compromising on functionality. If residents struggle to access functionality within the city e-service it is likely that they will not obtain the perceived benefits associated with its use (Kivijarvi at al., 2013).

These residents may revert to alternative methods for obtaining government services such as face to face or over the telephone (Elkadi, 2013).

Technology is integral to the smart city concept because through its use it has the potential to significantly transform life and work within a city (Hollands, 2008). Technology enables the creation of digitally interconnected communities that can collaborate regarding matters pertaining to quality of life and sustainability (Stratigea, Papadopoulou & Panagiotopoulou, 2015). From a technology perspective a smart city provides web based government services that enable the transformation of important government processes and provision of services across government agencies and with external stakeholders such as residents and businesses (Nam & Pardo, 2011). The government could use the results of the present study to better understand what factors to consider when implementing e-government services as part of their smart city campaigns.

## 9.5 Suggestions for Future Research

Many of the suggestions for future research are linked to the inherent limitations of this study. The study had time and resource limitations[25]. An area of future research could be to extend this research to include other residents in different municipal cities in South Africa or within other developing countries. This would provide a more detailed comparison of data across various cities or countries based on the same variables. In addition, this would improve the generalisation of the study results based on the number of participants across the cities or countries. A second suggestion for future research would be combining the quantitative and qualitative research approaches. This could be beneficial as it may balance the limitations from each research method. The quantitative approach would provide the comparison data and highlight areas that

[25] See section 8.5 on limitations of the study

could be explored more from a qualitative approach. The qualitative approach would also provide rich data on the residents' city e-service continued use intention.

A third suggestion is for future city e-service continued use intention research to focus on alternative theoretical lenses. For example, other theoretical perspectives, such as Hofstede's five cultural values (Hoehle et al., 2015) and self-perception theory (Wu & Kuo, 2008), have been used in prior research to study continued use intention. These alternative theories may provide further insights to academia and practice regarding the antecedents of city e-service continued use intention.

Another area future research could focus on is conducting the e-service continued use intention study using a longitudinal research design. This design approach will use continuous measures to observe residents over prolonged time periods (Bailey, 1994). This will be useful for assessing the association between continued use intention and its determinants over different time periods. This could provide researchers and practitioners insight on how continued use intention and what influences it, are shaped over time.

## 9.6 Limitations of the study

Despite using an inconsistent 3.5 month data collection period, the study had a relatively low response rate. An outcome of this is that there were only 203 usable responses. This could affect the generalisability of the study's results. The study only focused on residents within Ekurhuleni. This may have resulted in a participant response bias. The study's results may be less generalisable to residents from other municipal cities within South Africa. It is worth mentioning that there were other variables that could have positively influenced the resident continued use intention that were not included in this study. A less parsimonious model could have found the justification in the addition of additional constructs such as habit, perceived credibility and enjoyment which excluded from the study.

## 9.7 Conclusion

This study has improved our understanding of the factors that influence residents' city e-service continued use intention within Ekurhuleni in Gauteng. Analysis of a model combining ECT and trust dimensions allowed relationships between satisfaction-related and trust factors to be examined and tested. Findings suggest that trust in city e-services, performance beliefs, trust in government and satisfaction are directly related to resident city e-service continued use intention. "Distrust in the City and Perceived Risk" and "city e-service use" were found to be insignificant on resident city e-service continued use intention.

The study has improved our understanding of continued use intention by showing that context is critical when shaping continued use intention. Applying ECT and Trust theories may not predict continued use intention similarly in different contexts. In contrast to ECT, besides satisfaction, trust factors were the key determinants of continued use intention. Within the setting of the present study, the trust dimensions emerged as the key predictors of continued use intention. This environment involves the interaction between residents and their respective governments.

When using constructs such as expectations and perceived performance there is the possibility that individuals cannot reflect on their past beliefs. This was shown in the study by residents' expectations which focused on their pre-usage beliefs instead of their past usage beliefs.

The present study has also shown that the different dimensions of trust, namely distrust in the city, trust in the city and trust in city e-services are indeed distinct constructs, and even their effects on continued use intention were not identical. What has also emerged is that in an online setting such as that of e-government, trust in the technology artefact has a greater influence on how continued use intention is shaped rather than how Trust manifests itself in an exchange party. These may also imply that the object of interest shapes trust beliefs. Lastly, the current study has also shown that distrust in the city and trust in the city are not opposite ends of the

same measure. Trust in the city had a positive and direct association to continued use intention whereas distrust in the city had a non-significant effect on continued use intention.

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# APPENDIX A – AIS BASKET OF JOURNALS

The table below highlights the AIS basket of journals.

Table 33: AIS basket of journals

| # | Journal |
|---|---|
| 1 | European Journal of Information Systems |
| 2 | Information Systems Journal |
| 3 | Information Systems Research |
| 4 | Journal of AIS |
| 5 | Journal of MIS |
| 6 | MIS Quarterly |
| 7 | Journal of Strategic Information Systems |
| 8 | Journal of Information Technology |

# APPENDIX B - SEARCH STRINGS AND SEARCH RESULTS

Table 34 summarises the search strings used for research question 1.Table 34 also highlights the database search results.

Table 34: Search strings and numeric results of searches Question 1

| Search String | EBSCOhost: Number of results |
|---|---|
| (Theory OR Model OR Framework OR Theories) AND ("Information Technology Continued Use" OR "Information System Continued Use" OR "Information Technology Continuance" OR "Information System Continuance") AND (Underpin OR Underpinning OR Support) | 1 |
| (Theory OR Model OR Framework OR Theories) AND ("Information Technology Continued Use" OR "Information System Continued Use" OR "Information Technology Continuance" OR "Information System Continuance") AND (Founding OR Foundation OR Grounding) | 0 |
| (Theory OR Model OR Framework OR Theories) AND ("IS Continued Use" OR "IT Continued Use" OR "IS Continuance" OR "IT Continuance") AND (Underpin OR Underpinning OR Support) | 120 |
| (Theory OR Model OR Framework OR Theories) AND ("IS Continued Use" OR "IT Continued Use" OR "IS Continuance" OR "IT Continuance") AND (Founding OR Foundation OR Grounding) | 17 |
| (Theory OR Model OR Framework OR Theories) AND ("Continuous Use" OR Continuance OR "Continued Usage") AND (Underpin OR Underpinning OR Support) | 68 |
| (Theory OR Model OR Framework OR Theories) AND ("Continuous Use" OR Continuance OR "Continued Usage") AND (Founding OR Foundation OR Grounding) | 7 |
| (Theory OR Model OR Framework OR Theories) AND ("Continued Use Intention" OR "Continuance Intention" OR "Intention to Continue Using") AND (Underpin OR Underpinning OR Support) | 16 |
| (Theory OR Model OR Framework OR Theories) AND ("Continued Use Intention" OR "Continuance Intention" OR "Intention to Continue Using") AND (Founding OR Foundation OR Grounding) | 1 |
| (Theory OR Model OR Framework OR Theories) AND ("Sustained Use" OR "Sustained Usage") AND (Founding OR Foundation OR Grounding) | 2 |
| (Theory OR Model OR Framework OR Theories) AND ("Sustained Use" OR "Sustained Usage") AND (Underpin OR Underpinning OR Support) | 12 |
| Database total before duplicate removal | 244 |
| Database total after duplicate removal | 153 |
| | |
| Search String | JSTOR: Number of results |
| (Theory OR Model OR Framework OR Theories) AND ("Information Technology Continued Use" OR "Information System Continued Use" OR "Information Technology Continuance" OR "Information System Continuance") AND (Underpin OR Underpinning | 4 |

| | |
|---|---|
| OR Support) | |
| (Theory OR Model OR Framework OR Theories) AND (“Information Technology Continued Use” OR “Information System Continued Use” OR “Information Technology Continuance” OR “Information System Continuance”) AND (Founding OR Foundation OR Grounding) | 2 |
| (Theory OR Model OR Framework OR Theories) AND (“IS Continued Use” OR “IT Continued Use” OR “IS Continuance” OR “IT Continuance”) AND (Underpin OR Underpinning OR Support) | 26 |
| (Theory OR Model OR Framework OR Theories) AND (“IS Continued Use” OR “IT Continued Use” OR “IS Continuance” OR “IT Continuance”) AND (Founding OR Foundation OR Grounding) | 14 |
| (Theory OR Model OR Framework OR Theories) AND (“Continued Use Intention” OR “Continuance Intention” OR “Intention to Continue Using”) AND (Underpin OR Underpinning OR Support) | 36 |
| (Theory OR Model OR Framework OR Theories) AND (“Continued Use Intention” OR “Continuance Intention” OR “Intention to Continue Using”) AND (Founding OR Foundation OR Grounding) | 18 |
| Database total before duplicate removal | 100 |
| Database total after duplicate removal | 53 |
| | |
| Search String | ACM: Number of results |
| +("Continued Use") +("Information Technology" OR technology) +(theory OR model OR framework OR theories) | 22 |
| +("Continued Use") +("Information System") +(theory OR model OR framework OR theories)" | 13 |
| +("Continued Usage") +("Information Technology" OR technology OR "Information System") +( theory OR model OR framework OR theories) | 3 |
| +("Continued Use Intention") +("Information Technology" OR technology OR "Information System") +( theory OR model OR framework OR theories) | 1 |
| +("Continuance Intention") +("Information Technology" OR technology OR "Information System") +( theory OR model OR framework OR theories) | 5 |
| +("Intention to Continue Using") +("Information Technology" OR technology OR "Information System") +( theory OR model OR framework OR theories) | 2 |
| +("Sustained Use" OR "Sustained Usage") +("Information Technology" OR technology) +( theory OR model OR framework OR theories) | 3 |
| +("Sustained Use" OR "Sustained Usage") +("Information System") +( theory OR model OR framework OR theories) | 3 |
| Database total before duplicate removal | 52 |
| Database total after duplicate removal | 41 |
| | |
| Search String | Proquest: Number of results |
| (Theory OR Model OR Framework OR Theories) AND (“Information Technology Continued Use” OR “Information System Continued Use” OR “Information Technology Continuance” OR “Information System Continuance”) AND (Underpin OR Underpinning OR Support) | 89 |

| | |
|---|---|
| (Theory OR Model OR Framework OR Theories) AND (“Information Technology Continued Use” OR “Information System Continued Use” OR “Information Technology Continuance” OR “Information System Continuance”) AND (Founding OR Foundation OR Grounding) | 42 |
| (Theory OR Model OR Framework OR Theories) AND (“IS Continued Use” OR “IT Continued Use” OR “IS Continuance” OR “IT Continuance”) AND (Underpin OR Underpinning OR Support) | 195 |
| (Theory OR Model OR Framework OR Theories) AND (“IS Continued Use” OR “IT Continued Use” OR “IS Continuance” OR “IT Continuance”) AND (Founding OR Foundation OR Grounding) | 96 |
| (Theory OR Model OR Framework OR Theories) AND (“Continued Use Intention” OR “Continuance Intention” OR “Intention to Continue Using”) AND (Founding OR Foundation OR Grounding) | 186 |
| Database total before duplicate removal | 608 |
| Database total after duplicate removal | 374 |
| | |
| Total before duplicate removal (244 + 608 + 52 + 100) | 1004 |
| Total after duplicate removal (153 + 374 + 41 + 53) | 621 |

Table 35 summarises the search strings used for research question 2. Table 35 also highlights the database search results.

Table 35: Search strings and numeric results of searches Question 2

| Search String | EBSCOhost: Number of results |
|---|---|
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic government" OR "E-government" OR "Electronic government websites" OR "E-government websites") AND (Impact) | 7 |
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic government" OR "E-government" OR "Electronic government websites" OR "E-government websites") AND (Effect) | 1 |
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic government" OR "E-government" OR "Electronic government websites" OR "E-government websites") AND (Use) | 22 |
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic government" OR "E-government" OR "Electronic government websites" OR "E-government websites") AND (Usage) | 1 |
| (Residents OR Citizens OR People OR Individuals) AND (“Developing Countries” OR “Developing Nations” OR “Developing States” OR “Developing Economies”) AND (“Electronic government services” OR “E-government services” OR “Electronic services” OR E-services) AND (Impact) | 2 |

| | |
|---|---|
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic government services" OR "E-government services" OR "Electronic services" OR E-services) AND (Effect) | 1 |
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic government services" OR "E-government services" OR "Electronic services" OR E-services) AND (Use) | 4 |
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic government services" OR "E-government services" OR "Electronic services" OR E-services) AND (Usage) | 1 |
| (Residents OR Citizens OR People OR Individuals) AND ("Emerging Countries" OR "Emerging Nations" OR "Emerging States" OR "Emerging Economies") AND ("Electronic government" OR E-government OR "Electronic government websites" OR "E-government websites") AND (Impact) | 1 |
| (Residents OR Citizens OR People OR Individuals) AND ("Emerging Countries" OR "Emerging Nations" OR "Emerging States" OR "Emerging Economies") AND ("Electronic government" OR E-government OR "Electronic government websites" OR "E-government websites") AND (Effect ) | 0 |
| (Residents OR Citizens OR People OR Individuals) AND ("Emerging Countries" OR "Emerging Nations" OR "Emerging States" OR "Emerging Economies") AND ("Electronic government" OR E-government OR "Electronic government websites" OR "E-government websites") AND (Use) | 8 |
| (Residents OR Citizens OR People OR Individuals) AND ("Emerging Countries" OR "Emerging Nations" OR "Emerging States" OR "Emerging Economies") AND ("Electronic government" OR E-government OR "Electronic government websites" OR "E-government websites") AND (Usage) | 0 |
| Database total before duplicate removal | 48 |
| Database total after duplicate removal | 25 |
| | |
| Search String | JSTOR: Number of results |
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic government services" OR "E-government services") AND (Impact) | 13 |
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic services" OR E-services) AND (Impact) | 25 |
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic government services" OR "E-government services") AND (Effect) | 13 |
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic services" OR E-services) AND (Effect) | 20 |
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic government services" OR "E-government services") AND (Use) | 18 |

| | |
|---|---|
| (Residents OR Citizens OR People OR Individuals) AND (“Developing Countries” OR “Developing Nations” OR “Developing States” OR “Developing Economies”) AND (“Electronic services” OR E-services) AND (Use) | 31 |
| (Residents OR Citizens OR People OR Individuals) AND (“Developing Countries” OR “Developing Nations” OR “Developing States” OR “Developing Economies”) AND (“Electronic government services” OR “E-government services”) AND (Usage) | 9 |
| (Residents OR Citizens OR People OR Individuals) AND (“Developing Countries” OR “Developing Nations” OR “Developing States” OR “Developing Economies”) AND (“Electronic services” OR E-services) AND (Usage) | 10 |
| (Residents OR Citizens OR People OR Individuals) AND (“Emerging Countries” OR “Emerging Nations” OR “Emerging States” OR “Emerging Economies”) AND (“Electronic government” OR E-government) AND (Impact) | 16 |
| (Residents OR Citizens OR People OR Individuals) AND (“Emerging Countries” OR “Emerging Nations” OR “Emerging States” OR “Emerging Economies”) AND (“Electronic government websites” OR “E-government websites”) AND (Impact) | 0 |
| (Residents OR Citizens OR People OR Individuals) AND (“Emerging Countries” OR “Emerging Nations” OR “Emerging States” OR “Emerging Economies”) AND (“Electronic government” OR E-government) AND (Effect ) | 13 |
| (Residents OR Citizens OR People OR Individuals) AND (“Emerging Countries” OR “Emerging Nations” OR “Emerging States” OR “Emerging Economies”) AND (“Electronic government websites” OR “E-government websites”) AND (Effect ) | 0 |
| (Residents OR Citizens OR People OR Individuals) AND (“Emerging Countries” OR “Emerging Nations” OR “Emerging States” OR “Emerging Economies”) AND (“Electronic government” OR E-government) AND (Use) | 14 |
| (Residents OR Citizens OR People OR Individuals) AND (“Emerging Countries” OR “Emerging Nations” OR “Emerging States” OR “Emerging Economies”) AND (“Electronic government websites” OR “E-government websites”) AND (Use) | 0 |
| (Residents OR Citizens OR People OR Individuals) AND (“Emerging Countries” OR “Emerging Nations” OR “Emerging States” OR “Emerging Economies”) AND (“Electronic government” OR E-government) AND (Usage) | 5 |
| (Residents OR Citizens OR People OR Individuals) AND (“Emerging Countries” OR “Emerging Nations” OR “Emerging States” OR “Emerging Economies”) AND (“Electronic government websites” OR “E-government websites”) AND (Usage) | 0 |
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic government" OR "E-government") AND (Usage) | 37 |
| Database total before duplicate removal | 224 |
| Database total after duplicate removal | 87 |
| | |
| Search String | ACM: Number of results |
| +(Residents OR Citizens OR People OR Individuals) +("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") +("Electronic government" OR "E-government" OR "Electronic government websites" OR "E-government websites" | 41 |
| +(Residents OR Citizens OR People OR Individuals) + ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") +("Electronic government services" OR "E-government services" OR "Electronic | 1 |

| | |
|---|---|
| services" OR E-services) +(Impact OR Effect OR Use OR Usage) | |
| +(Residents OR Citizens OR People OR Individuals) +("Emerging Countries" OR "Emerging Nations" OR "Emerging States" OR "Emerging Economies") +("Electronic government" OR E-government OR "Electronic government websites" OR "E-government websites") +(Impact OR Effect OR Use OR Usage) | 4 |
| +(Residents OR Citizens OR People OR Individuals) +("Emerging Countries" OR "Emerging Nations" OR "Emerging States" OR "Emerging Economies") +("Electronic government services" OR "E-government services" OR "Electronic services" OR E-services) +(Impact OR Effect OR Use OR Usage) | 10 |
| +(Residents OR Citizens OR People OR Individuals) +("third world" OR " third world countries") +("Electronic government" OR E-government OR "Electronic government websites" OR "E-government websites") +(Impact OR Effect OR Use OR Usage) | 1 |
| +(Residents OR Citizens OR People OR Individuals) +("third world" OR " third world countries") +("Electronic government services" OR "E-government services" OR "Electronic services" OR E-services) +(Impact OR Effect OR Use OR Usage) | 1 |
| Database total before duplicate removal | 58 |
| Database total after duplicate removal | 53 |
| | |
| Search String | Proquest |
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic government" OR "E-government" OR "Electronic government websites" OR "E-government websites") AND (Impact) | 67 |
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic government" OR "E-government" OR "Electronic government websites" OR "E-government websites") AND (Effect) | 54 |
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic government" OR "E-government" OR "Electronic government websites" OR "E-government websites") AND (Use) | 75 |
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic government" OR "E-government" OR "Electronic government websites" OR "E-government websites") AND (Usage) | 44 |
| (Residents OR Citizens OR People OR Individuals) AND ("Developing Countries" OR "Developing Nations" OR "Developing States" OR "Developing Economies") AND ("Electronic government services" OR "E-government services" OR "Electronic services" OR E-services) AND (Impact OR Effect OR Use OR Usage) | 43 |
| (Residents OR Citizens OR People OR Individuals) AND (“Emerging Countries” OR “Emerging Nations” OR “Emerging States” OR “Emerging Economies”) AND (“Electronic government” OR E-government OR “Electronic government websites” OR “E-government websites”) AND (Impact OR Impact OR Use OR Usage) | 10 |
| (Residents OR Citizens OR People OR Individuals) AND ("Emerging Countries" OR "Emerging Nations" OR "Emerging States" OR "Emerging Economies") AND ("Electronic government services" OR "E-government services" OR "Electronic services" OR E-services) AND (Impact OR Effect OR Use OR Usage) | 3 |
| (Residents OR Citizens OR People OR Individuals) AND ("third world" OR "third world countries ") AND ("Electronic government" OR "E-government" OR "Electronic | 3 |

| | |
|---|---|
| government websites" OR "E-government websites") AND (Impact OR Effect OR Use OR Usage) | |
| Database total before duplicate removal | 299 |
| Database total after duplicate removal | 90 |
| | |
| Total before duplicate removal (299 + 58 + 224 + 48) | 629 |
| Total after duplicate removal (90 + 53 + 87 + 25) | 261 |

# APPENDIX C – SUMMARY OF DEVELOPING COUNTRIES

Table 36 provides a summary of developing countries.

Table 36: Developing Countries

| Developing Countries | | | | |
|---|---|---|---|---|
| Afghanistan | Central African Republic | Guinea-Bissau | Maldives | Qatar |
| Albania | Chad | Guyana | Mali | Romania |
| Algeria | Chile | Haiti | Marshall Islands | Russia |
| Angola | China | Honduras | Mauritania | Rwanda |
| Antigua and Barbuda | Colombia | Hungary | Mauritius | Saint Kitts and Nevis |
| Argentina | Comoros | India | Mexico | Saint Lucia |
| Armenia | Democratic Republic of the Congo | Indonesia | Federated States of Micronesia | Saint Vincent and the Grenadines |
| Azerbaijan | Republic of the Congo | Iran | Moldova | Samoa |
| Bahamas | Costa Rica | Iraq | Mongolia | São Tomé and Príncipe |

| | | | | |
|---|---|---|---|---|
| Bahrain | Croatia | Ivory Coast | Montenegro | Saudi Arabia |
| Bangladesh | Djibouti | Jamaica | Morocco | Senegal |
| Barbados | Dominica | Jordan | Mozambique | Serbia |
| Belarus | Dominican Republic | Kazakhstan | Myanmar | Seychelles |
| Belize | Ecuador | Kenya | Namibia | Sierra Leone |
| Benin | Egypt | Kiribati | Nepal | Solomon Islands |
| Bhutan | El Salvador | Kosovo | Nicaragua | Somalia |
| Bolivia | Equatorial Guinea | Kuwait | Niger | South Africa |
| Bosnia and Herzegovina | Eritrea | Kyrgyzstan | Nigeria | South Sudan |
| Botswana | Ethiopia | Laos | Oman | Sri Lanka |
| Brazil | Fiji | Lebanon | Pakistan | Sudan |
| Brunei | Gabon | Lesotho | Palau | Suriname |
| Bulgaria | The Gambia | Liberia | Panama | Swaziland |
| Burkina Faso | Georgia | Libya | Papua New Guinea | Syria |

| | | | | |
|---|---|---|---|---|
| Burundi | Ghana | Macedonia | Paraguay | Tajikistan |
| Cambodia | Grenada | Madagascar | Peru | Tanzania |
| Cameroon | Guatemala | Malawi | Philippines | Thailand |
| Cape Verde | Guinea | Malaysia | Poland | Timor-Leste |
| Togo | Tonga | Trinidad and Tobago | Tunisia | Turkey |
| Turkmenistan | Tuvalu | Uganda | Ukraine | United Arab Emirates |
| Uruguay | Uzbekistan | Vanuatu | Venezuela | Vietnam |
| Yemen | Zambia | Zimbabwe | | |

(International Monetary Fund, 2015)

# APPENDIX D - SUMMARY OF RESULTS

Table 37 highlights the information relating to the theories, models and frameworks which have been used to study continued use and continued use intention.

Table 37: Summary of Theories, Models and Frameworks

| Author | Theory/Model/ Framework | Dependant Variable | Independent/Moderator Variables | IT Artefact | Publication | Year | Source of Data |
|---|---|---|---|---|---|---|---|
| Agrifoglio, Black, Metallo and Ferrara (2012) | The Technology Acceptance Model (TAM) | IS Continuance Intention | Perceived ease of use, perceived usefulness, enjoyment and playfulness | Twitter | The Journal of Computer Information Systems | 2012 | Cross-sectional survey of 380 Twitter users. |
| Bhattacherjee (2001) | Expectation Confirmation Theory (ECT) | IS Continuance Intention | Confirmation, satisfaction and perceived usefulness | Online banking platform | MIS Quarterly | 2001 | Cross-sectional survey of 122 online banking users. |
| Bhattacherjee and Premkumar (2004) | ECT and TAM | Usage Intention | Attitude, disconfirmation, usefulness and satisfaction | Computer-based training software and rapid application development software | MIS Quarterly | 2004 | 3 time-period survey of 54 students and 2 time-period surveys of 77 students. |
| Barnes and Bohringer (2011) | Expectation Confirmation Model (ECM) and Critical Mass Theory | Continuance Intention | Confirmation, satisfaction, perceived usefulness, habit, perceived critical mass, comprehensiveness of usage, frequency of past behaviour and social network size | Twitter | The Journal of Computer Information Systems | 2011 | Cross-sectional survey of 131 Twitter users. |
| Bhattacherjee and Lin (2015) | ECM and Theory of Reasoned Action (TRA) | Continuance behaviour | Disconfirmation, habit, subjective norm, perceived usefulness, satisfaction and continuance intention | Insurance agent work system | European Journal of Information Systems | 2015 | Longitudinal survey of 514 insurance agents. |
| Bhattacherjee, Perols and Sanford (2008) | ECM, Theory of Planned Behaviour (TPB) and Social Cognitive Theory (SCT) | Continuance behaviour | Disconfirmation, post-usage usefulness, satisfaction, continuance intention, facilitating conditions and information technology self-efficacy | Document management system | The Journal of Computer Information Systems; | 2008 | Longitudinal survey of 28 administrators and 53 staff personnel. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Cao, Jiang, Oh, Li, Liao and Chen (2013) | ECM and Maslow's hierarchy of needs theory | Continuance Intention | Confirmation, fulfilment of social presence, fulfilment of emotion belonging, fulfilment of social needs, fulfilment of self-actualization needs, fulfilment of self-expression, fulfilment of happiness and satisfaction Self-Actualization Needs | Social networking services | Journal of Service Management | 2013 | Cross-sectional survey of 202 social networking service users. |
| Chen, Wu, Su and Yang (2008) | ECM | Continuance Intention | Confirmation, satisfaction, perceived usefulness: front-end, perceived usefulness: back-end and performance expectancy | Radio frequency identification (RFID) technology | Management Research News | 2008 | Cross-sectional survey of 81 care givers. |
| Chen, Jong and Lai (2014) | ECM | Continuance Intention | Satisfaction, trust, optimism, innovativeness, discomfort and insecurity | E-appointment system | Journal of Medical Systems | 2014 | Cross-sectional survey of 378 nurses. |
| Cheng (2014) | ECM, Flow theory and updated DeLone and McLean information system (IS) success model | Continuance Intention | Confirmation, satisfaction, perceived usefulness, flow, instructor quality, support service quality, system quality and information quality | Learning management system | Information Technology & People | 2014 | Cross-sectional survey of 313 e-appointment system users. |
| Cheng (2014) | ECM, TAM and DeLone and McLean IS success model | Continuance Intention | Confirmation, satisfaction, perceived usefulness, perceived ease of use, information relevance, system accessibility, technical support, interface design and navigation | Digital library | Aslib Journal of Information Management | 2014 | Cross-sectional survey of 525 students. |
| Chiang (2013) | Innovation Diffusion theory, Uses and Gratifications theory and TRA | Intention to continuously use social networking service | Complexity, relative advantage, compatibility, informativeness, social interactivity, playfulness, attitude towards social networking service and social norms | Facebook | Online Information Review | 2013 | Cross-sectional survey of 348 Facebook users. |
| Chang (2013) | ECM and the DeLone and McLean IS success model | Continuance Intention | Satisfaction, perceived value, service quality, information quality and system quality | E-learning system | Library Management | 2013 | Cross-sectional survey of 302 students. |
| Chiu and Huang (2015) | Media System Dependency theory and Uses and Gratifications theory | Continuance Intention | Understanding dependency relation, orientation dependency relations, play dependency relations, par asocial interaction, gratification and habit | Social network services | European Journal of Information Systems | 2015 | Cross-sectional survey of 657 Facebook users. |
| Chong (2013) | ECM | Continuance | Confirmation, | Mobile | The Journal | 2013 | Cross-sectional |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Intention | satisfaction, perceived usefulness, perceived ease of use, trust, perceived enjoyment and perceived cost | commerce | of Computer Information Systems; | | survey of 410 students. |
| Chou, Lin, Woung and Tsai (2012) | ECT | Usage Continuance Intention | Confirmation, satisfaction, perceived performance and expectation | E-learning system | Journal of Medical Systems | 2012 | Longitudinal survey of 281 outpatients. |
| Deng, Turner, Gehling and Prince (2010) | ECM | Continuance Intention | Expectation disconfirmation, satisfaction, cognitive absorption, perceived hedonic performance and perceived utilitarian performance | Mobile internet services | European Journal of Information Systems | 2010 | Cross-sectional survey of 289 students. |
| Ding and Chai (2015) | Expectancy Disconfirmation theory (EDT), Discrepancy-arousal theory and Coping theory | Continuance Intention | Arousal, disconfirmation, positive emotions, negative emotions and perceived benefits instrumental | Mobile apps | Industrial Management & Data Systems | 2015 | Cross-sectional survey of 271 students. |
| Doong and Lai (2008) | EDT | Continuance Intention | Satisfaction, positive disconfirmation and perceived usefulness | E-negotiation system | Group Decision and Negotiation | 2008 | Online experiment consisting of 170 negotiators. |
| Gao and Bai (2014) | Flow theory and DeLone and McLean IS success model | Continuance Intention | Satisfaction, system quality, information quality, referent network size, perceived complementarity, flow and perceived usefulness | Mobile social networking services | Asia Pacific Journal of Marketing and Logistics | 2014 | Cross-sectional survey of 221 students. |
| Gefen (2003) | TAM | Use Intentions | Habit, perceived usefulness and perceived ease of use | E-commerce website | Journal of End User Computing | 2003 | Cross-sectional survey of 179 students. |
| Halilovic and Cicic (2013) | ECM and extended ECM | IS Continuance Intention | Confirmation, satisfaction, perceived usefulness and conditions of support | Integrated software package for budget, accounting and finance (IABS Finova) | Behaviour & Information Technology | 2013 | Cross-sectional survey of 188 IABS Finova users. |
| Hayashi, Chen, Ryan and Wu (2004) | ECM and Theory of Self-Efficacy | IS Continuance Intention | Confirmation, satisfaction, perceived usefulness and computer self-efficacy | E-learning system | Journal of Information Systems Education | 2004 | Longitudinal survey of 110 students. |
| Ho (2010) | ECM, TAM, Cognitive Model and Self-Determination Model | Continuance Intention | Confirmation, satisfaction, perceived usefulness, perceived ease of use, attitude, autonomy, competence and relatedness. | E-learning platform | International Journal of Electronic Business Management | 2010 | Cross-sectional survey of 709 e-learning platform users. |
| Hoehle, Zhang and Venkatesh (2015) | Hofstede's Five Cultural Values | Continued Intention to Use | Application design, application utility, interface graphics, interface structure, interface input, interface output, individualism/collectivism, masculinity/femininity, power distance, | Mobile social media | European Journal of Information Systems | 2015 | Cross-sectional survey of 1844 social media application users from four countries. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | uncertainty avoidance and long-term orientation | | | | |
| Hong, Kim and Lee (2008) | ECT, TPB and Triandis Model | Behavioural Intention | Previous behaviour, object-based belief, object-based attitude, behavioural control belief and behaviour-based attitude | Web portal site | The Journal of Computer Information Systems | 2008 | Cross-sectional survey of 345 web portal site users. |
| Hsu, Yu and Wu (2014) | TAM, TPB, ECM and Flow theory | Continuance Intention | Flow, disconfirmation, satisfaction, perceived usefulness, perceived behavioural control, subjective norm, attitude and perceived ease of use | Facebook | Information Systems and e-Business Management | 2014 | Cross-sectional survey of 482 Facebook users. |
| Hsu, Hsu, Wang and Chang (2016) | EDT | Continuance Intention | Unexpected negative outcome, unexpected positive outcome, satisfaction, confirmation of negative expectations and confirmation of positive expectations | Blogs | Journal of Electronic Commerce Research | 2016 | Cross-sectional survey of 128 physicians. |
| Hsu, Chiu and Ju (2004) | EDT and SCT | Continuance Intention | Prior perceived confirmation, satisfaction with prior use, internet self-efficacy and outcome expectation | World wide web | Industrial Management & Data Systems | 2004 | Cross-sectional survey of 235 students. |
| Hu, Kettinger and Poston (2015) | Social Exchange Theory (SET) | Continued Use | Utilitarian benefits, hedonic benefits, information risk, effort, online social value and satisfaction | Online social networking services | European Journal of Information Systems | 2015 | Longitudinal survey of 518 online network service users. |
| Hung and Cho (2008) | ECM | Continued Usage | User satisfaction, perceived usefulness, perceived performance outcome, system support, learning self-efficacy and compatibility | E-learning communicatio n tool | International Journal of Training and Development | 2008 | Cross-sectional survey of 682 e-learners. |
| Idemudia and Raisinghani (2014) | Visual Perception Theories | Continuance Usage | Cognitive trust in competence for a smartphone, cognitive trust in integrity for a smartphone, familiarity with a smartphone, accessibility of a smartphone, usefulness of smartphone Siri's feature, usefulness of a smartphone apps feature, smartphone reliability, smartphone functionality, smartphone emotional trust and smartphone satisfaction | Smartphones /Mobile devices | Journal of International Technology and Information Management | 2014 | Cross-sectional survey of 251 students. |
| Hsieh, Rai and Keil (2008) | Decomposed TPB | Continued Use Intention | Attitude, subjective norms, perceived behavioural control, availability, perceived ease of use, self-efficacy, governmental influence, 'family, relatives, friends and peers influence', | Internet television | MIS Quarterly | 2008 | Cross-sectional survey of 451 internet television users. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | utilitarian outcomes, hedonic outcomes and exposure to innovation | | | | |
| Jiang and Ji (2015) | ECM and DeLone and McLean IS success model | Continuance Intention | User satisfaction, perceived usefulness, information quality, reliability, security and privacy, responsiveness and design and function | E-Government Web Portal | e-Service Journal | 2015 | Cross-sectional survey of 630 web portal users. |
| Liao, Palvia and Lin (2010) | EDT and ECM | Continuance Intention | Perceived usefulness, confirmation with ordering process, confirmation with fulfilment process, satisfaction with ordering process and satisfaction with fulfilment process | Business-to-consumer website | Electron Markets | 2010 | Cross-sectional survey of 418 online shoppers. |
| Limayem, Hirt and Cheung (2007) | ECM | IS Continuance Usage | IS continuance intention, perceived usefulness, comprehensiveness of usage, frequency of past behaviour, confirmation and satisfaction | World wide web | MIS Quarterly | 2007 | Longitudinal survey of 227 students. |
| Xu, Lin and Chan (2012) | TAM | Intention to Continue Use | Perceived usefulness, perceived ease of use, pleasure, hedonic value and utilitarian value | Smartphone | ACM Transactions on Computer-Human Interaction | 2012 | Cross-sectional survey of 210 smartphone users. |
| Lwoga and Komba (2015) | Unified Theory of Acceptance and Use of Technology (UTAUT) | Continued Usage Intention | Actual use, performance expectancy, effort expectancy, facilitating conditions, social influence and self-efficacy | Web-based learning management system | Education and Training | 2015 | Cross-sectional survey of 231 students. |
| Wu and Kuo (2008) | TAM and Self-Perception Theory | IS Continuance Intention | Perceived usefulness, perceived ease of use, past usage and habitual usage | Google search engine | The DATA BASE for Advances in Information Systems | 2008 | Cross-sectional survey of 232 search engine users. |
| Mouakket and Bettayeb (2015) | ECM | Continuance Usage Intention | Satisfaction, perceived usefulness, training, technical support, user-interface design and computer self-efficacy | Blackboard system | International Journal of Web Information Systems | 2015 | Cross-sectional survey of 158 university instructors. |
| Nel and Boshoff (2014) | TAM | Continued Use Intentions | Perceived usefulness, perceived ease of use, perceived self-efficacy, perceived time saving, facilitating conditions, perceived convenience, perceived risk and perceived trust | Mobile banking services | Management Dynamics | 2014 | Cross-sectional survey of 487 concurrent users of internet and mobile banking. |
| Ifinedo (2007) | TAM | Continuance Intention | Usage, perceived usefulness, perceived ease of use, ease of finding, ease of understanding, computer anxiety and self-efficacy | Course management system | International Journal of Information and Communication Technology Education | 2007 | Cross-sectional survey of 72 students. |
| Recker (2010) | ECM and TAM | Intention to Continue to Use | Grammar familiarity, modeller background, modelling experience, | Process modelling grammars | European Journal of Information | 2010 | Cross-sectional survey of 529 grammar users. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | perceived ease of use, perceived usefulness, confirmation and satisfaction | | Systems | | |
| Schuster, Proudfoot and Drennan (2015) | Model of Goal-Directed Behaviour | Continued Use | Attitude, subjective norms, perceived behavioural control, goals, anticipated emotions, frequency of past behaviour, desire and social influence | Technology-based self-services | Journal of Services Marketing | 2015 | 20 interviews of young adults. |
| Chen, Chen and Chen (2009) | TAM and TPB | Continuance Intention | Optimism, innovativeness, discomfort, insecurity, subjective norm, perceived behavioural control, perceived usefulness, perceived ease of use and satisfaction | Self-service technology | Industrial Management & Data Systems | 2009 | Cross-sectional survey of 481 students. |
| Ho, Chen and Luo (2012) | ECT | Continuance | Perceived usefulness, perceived enjoyment, interactivity, mobile device performance, personalization, location-based services confirmation, social network confirmation, information sharing and satisfaction | Location-based services | International Conference on Electronic Commerce | 2012 | Cross-sectional survey of 332 location-based service users. |
| Song and Wang (2011) | Social Presence Theory, Media Richness Theory, Critical Mass Theory, Motivation Theory and IS Continuance Model | Continuance Intention | Perceived usefulness, perceived enjoyment, perceived social presence, perceived media richness and perceived critical mass | Instant Messaging Service | Frontiers of Business Research in China | 2011 | Cross-sectional survey of 207 students. |
| Sun, Liu, Peng, Dong and Barnes (2014) | Flow theory, UTAUT, Social Capital Theory and ECM | Continuance Intention | Usage satisfaction, perceived usefulness, perceived enjoyment, shared norms, trust, tie strength, effort expectancy and social influence | Online social networking services | Electron Markets | 2014 | Cross-sectional survey of 320 online social network users. |
| Tan and Kim (2015) | ECM | Intention to continue using SaaS Collaboration Tool | Confirmation with expectations, perceived usefulness of SaaS collaboration tool, prior experience with SaaS collaboration tool, IT skills and satisfaction | Software-as-a-Service collaboration tools | Journal of Enterprise Information Management | 2015 | Cross-sectional survey of 132 students. |
| Tang and Chiang (2010) | ECT | Continuance Intention | Experiential value, confirmation, perceived usefulness and satisfaction | Weblog sites | Social Behaviour and Personality | 2010 | Cross-sectional survey of 272 blog users. |
| Teo, Srivastava and Jiang (2009) | Updated DeLone and McLean IS success model | Intention to Continue Using | Trust in government, trust in technology, trust in an e-government web, system quality, service | Electronic Government | Journal of Management Information Systems | 2009 | Cross-sectional survey of 214 students. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | quality, information quality and user satisfaction | | | | |
| Liang and Yeh (2011) | TAM and TRA | Continuance Intention | Playfulness, easy of use, attitude and subjective norms | Mobile games | Personal and Ubiquitous Computing | 2011 | Cross-sectional survey of 390 mobile gamers. |
| Venkatesh, Thong, Chan, Hu and Brown (2011) | ECT and UTAUT | Continuance Intention | Pre-usage beliefs, pre-usage attitude, disconfirmation, post-usage beliefs, post-usage attitude and satisfaction | Electronic Government | Information Systems Journal | 2011 | Longitudinal survey of 3159 Hong Kong citizens. |
| Wang, Ngai and Wei (2012) | ECM and Five-Factor Model (FFM) of personality | Continuance Intention | Openness, neuroticism, agreeableness, conscientiousness, extraversion, perceived usefulness, perceived enjoyment and user satisfaction | Instant Messaging Service | International Journal of Human–Computer Interaction | 2012 | Cross-sectional survey of 228 students. |
| Wangpipatwong, Chutimaskul and Papasratorn (2008) | DeLone and McLean IS success model | Continued Use | Accuracy, timeliness, relevance, understandability, completeness, functionality, dependability, ease of use, usefulness, tangibles, reliability, empathy, responsiveness and assurance | Electronic Government | International Journal of Electronic Government Research | 2008 | Cross-sectional survey of 614 e-government web site users. |
| Shiau and Chau (2012) | ECM and TAM | Continuance Intention | Perceived ease of use, perceived usefulness, confirmation and satisfaction | Blogging Services | Industrial Management and Data Systems | 2012 | Cross-sectional survey of 361 blog users. |
| Wirtz, Piehler and Daiser (2015) | TAM | Continuance Intention | Ease of use, usefulness, interaction, privacy, internet competence, need for personal interaction and e-government portal acceptance | Electronic Government Portal | Journal of Nonprofit & Public Sector Marketing | 2015 | Cross-sectional survey of 1273 e-government web site users. |
| Wu, Huang and Hsu (2014) | UTAUT | Continuance Intention | Social influence, performance expectancy, effort expectancy, facilitating conditions, credibility trust, benevolence trust and satisfaction. | Online social networking | Information Systems and e-Business Management | 2014 | Cross-sectional survey of 676 Facebook users. |
| Wu, Tsai, Chen and Wu (2006) | ECM | Continuance Intention | Perceived usefulness, computer self-efficacy, confirmation and satisfaction | E-learning platform | International Journal on E-Learning | 2006 | Cross-sectional survey of 187 students. |
| Yoon and Rolland (2015) | ECM | Continuance Usage | Continuance intention, confirmation, satisfaction, perceived usefulness, subjective norm and enjoyment | Social network services | The Journal of Computer Information Systems | 2015 | Cross-sectional survey of 150 students. |
| Yu, Balaji and Khong (2015) | Trust theory | Internet banking continuance | Competence, integrity, benevolence, shared values, trustworthiness and trust | Internet banking | Industrial Management and Data Systems | 2015 | Cross-sectional survey of 322 nurses. |
| Cheng (2014) | ECM and Task Technology Fit | Continuance Intention | Perceived usefulness, subjective norm, network externality, task- | E-learning system | Journal of Educational Technology | 2014 | Cross-sectional survey of 227 internet banking users. |

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|---|---|---|---|---|---|---|---|
| | | | technology fit, confirmation and satisfaction | | and Society | | |
| Zhang, Lu, Gupta and Gao (2015) | ECM | Continuance Intention | Perceived price advantage, perceived reputation, perceived web site quality, subjective norm, perceived critical mass, confirmation and satisfaction | Group-buying web site | Internet Research | 2015 | Cross-sectional survey of 605 group-buying web site users |
| Zhou (2014) | ECM, Flow theory and DeLone and McLean information system (IS) success model | Continuance Intention | System quality, information quality, perceived usefulness, satisfaction and flow | Mobile internet sites | Universal Access in the Information Society | 2014 | Cross-sectional survey of 216 students. |
| Zhou (2013) | ECM, Flow theory and DeLone and McLean information system (IS) success model | Continuance Usage | System quality, information quality, perceived enjoyment, satisfaction and attention focus | Mobile sites | Industrial Management and Data Systems | 2013 | Cross-sectional survey of 231 mobile site users. |
| Zhou (2014) | ECM, Flow theory and DeLone and McLean information system (IS) success model | Continuance Usage | Trust in online payment, system quality, information quality, trust, flow and performance expectancy | Mobile payment service | Industrial Management and Data Systems | 2014 | Cross-sectional survey of 226 mobile payment users. |

Table 38 highlights the information relating to the e-government service research.

Table 38: Summary of Results

| Author | Theory/Model/Framework | Focus | Major Findings | Country | Publication | Publication year | Source of Data |
|---|---|---|---|---|---|---|---|
| Allahawiah and Alsaraireh (2014) | None | This paper looks at identifying e-government services, the uses and practices of e-government in Jordan. | Stakeholders' dealings in the digital society can be supported and simplified through the strategic goal management of e-government. Customers' needs that are in sync with their aspirations and the mechanism to access electronic services through various channels may be simplified by management of e-government. This will be | Jordan | Economics, Management, and Financial Markets | 2014 | Survey |

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| | | | considered one of the external objectives of e-government. | | | | |
| Alomari, Sandhu and Woods (2013) | Rogers, 1983 Relative advantage | This study investigates how citizens interact and connect with regards to the use and adoption of e-government. | It is important to consider factors that influence resistance to change when exploring adoption of e-government within a social community. Factors such as cultural themes, social themes, word of mouth appeared as resistance to change in the Middle East. | Jordan | Transforming Government: People, Process and Policy | 2013 | Interviews |
| Avgerou, Ganzaroli,Poulymenakou and Reinhard (2009) | The technology acceptance model (TAM) | This paper investigates the creation of beliefs on trust and trustworthiness. | A possible way of resolving broken trust in government is through the implementation of e-government to improve services provided to citizens. In Brazil, citizens' perspective of a trustworthy electronic election depends on the e-government service being trustworthy. Commitment to a fair election is also an important factor to be considered. | Brazil | Information Technology for Development | 2009 | Survey |

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| Shah and Lim (2011) | The technology acceptance model | This paper investigates a cost-effective solution that governments in developing countries can use. It focuses on the digital groups as these are considered the young generation with a great potential impact on the future of the developing countries. | In this study, respondents were on the internet and social media for more than four hours a day. Results revealed that respondents had a low level of skills and low benevolence trust in the Nepalese government. The level of integrity and institutional trust in government was considered as significantly low. | Nepal | ACM | 2011 | Survey |
| Chen, Huang and Hsiao (2006) | Niskanen's 'bureaucratic budget-maximization model | The aim of this study is to explore the challenge to technology optimism. | Results show that complaint-filers are pleased with prompt responses and service attitude. However, the degree of satisfaction is viewed as continuously lower. The managers believed this was due to an existence of a conflict between responsiveness and responsibility of the digital bureaucrats. External customer satisfaction can be increased when the bureaucratic structure and the legal environment is improved. | Taiwan | Public Administration and Development | 2006 | Survey |
| Tiwari and Israel (2011) | The study is based on the Unified Theory of Acceptance and Use of Technology | This paper looks at the adoption of e-filing for tax paying individuals. | The influence of perceived risk on behavioral intention was supported in this study. Face to face contact is necessary to ensure tax payers feel comfortable when transacting as they were worried about information leaking to third parties. Results show that an | India | ACM | 2011 | Survey |

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| | | | increase in performance expectancy and effort expectancy are necessary to attract tax payers to e-filing. | | | | |
| Gregor, Imran and Turner (2014) | Kernel Theory | Reports on an action design research project designed to address the problem of limited adoption of e-Government in Bangladesh. | (i) Identify and act on a sweet spot, (ii) Engage influential stakeholders, (iii) Local knowledge is mandatory (iv)Tailor the intervention to suit the LDC with existing knowledge as a base. | Banglad esh | European Journal of Information Systems | 2014 | Interviews |
| Hamiduzzaman (2011) | | This study looks at the prospects of e-government in Bangaladesh. | The variables of e-governance in management incorporated in Bangladesh civil service are (i) e-Management, (ii) e-learning and (iii) e-learning resources. | Banglad esh | Journal of E-Governance | 2011 | Interviews and surveys |
| Misra and Panigrahi (2014) | Theory and Methods for Software Engineering Performance: Measurement, Modeling and Prediction | This study focuses on evaluating the Sahaj e-Village initiatives. | Associating e-Governance service to DL services had two implications that are (i) acceptance of DL because of the learning environment provided for rural households (ii) the use of VLEs to promote DL services to encourage citizen interfaces. | India | ACM | 2014 | Survey |

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| Bokhari (2010) | eSahulat programme | This study focuses on the eSahulat eService for Pakistan citizens. | One of the key factors about the eSahulat initiative is that it depends on the existing financial, technical and human infrastructure. It is also developed locally and makes use of popular common oral communication patterns. eSahulat shows how developing countries are redefining digital communication patterns for G2C eservices that are reliant on local multichannel solutions. | Pakistan | ACM | 2010 | Survey |
| Heeks and Stanforth (2007) | Actor network theory | This paper looks at IT usage for financial management in a public sector organisation. | Power in practice is revealed in the way actor-network ideas are dealt with after evaluation of an e-government project. Results show that insights of practical relevance are revealed where there is a pattern of network formation and control for e-government researchers, practitioners on groups and politics. | Sri Lanka | European Journal of Information Systems | 2007 | Interview |

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|---|---|---|---|---|---|---|---|
| Galpaya, Samarajiva and Soysa (2007) | Model for electronic delivery of public services citizens | This paper explores objectives of e-government, delivery channel focused on increasing multi-purpose capabilities of the evolved mobile phones (and fixed phones that mimic the mobile one). | Telephones, primarily mobile phones have made considerable gains. This should help e-government to focus on dominant channels for e-gov. | Pakistan, India,Sri Lanka,Philippines ,Thailand | ACM | 2007 | Survey |
| Bhattacharya and Vashistha (2008) | Utility Based Computing (UBC) model | The focus is on the potential of UBC to deliver computing on demand and to pay as you go, a new approach to deliver cost-effective and efficient governance to the citizens. | UBC is the next way of using IT and its applications in the e-Governance domains are tremendous. The governments of the developing countries should not only consider having national UBC infrastructure but can also look into offering the same to other countries for non-critical applications. | India | ACM | 2008 | Survey |
| Kamoun and Almourad (2013) | Rawls's moral theory | This paper focuses on the extent to which accessibility is incorporated in the assessment and ranking or e-government web sites in Dubai e-government. | The relationship between e-government web site ranking versus web site accessibility showed a weak relationship | Dubai | Information Technology & People | 2013 | Survey |
| Kumar and Best (2005) | A multiple linear regression model | Various government programs focuses on online birth, death, income and community certifications. | Corruption in government offices may be reduced through the implementation of kiosks. Kiosks providing e-government services in rural communities leads to a ris in applications submitted by | India | The Information Society | 2005 | Survey |

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| | | | citizens for e-government services. | | | | |
| Brooks and Mohammed (2014) | Conceptual Model for Nigerian E-government Adoption | This paper reviews the stages of e-voting development and implementation challenges that influence the success of e-government in Nigeria for both stakeholders and policymakers'. | Political parties influence the INEC as well as political instability, politically motivated crises, and political interference. | Nigeria | ACM | 2014 | Interviews |
| Zhang,Guo, Chen,and Chau (2008) | User centric IT/IS evaluation model based on perceived usefulness, perceived ease of use and perceived fit | Investigating the e-government systems application and management in China to understand user evaluation regarding e-government systems. | Reasons for failures in e-government systems application in China are due to a lack of fit | China | Journal of Global Information Management | 2009 | Survey |
| Weerakkody,Dwivedi and Kurunananda (2009) | | Implementation of e-government services in developing countries can be effective if experiences acquired by developed countries are shared proficiently. | There are common challenges in e-government initiatives in both developed and developing countries. These challenges are (i) lack of ICT literacy, (ii) inadequate ICT infrastructure, and (iii) inability to access e-government services using local languages. These adoption challenges can be overcome through ICT training combined with multilingual e-services as the key enabler in developing countries context | Sri Lanka | Information Technology for Development | 2009 | Case study based on email, telephone follow up conversations and semistructure interviews. |

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| | | | developing country context. | | | | |
| Venkatesh, Sykes and Venkatraman (2013) | e-Government portal | e-Government portal based on the following characteristics, demographics and personality, as predictors of e-Government portal use as well as (i) gender, age, income and education; (ii) the Big Five personality characteristics, i.e. extraversion, neuroticism, conscientiousness, agreeableness and openness to experience; and (iii) personal innovativeness with information technology. | Model was supported with most variables being significant and explaining 40% of the variance in e-Government portal use. | India | Information Systems Journal | 2013 | Field study from over 300 households |
| Mawela and Ochara (2013) | | Mobile technology as anchor in e-participation strategies and policies to improve the social sustainability ofICT4D projects geared towards improving governance. | Mobile technology provides a viable platform for enhancing e-participation even though there is a perception that socially excluded groups typically lack the skills, equitable access and the right attitudes for e-inclusion. | South Africa | ACM | 2013 | Survey |

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|---|---|---|---|---|---|---|---|
| Sharma (2014) | Model for understanding the relationship between service quality dimensions and demographic variables; and the willingness to use e-government services in Oman. | Exploring the key determinants of e-government services in order to enhance the degree of useage of these services by users. | The key determinants that influenced the willingness to use e-government services where reliability, security, efficiency and responsiveness. | Oman | Transforming Government: People,Process and Policy | 2015 | Google forms from 248 e-government service users |
| Rezai-Rad , Vaezi and Nattagh (2012) | E-health Readiness Assessment Framework (EHRAF) in Iran. | E-health readiness | Technical readiness was the most importance coefficient and the other dimensions were of the next levels of coefficient importance: core readiness followed by social communication readiness and lastly engagement readiness. | Iran | Iranian Journal of Public Health | 2012 | Questionnaires |
| Ochara and Mawela (2015) | | Advances the prominent role that mobile technology will play in anchoring e-participation strategies and policies to improve the social sustainability of ICT4D projects geared toward improving governance. | Mobile technology provides a viable platform for enhancing e-participation despite predominant perception that socially excluded groups typically lack the skills, equitable access and the right attitudes for e-inclusion. | South Africa | Information Technology for Development | 2015 | Survey |
| Gosebo and Obono (2012) | model of the factors affecting the decision of municipal councils of less developed countries | Factors affecting the preparatory stage of e-services adoption. | Model can be used for the engineering of decision support systems to help municipal councils make investment decisions in preparation of the adoption of e-government especially in the context of LDCs | South Africa | ACM | 2012 | Survey |

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| Akram and Malik (2012) | framework of citizens' adoption of e-government services | Citizens' adoption of e-government services by integrating technology acceptance and information systems success literature along with citizens' attitudinal beliefs. | The effect of perceived information quality and perceived system quality on adoption of e-government services is mediated by perceived ability to use, perceived functional benefit, trust in medium, trust in government and user satisfaction. | Pakistan | ACM | 2012 | Survey |
| Lagzian and Pourbagheri (2014) | | Factors affecting acceptance of e-services of e-government counters in Mashhad, Iran. | Perceived usefulness and perceived ease of use where significantly positively influenced by organizational and social factors. In addition, the influences of perceived ease of use and usefulness on attitude towards utilizing these services and, ultimately, influence of this variable on behavioral intention were confirmed. | Iran | ACM | 2014 | Survey |
| Mohamed and Xavier (2016) | | implementation of e-government in Malaysia, particularly at the third tier of government - local authorities | Integrated top-down approach to implementation is imperative for effective e-government implementation. | Malaysia | Contemporary Management Research | 2016 | Semi-structured interviews |
| Miyata (2011) | | the effects of computerization of vehicle registration in Bhutan | There was a positive impact in terms of efficiency and governance. There was evidence of increased efficiency in the working system, reducing administrative burden of the staff and delivering speedier services. Technology had the potential to cut | Bhutan | Information Technology for Development | 2011 | Staff interviews and customer surveys |

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| | | | corruption and increase accountability where management encouraged the use of technology. | | | | |
| Dinesh, Mirchandani, Johnson and Joshi (2008) | | Assessment of the importance of e-government services and website success factors from citizens perspectives. | Two expected relationships were found to be equivalent across both Thailand and Indonesia. These were: (i) The importance of financial transactions services positively related to the importance of website efficiency and (ii) the importance of local information services is positively related to the importance of citizen identification with the site. | Thailand and Indonesia | Information Systems Front | 2008 | Survey |
| McGrath and Maiye (2010) | | The role of institutions in the adoption and use of IT innovations to examine two attempts by the Independent National Electoral Commission to introduce an electronic voters' registration system. | Indigenous knowledge in technology transfer situations where knowledge building activities plays an important role in the adoption and use of innovations. Alternative theoretical concepts need to be included when taking account of the relationship between development goals and ICT policy making in development countries. | Nigeria | Information Technology for Development | 2010 | Semi-structured interviews |

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|---|---|---|---|---|---|---|---|
| Alam and Ahmed (2008) | | Adaptation of e-Governance as a key for smart governance and making information technology (IT) relevant to ordinary citizens in Bangladesh | Successful e-Governance initiatives have demonstrable and tangible impact on increasing government efficiency, improving citizen participation and quality of life as a result of effective multi-stakeholder partnerships. | Banglad esh | ACM | 2008 | Survey |
| Arfeen and Khan (2009) | | Analysis of the process of innovation particularly in ICT in the public sector. | The use of ICT is critical to linking government organisational functions since the use of e-government can enable the government to operate efficiently, design and implement better policies. | Pakistan | The Pakistan Development Review | 2009 | Interviews |
| Lu, Lu, Wang, Pan and Qin (2015) | "Model reflecting the relationships among technology acceptance, government social power, and adoption intention" [Technology acceptance model and the social power theory.] | The influence of government social power on farmers' intention to use government-sponsored agricultural information systems. | The role of government social power has a significance influence on farmers intention to use agricultural information systems as there was a substantial improvement in the variance explained in intention to use from 57.1 to 70.8%. | China | Inf Syst E-Bus Manage | 2015 | Survey |

# APPENDIX E – CITIES ASSESSED

The following South African municipalities were assessed as potential study sites, the City of Cape Town, EThekwini Municipality, the City of Johannesburg, the City of Ekurhuleni and the City of Tshwane. The City of Cape Town was considered because as part of its smart city strategy, specifically within its e-project suite, it focuses on the provision of e-government services (City of Cape Town, 2012). This municipality also currently offers various e-government services to residents such as initiating rates payments and entering meter readings (City of Cape Town, 2015). Residents within Cape Town are likely to have used these services. The City of Johannesburg was also assessed because it is one of the leading cities progressing towards becoming a smart city within the African continent (City of Johannesburg, 2015a). As part of its smart city agenda the city aims to use technology and investigate innovative ways to improve service delivery. This city offers residents e-government services that include building plan progression and online maps (City of Johannesburg, 2015b).

EThekwini Municipality was also assessed for this study, as it is one of the cities in South Africa that has a keen interest in the smart cities concept (EThekwini Municipality, 2015a). EThekwini is also committed towards becoming a smart city. In addition, the city currently provides its residents with e-government services that include water connection status monitoring and entering meter readings (EThekwini Municipality, 2015b). Residents may potentially be using e-government services provided by the government. The City of Tshwane was also assessed since it seeks to build a city that leads in providing e-government services, ensures its residents have access to information technology and lastly provide infrastructure to support access to e-government services (City of Tshwane, 2015a). The city of Tshwane holds the notion that a smart city is not limited to information technology, but is extended to encompass economics, people, infrastructure, healthcare and being technologically competitive (City of Tshwane, 2015a). This city offers residents e-government services that include paying for municipal rates and taxes and reporting infrastructure issues (City of Tshwane, 2015b).

Although the City of Cape Town, City of Johannesburg and City of eThekwini are committed to becoming smart cities, the municipality that was selected as the study site is the City of Ekurhuleni. This is because the City of Ekurhuleni is one of the most prominent cities within South Africa that is progressing towards becoming a smart city (City of Ekurhuleni, 2015a). For instance, the city of Ekurhuleni provides e-service features on reporting infrastructure issues, providing geographic information system services and requesting cutting of grass and trees that the other cities do not yet provide. A common e-government feature between City of Cape Town and City of Ekurhuleni is open data. However, the data provided by Ekurhuleni is far more comprehensive than the data provided by the City of Cape Town. For instance, Ekurhuleni provides residents with statistics on the use of their e-government platform such as the number of user logins and transactions made on the platform on a monthly basis. Whereas the City of Cape Town does not provide such information. Moreover, the City of Ekurhuleni's open data portal has application program interfaces for developers to create additional applications based on the exposed data. Another similarity between the City of Cape Town and City of Ekurhuleni is that both cities provide e-government service that enables residents to pay for their municipal accounts whereas the City of Johannesburg and EThekwini use emails to provide residents with their bill and do not provide e-government services to residents to make payments for their municipal accounts. The City of Tshwane is similar to City of Cape Town and City of Ekurhuleni in that it provides residents with services that enable them to pay for municipal rates online. In addition, the City of Ekurhuleni is investing in the implementation of a smart grid for water and electricity in 2016 to improve communication between the city and residents (City of Ekurhuleni, 2015a). Additionally the City of Ekurhuleni's Digital strategy focuses on Ekurhuleni becoming a smart city that leverages on digital technologies to improve performance and the wellbeing of residents. The city also aims to lessen the costs of business and development and to engage more effectively and actively with residents (City of Ekurhuleni, 2015a). This city aims to reduce the carbon footprint and the costs associated with delivering services by offering residents an e-government service that enables them to perform rate payments and querying. This e-government service is referred to as the e-Siyakhokha service (City of Ekurhuleni, 2015b).

This city also has an open data service that enables residents to obtain statistics relating to Ekurhuleni's social, infrastructure, growth, finance and corporate elements. The city aims for the data to be used by residents to improve their life decisions or to enable a more socially active community (City of Ekurhuleni, 2015b). Given all the above advantages of Ekurhuleni, it was decided as the site for the study. A summary of the assessed municipalities' information is highlighted in Table 39.

Table 39: Summary of Municipality Information

| Municipalities | City of Cape Town | City of Johannesburg | EThekwini Municipality | City of Ekurhuleni | City of Tshwane |
|---|---|---|---|---|---|
| Province | Western Cape | Gauteng | KwaZulu-Natal | Gauteng | Gauteng |
| Governed Areas | Cape Town | Johannesburg | Durban | East Rand region of Gauteng | Northern region of Gauteng |
| Population | 3,740,026 | 4,434,827 | 3,442,361 | 3,178,470 | 2,921,488 |
| e-service features | ▪ submitting infrastructural defects service requests<br>▪ viewing and paying for municipal accounts<br>▪ pet registration<br>▪ motor vehicle licensing | ▪ receiving municipal statements via email<br>▪ geographic information system service<br>▪ delivery of accounts by email<br>▪ building plans | ▪ viewing municipal account information<br>▪ delivery of municipal accounts by email<br>▪ copies of previous accounts | ▪ viewing, downloading and making payments for utility accounts<br>▪ Open Data Portal service<br>▪ reporting infrastructural issues<br>▪ request cutting of grass and trees<br>▪ geographic information system service | ▪ viewing and paying for municipal accounts<br>▪ submitting infrastructural defects service requests<br>▪ reporting fraud and corruption<br>▪ reporting illegal nightclub activities<br>▪ reporting substance abuse |
| User statistics of e-government services readily available to residents | No | No | No | Partially available | No |

(City of Cape Town, 2015; City of Ekurhuleni, 2015b; City of Johannesburg, 2015b; City of Tshwane, 2015b; EThekwini Municipality, 2015b; Statistics SA, 2015d)

# APPENDIX F– COVER LETTER

Participant Information Sheet

10th of August 2016

Good day,

My name is Daniel Mutale and I am an Information Systems Masters student at the University of the Witwatersrand. My research is about the continued use of e-government services by residents of the Ekurhuleni Municipal Area. A resident's continued use of an e-government service refers to his or her decision to continue using an e-government service over the long run. Examples of e-government services are online municipal rate payment systems and information kiosks.

The purpose of this letter is to ***invite*** you to participate in an academic survey about e-government. The survey will take approximately 20 minutes to complete and the survey will be anonymous since your identity is not required. The survey has been approved unconditionally by the Wits University Research Ethics Committee, (Non-Medical), Protocol Number: H16/07/23.

Participation in the survey is voluntary and the questionnaire is anonymous and confidential. You may withdraw from the survey at any time without any harm or negative consequences occurring to you. The results of this survey can be used to identify interventions that may lead to the greater continued use of e-government services by residents. Aggregate results may be shared with the government if they request them. Only group results and not individual results will be published. For any concerns about participating in the survey or if you would like to know the results of the survey, please contact me on 0714352136 or dgmutale@gmail.com. My supervisor can be contacted on 0117178156 or jean-marie.bancilhon@wits.ac.za.

Thank you for your time.

Kind regards

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Information Systems Division

# APPENDIX G - RESEARCH INSTRUMENT

Good Day

You are invited to participate in an e-government service survey.

Are you 20 or above? (to be asked orally by the researcher)

This questionnaire is divided into five sections. The first section focuses on the City of Ekurhuleni, the second, third and fourth sections focus on the e-government service itself and the fifth section focuses on demographic information.

If you have used the City of Ekurhuleni's online website (the e-Siyakhokha service) please answer Section A, B, C, D and E. If you have not used the City of Ekurhuleni's online website please answer Section A and E only.

## Section A

The following questions relate to your perceptions on the City of Ekurhuleni.

Before proceeding with this section please indicate whether you have used or not used the e-Siyakhokha service by placing an X over the relevant box:

| | Yes | No |
|---|---|---|
| I have used the City of Ekurhuleni online service | ☐ | ☐ |

Please indicate the extent of your agreement with each of the following statements by placing an X over the relevant number. This scale has five applicable options and ranges from 1 = strongly disagree to 5 = strongly agree.

| Item | Measurement | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| **40.** | The City of Ekurhuleni government is trustworthy. | 1 | 2 | 3 | 4 | 5 |
| **41.** | I trust that the City of Ekurhuleni government keeps my best interests in mind. | 1 | 2 | 3 | 4 | 5 |
| **42.** | The City of Ekurhuleni government keeps promises it makes to me. | 1 | 2 | 3 | 4 | 5 |
| **43.** | I believe in the information the City of Ekurhuleni government provides me. | 1 | 2 | 3 | 4 | 5 |
| **44.** | The City of Ekurhuleni government wants to be known as one that keeps commitments. | 1 | 2 | 3 | 4 | 5 |
| **45.** | The City of Ekurhuleni government seems suspicious. | 1 | 2 | 3 | 4 | 5 |
| **46.** | The City of Ekurhuleni government seems distrustful. | 1 | 2 | 3 | 4 | 5 |
| **47.** | I feel sceptical about the City of Ekurhuleni government. | 1 | 2 | 3 | 4 | 5 |
| **48.** | I must be watchful and wary when dealing with the City of Ekurhuleni government. | 1 | 2 | 3 | 4 | 5 |

## Section B:

The following questions relate to your perceptions of using the City of Ekurhuleni's online website.

Please indicate the extent of your agreement with each of the following statements by placing an X over the relevant number. This scale has five applicable options and ranges from 1 = strongly disagree to 5 = strongly agree.

| Item | Measurement | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| **49.** | I trust that the City of Ekurhuleni online service will show my payment and statement history. | 1 | 2 | 3 | 4 | 5 |
| **50.** | I trust that the City of Ekurhuleni online service will process municipal payments I submit to it. | 1 | 2 | 3 | 4 | 5 |
| **51.** | I trust that the City of Ekurhuleni online service will submit meter readings I input to it. | 1 | 2 | 3 | 4 | 5 |
| **52.** | I trust that the City of Ekurhuleni online service will lodge queries I submit to it. | 1 | 2 | 3 | 4 | 5 |
| **53.** | There is considerable risk involved in using the City of Ekurhuleni online service. | 1 | 2 | 3 | 4 | 5 |
| **54.** | There is a high potential for loss involved in using the City of Ekurhuleni online service. | 1 | 2 | 3 | 4 | 5 |
| **55.** | My decision to use the City of Ekurhuleni online service is risky. | 1 | 2 | 3 | 4 | 5 |
| **56.** | My experience with using the City of Ekurhuleni online service was better than what I expected. | 1 | 2 | 3 | 4 | 5 |
| **57.** | The service level provided by the City of Ekurhuleni online service was better than what I expected. | 1 | 2 | 3 | 4 | 5 |
| **58.** | Overall, most of my expectations from using the City of Ekurhuleni online service were confirmed. | 1 | 2 | 3 | 4 | 5 |
| **59.** | I intend to continue using the City of Ekurhuleni online service. | 1 | 2 | 3 | 4 | 5 |
| **60.** | I intend to continue using the City of Ekurhuleni online service for processing more municipal services. | 1 | 2 | 3 | 4 | 5 |
| **61.** | I intend to continue using the City of Ekurhuleni online service for more of my transactions with the City of Ekurhuleni. | 1 | 2 | 3 | 4 | 5 |

## Section C:

The following questions relate to your perceptions of using the City of Ekurhuleni's online website.

Please select the most appropriate response below.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **62.** | Number of times you currently use the City of Ekurhuleni online service per week: | 0 | 1-3 | 4-6 | 7-9 | 10-12 | Other: |
| **63.** | Which of the following City of Ekurhuleni online service functionalities do you use? :<br>Rates payment ☐<br>Municipal tax payment ☐<br>Traffic fine payment ☐<br>Utility statement viewing ☐<br>Meter reading submitting ☐<br>Personal information updating ☐<br>Other ☐ Please specify ---------- | | | | | | |
| **64.** | Which government service requests do you currently process using the City of Ekurhuleni online service? :<br>Paying rates ☐<br>Paying municipal tax ☐<br>Paying traffic fines ☐<br>Viewing utility statements ☐<br>Submitting meter readings ☐<br>Updating personal information ☐<br>Other ☐ Please specify ---------- | | | | | | |
| **65.** | How many hours do you use the City of Ekurhuleni online service every week? | Number of Hours | | | | | |
| | | 0-1 | 1–3 | 3–6 | 6–9 | 9–12 | Other: |
| | | | | | | | |
| **66.** | How frequently do you use the City of Ekurhuleni online service? | Never | Rarely | Occasionally | Frequently | Very Frequently | |
| | | 1 | 2 | 3 | 4 | 5 | |

## Section D:

The following questions relate to your perceptions of using the City of Ekurhuleni's online website.

Please indicate the extent of your agreement to the following questions and statements.

| Item | Measurement | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| **How do you feel about your overall experience of the City of Ekurhuleni online service use:** (Question 28-31) | | | | | | |
| **67.** | Very satisfied. | 1 | 2 | 3 | 4 | 5 |
| **68.** | Very pleased. | 1 | 2 | 3 | 4 | 5 |
| **69.** | Very contented. | 1 | 2 | 3 | 4 | 5 |
| **70.** | Absolutely delighted. | 1 | 2 | 3 | 4 | 5 |
| **Based on my experience so far, I expect that the City of Ekurhuleni online service will :** (Question 32-35) | | | | | | |
| **71.** | save me time for the functions in Question 24. | 1 | 2 | 3 | 4 | 5 |
| **72.** | be convenient for the functions in Question 24. | 1 | 2 | 3 | 4 | 5 |
| **73.** | enhance my effectiveness for the functions in Question 24. | 1 | 2 | 3 | 4 | 5 |
| **74.** | be useful for the functions in Question 24. | 1 | 2 | 3 | 4 | 5 |
| **Based on your experience with the City of Ekurhuleni online service, it:** (Question 36-39) | | | | | | |
| **75.** | saved me time for the functions in Question 24. | 1 | 2 | 3 | 4 | 5 |
| **76.** | was convenient for the functions in Question 24. | 1 | 2 | 3 | 4 | 5 |
| **77.** | enhanced my effectiveness for the function in Question 24. | 1 | 2 | 3 | 4 | 5 |
| **78.** | was useful for the functions in Question 24. | 1 | 2 | 3 | 4 | 5 |

## Section E:

Please put an X next to the relevant category.

| # | Question and Category / Response |
|---|---|
| 79. | Please indicate your age:<br>20 – 24 ☐<br>25 – 29 ☐<br>30 – 34 ☐<br>35 – 39 ☐<br>40 – 44 ☐<br>45 – 49 ☐<br>50 – 54 ☐<br>55 – 59 ☐<br>>60 ☐<br>Prefer not to specify ☐ |
| 80. | Please indicate your gender:<br>Female ☐ Male ☐ Prefer not to specify ☐ |
| 81. | Please indicate your highest level of education?:<br>Some high school ☐<br>High school (matric) ☐<br>Some tertiary university ☐<br>Bachelor's degree ☐<br>Postgraduate degree ☐<br>Prefer not to specify ☐ |

Thank you for your participation.

# APPENDIX H- ETHICS CLEARANCE

Research Office

**HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)**
R14/49 Mutale

| | |
|---|---|
| **CLEARANCE CERTIFICATE** | **PROTOCOL NUMBER: H16/07/23** |
| **PROJECT TITLE** | Continued use of e-government services: An expectation confirmation theory and trust theory approach |
| **INVESTIGATOR(S)** | Mr D Mutale |
| **SCHOOL/DEPARTMENT** | Economics and Business Science/ |
| **DATE CONSIDERED** | 22 July 2016 |
| **DECISION OF THE COMMITTEE** | Approved unconditionally |
| **EXPIRY DATE** | 15 August 2019 |

**DATE** 16 August 2016 **CHAIRPERSON** J-Wright
(Professor J Knight)

cc: Supervisor : Mr J-M Bancilhon

**DECLARATION OF INVESTIGATOR(S)**

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10005, 10th Floor, Senate House, University.

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to completion of a yearly progress report.**

_____ _____/_____/_____
Signature Date

**PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES**

# APPENDIX I - RANDOM NUMBERS GENERATED

The table below shows the random numbers generated for the proposed study sites.

Table 40: Random Numbers

| Site | Random Number Generated |
|---|---|
| Alberton | 9 |
| Bapsfontein | 3 |
| Benoni | 7 |
| Boksburg | 4 |
| Brakpan | 4 |
| Breswol | 7 |
| Centurion | 1 |
| Chief A Luthuli Park | 7 |
| Clayville | 10 |
| Daveyton | 2 |
| Duduza | 9 |
| Dukathole | 7 |
| Edenvale | 9 |
| Ekurhuleni NU | 3 |
| Etwatwa | 5 |
| Geluksdal | 2 |
| Germiston | 10 |
| Harry Gwala | 3 |
| Holfontein | 1 |
| Kanana | 3 |
| Katlehong | 7 |
| Kempton Park | 8 |
| Kwa-Thema | 9 |
| Langaville | 2 |
| Lindelani Village | 7 |
| Nigel | 1 |
| Springs | 10 |
| Tembisa | 1 |
| Thinasonke | 5 |
| Tokoza | 3 |

| | |
|---|---|
| Tsakane | 6 |
| Tweefontein | 1 |
| Vosloorus | 7 |
| Wattville | 3 |

# APPENDIX J - SURVEY SCHEDULE

The table below highlights the survey schedule.

Table 41: Survey Schedule

| Date | Location |
|---|---|
| 5/10/2016 | Germiston |
| 11/10/2016 | Kempton Park |
| 12/10/2016 | Boksburg |
| 13/10/2016 | Germiston |
| 16/10/2016 | Germiston |
| 22/10/2016 | Springs |
| 23/10/2016 | Boksburg |
| 1/11/2016 | Germiston |
| 5/11/2016 | Germiston |
| 21/11/2016 | Boksburg |
| 22/11/2016 | Daveyton |
| 26/11/2016 | Thokoza |
| 28/11/2016 | Springs |
| 1/12/2016 | Thokoza |
| 2/12/2016 | Langaville |
| 3/12/2016 | Germiston |
| 3/12/2016 | Boksburg |
| 5/12/2016 | Germiston |
| 9/12/2016 | Germiston |
| 12/12/2016 | Springs |
| 7/1/2017 | Brakpan |
| 8/1/2017 | Boksburg |
| 14/1/2017 | Geluksdal |

# APPENDIX K – CODES

Table 42 highlights the coding which was used for the study's constructs when using SPSS.

Table 42: Code Matrix

| Code | Construct | Question |
|---|---|---|
| TIC1 | Trust in the City | The City of Ekurhuleni government is trustworthy. |
| TIC2 | | I trust that the City of Ekurhuleni government keeps my best interests in mind. |
| TIC3 | | The City of Ekurhuleni government keeps promises it makes to me. |
| TIC4 | | I believe in the information the City of Ekurhuleni government provides me. |
| TIC5 | | The City of Ekurhuleni government wants to be known as one that keeps commitments. |
| **Code** | **Construct** | **Question** |
| DIS1 | Distrust in the City | The City of Ekurhuleni government seems suspicious. |
| DIS2 | | The City of Ekurhuleni government seems distrustful. |
| DIS3 | | I feel sceptical about the City of Ekurhuleni government. |
| DIS4 | | I must be very watchful and wary when dealing with the City of Ekurhuleni government. |
| **Code** | **Construct** | **Question** |
| TES1 | Trust in City e-Services | I trust that the City of Ekurhuleni online service will show my payment and statement history. |
| TES2 | | I trust that the City of Ekurhuleni online service will process municipal payments I submit on it. |
| TES3 | | I trust that the City of Ekurhuleni online service will submit meter readings I input on it. |
| TES4 | | I trust that the City of Ekurhuleni online service will lodge queries I submit on it. |
| **Code** | **Construct** | **Question** |
| PER1 | Perceived Risk | There is a considerable risk involved in using the City of Ekurhuleni online service. |
| PER2 | | There is a high potential for loss involved in using the City of Ekurhuleni online service. |
| PER3 | | My decision to use the City of Ekurhuleni online service is risky. |
| **Code** | **Construct** | **Question** |
| CON1 | Confirmation | My experience with using the City of Ekurhuleni online service was better than what I expected. |
| CON2 | | The service level provided by the City of Ekurhuleni online service was better than |

| | | |
|---|---|---|
| | | what I expected |
| CON3 | | Overall, most of my expectations from using the City of Ekurhuleni online service were confirmed. |
| **Code** | **Construct** | **Question** |
| CUI1 | Continued Use Intention | I intend to continue using the City of Ekurhuleni online service. |
| CU12 | | I intend to continue using the City of Ekurhuleni online service for processing more municipal services. |
| CUI3 | | I intend to continue using the City of Ekurhuleni online service for more of my transactions with the City of Ekurhuleni. |
| **Code** | **Construct** | **Question** |
| SAT | Satisfaction | How do you feel about your overall experience of the City of Ekurhuleni online service use: |
| SAT1 | | Very satisfied. |
| SAT2 | | Very pleased. |
| SAT3 | | Very contented. |
| SAT4 | | Absolutely delighted. |
| **Code** | **Construct** | **Question** |
| EXP | Expectation | Based on my experience so far, I expect that the City of Ekurhuleni online service will: |
| EXP1 | | save me time for the functions in Question 24. |
| EXP2 | | be convenient for the functions in Question 24. |
| EXP3 | | enhance my effectiveness for the functions in Question 24. |
| EXP4 | | be useful for the functions in Question 24. |
| **Code** | **Construct** | **Question** |
| PEP | Perceived Performance | Based on your experience with the City of Ekurhuleni online service, it: |
| PEP1 | | saved me time for the functions in Question 24. |
| PEP2 | | was convenient for the functions in Question 24. |
| PEP3 | | enhanced my effectiveness for the function in Question 24. |
| PEP4 | | was useful for the functions in Question 24. |
| **Code** | **Construct** | **Question** |
| USE1 | City e-Service Use | Number of times you currently use the City of Ekurhuleni online service per week: |
| USE2 | | Which of the following City of Ekurhuleni online service functionalities do you use?:<br>rates payment □<br>municipal tax payment □<br>traffic fine payment □ |

| | | |
|---|---|---|
| | | utility statement viewing □<br>meter reading submitting □<br>personal information updating □<br>other □ |
| USE3 | | Which government service requests do you currently process using the City of Ekurhuleni online service?:<br>paying rates □<br>paying municipal tax □<br>paying traffic fine □<br>viewing utility statements □<br>submitting meter readings □<br>updating personal information □<br>other □ |
| USE4 | | How many hours do you use the City of Ekurhuleni online service every week? |
| USE5 | | How frequently do you use the City of Ekurhuleni online service? |

# APPENDIX L – T-TEST RESULTS

Table 43 and 44 highlight the results of the t-Test for Trust in the City.

Table 43: Group Statistics

| | Group | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| CompositeTIC | User | 203 | 3.2443 | .56059 | .03935 |
| | Non-User | 293 | 3.0914 | .70868 | .04140 |

Table 44: Independent Samples Test

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | | | | Lower | Upper |
| CompositeTIC | Equal variances assumed | 8.277 | .004 | 2.568 | 494 | .011 | .15293 | .05956 | .03591 | .26995 |
| | Equal variances not assumed | | | 2.678 | 485.345 | .008 | .15293 | .05712 | .04071 | .26515 |

Table 45 and 46 highlight the results of the t-test. for Distrust in the City.

Table 45: Group Statistics

| | Group | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| CompositeDIS | User | 203 | 3.1232 | .62109 | .04359 |
| | Non-User | 293 | 2.8345 | .65714 | .03839 |

Table 46: Independent Sample Test

| | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | |
|---|---|---|---|---|---|---|---|---|
| | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference |

| | | | | | | | | | Lower | Upper |
|---|---|---|---|---|---|---|---|---|---|---|
| CompositeDIS | Equal variances assumed | 1.294 | .256 | 4.919 | 494 | .000 | .28869 | .05869 | .17339 | .40400 |
| | Equal variances not assumed | | | 4.970 | 449.713 | .000 | .28869 | .05809 | .17454 | .40285 |

# APPENDIX M - SOLUTION EVALUATION

## 1 Summary of Solution Principal Component Factor Analysis (PCFA) and Reliability Analysis Results

Solution A (63.790%) had a higher variance explained by each extracted component compared to solutions' B (63.634%) and C (62.833%). Solutions' A and B each had one item loading below 0.60 on its component. Solution C had three items loading below 0.60 on their respective components. Solutions' A and B had three measures with Cronbach alpha scores below 0.7 and this included the current study's dependent variable. Solution C had two measures with Cronbach alpha scores below 0.7. Continued use intention, which is the study's dependent variable, had an alpha score of 0.7. Solution C was chosen as the most appropriate solution. This is because, Solution C had more reliable measures as highlighted by Cronbach's alpha compared to solutions' A and B. Furthermore, this included the measure for the dependent variable. Results obtained using the dependent variable in solutions' A and B during hypothesis testing would need be considered with more caution than in solution C.

## 2 Solution A PCFA and Reliability Analysis

Table 47: Total Variance Explained

| Component | Initial Eigenvalues | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 6.439 | 25.755 | 25.755 | 4.620 | 18.480 | 18.480 |
| 2 | 3.152 | 12.608 | 38.363 | 3.062 | 12.246 | 30.726 |
| 3 | 1.856 | 7.424 | 45.787 | 2.085 | 8.341 | 39.067 |
| 4 | 1.473 | 5.891 | 51.678 | 1.807 | 7.228 | 46.295 |
| 5 | 1.251 | 5.004 | 56.682 | 1.519 | 6.077 | 52.372 |
| 6 | .909 | 3.636 | 60.318 | 1.509 | 6.037 | 58.410 |
| 7 | .868 | 3.472 | 63.790 | 1.345 | 5.380 | 63.790 |
| 8 | .789 | 3.158 | 66.948 | | | |
| 9 | .767 | 3.067 | 70.014 | | | |
| 10 | .761 | 3.042 | 73.057 | | | |
| 11 | .726 | 2.903 | 75.960 | | | |
| 12 | .646 | 2.585 | 78.545 | | | |
| 13 | .624 | 2.496 | 81.040 | | | |
| 14 | .560 | 2.240 | 83.281 | | | |
| 15 | .515 | 2.058 | 85.339 | | | |
| 16 | .493 | 1.972 | 87.311 | | | |
| 17 | .448 | 1.792 | 89.102 | | | |
| 18 | .434 | 1.735 | 90.837 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 19 | .401 | 1.602 | 92.439 | | | |
| 20 | .374 | 1.497 | 93.937 | | | |
| 21 | .358 | 1.430 | 95.367 | | | |
| 22 | .314 | 1.254 | 96.621 | | | |
| 23 | .296 | 1.183 | 97.803 | | | |
| 24 | .284 | 1.136 | 98.940 | | | |
| 25 | .265 | 1.060 | 100.000 | | | |

Table 48: Principal Component Factor Analysis and Scale Reliability

| | Component | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| TIC1 | | | | | | | .722 |
| TIC4 | | | | | | | .774 |
| DIS1 | | .677 | | | | | |
| DIS2 | | .729 | | | | | |
| DIS3 | | .668 | | | | | |
| TES1 | | | .772 | | | | |
| TES2 | | | .619 | | | | |
| TES4 | | | .622 | | | | |
| PER1 | | .679 | | | | | |
| PER2 | | .739 | | | | | |
| PER3 | | .714 | | | | | |
| USE1 | | | | | | .831 | |
| USE4 | | | | | | .835 | |
| SAT1 | | | | .744 | | | |
| SAT2 | | | | .660 | | | |
| SAT3 | | | | .561 | | | |
| EXP1 | .706 | | | | | | |
| EXP2 | .666 | | | | | | |
| EXP3 | .784 | | | | | | |
| PEP1 | .713 | | | | | | |
| PEP2 | .766 | | | | | | |
| PEP3 | .750 | | | | | | |
| PEP4 | .751 | | | | | | |
| CUI1 | | | | | .648 | | |
| CUI2 | | | | | .723 | | |
| Cronbach's | 0.893 | 0.796 | 0.659 | 0.734 | 0.625 | 0.616 | 0.538 |

| Alpha | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Cronbach's Alpha | 0.9 | 0.8 | 0.7 | 0.7 | 0.6 | 0.6 | 0.5 |

* Computed to 2 significant figures

Although the study had ten defined factors, a seven-component solution was extracted using SPSS. This solution accounted for a majority (63.790) of the variance in the data. The EXP and PEP measurement items loaded highly onto a single component. The DIS and PER items also loaded highly onto one component. Convergent validity was highlighted by items which intended to measure a single construct converging. Each item except SAT3 (.561) had a loading above 0.60 on its component.

The reliability of the solution's measures was assessed using Cronbach's alpha. The value of a construct's Cronbach's alpha should be above 0.7 as this indicates an acceptable internal consistency (Cronbach, 1951). Nunnally (1978) recommends a more modest alpha range and suggests that an acceptable alpha should be 0.7 or above. The solution's scores ranged from 0.538 to 0.893 for Cronbach's alpha. Trust in the City, continued use intention and city e-Service use had Cronbach alpha scores below 0.7, and thus results obtained using these constructs during hypothesis testing need to be considered with caution. Furthermore, continued use intention, which is the study's dependent variable, had an alpha score of 0.6.

## 3 Solution B PCFA and Reliability Analysis

Table 49: Total Variance Explained

| Component | Initial Eigenvalues | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 6.488 | 25.951 | 25.951 | 4.498 | 17.990 | 17.990 |
| 2 | 3.126 | 12.505 | 38.457 | 3.070 | 12.279 | 30.269 |
| 3 | 1.772 | 7.087 | 45.544 | 1.989 | 7.956 | 38.225 |
| 4 | 1.479 | 5.917 | 51.461 | 1.880 | 7.519 | 45.744 |
| 5 | 1.239 | 4.957 | 56.418 | 1.632 | 6.528 | 52.272 |
| 6 | .935 | 3.740 | 60.158 | 1.509 | 6.038 | 58.310 |
| 7 | .869 | 3.476 | 63.634 | 1.331 | 5.324 | 63.634 |
| 8 | .790 | 3.162 | 66.796 | | | |
| 9 | .783 | 3.131 | 69.927 | | | |
| 10 | .741 | 2.965 | 72.893 | | | |
| 11 | .677 | 2.709 | 75.601 | | | |
| 12 | .653 | 2.610 | 78.211 | | | |
| 13 | .589 | 2.358 | 80.569 | | | |
| 14 | .565 | 2.261 | 82.831 | | | |
| 15 | .554 | 2.214 | 85.045 | | | |
| 16 | .509 | 2.037 | 87.082 | | | |
| 17 | .475 | 1.899 | 88.981 | | | |
| 18 | .427 | 1.708 | 90.689 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 19 | .409 | 1.635 | 92.324 | | | |
| 20 | .393 | 1.573 | 93.897 | | | |
| 21 | .357 | 1.429 | 95.326 | | | |
| 22 | .322 | 1.290 | 96.615 | | | |
| 23 | .295 | 1.180 | 97.795 | | | |
| 24 | .287 | 1.147 | 98.941 | | | |
| 25 | .265 | 1.059 | 100.000 | | | |

Table 50: Principal Component Factor Analysis and Scale Reliability

| | Component | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| TIC1 | | | | | | | .731 |
| TIC4 | | | | | | | .764 |
| DIS1 | | .691 | | | | | |
| DIS2 | | .739 | | | | | |
| DIS3 | | .673 | | | | | |
| TES1 | | | .788 | | | | |
| TES2 | | | .639 | | | | |
| TES4 | | | .633 | | | | |
| PER1 | | .669 | | | | | |
| PER2 | | .728 | | | | | |
| PER3 | | .707 | | | | | |
| USE1 | | | | | | .832 | |
| USE4 | | | | | | .835 | |
| SAT1 | | | | .755 | | | |
| SAT2 | | | | .686 | | | |
| SAT3 | | | | .598 | | | |
| EXP1 | .722 | | | | | | |
| EXP2 | .686 | | | | | | |
| EXP3 | .786 | | | | | | |
| PEP1 | .712 | | | | | | |
| PEP2 | .749 | | | | | | |
| PEP3 | .725 | | | | | | |
| PEP4 | .731 | | | | | | |
| CUI2 | | | | | .683 | | |
| CUI3 | | | | | .711 | | |
| Cronbach's | 0.893 | 0.796 | 0.659 | 0.734 | 0.574 | 0.616 | 0.538 |

| Alpha | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Cronbach's Alpha | 0.9 | 0.8 | 0.7 | 0.7 | 0.6 | 0.6 | 0.5 |

* Computed to 2 significant figures

Although the study had ten defined factors, a seven-component solution was extracted using SPSS. This solution accounted for a majority (63.634) of the variance in the data. The EXP and PEP measurement items loaded highly onto a single component. The DIS and PER items also loaded highly onto one component. Convergent validity was highlighted by items which intended to measure a single construct converging. Each item except SAT3 (.598) had a loading above 0.60 on its component.

The reliability of the solution's measures was assessed using Cronbach's alpha. The value of a construct's Cronbach's alpha should be above 0.7 as this indicates an acceptable internal consistency (Cronbach, 1951). Nunnally (1978) recommends a more modest alpha range and suggests that an acceptable alpha should be 0.7 or above. The solution's scores ranged from 0.538 to 0.893 for Cronbach's alpha. Trust in the City, continued use intention and city e-Service use had Cronbach alpha scores below 0.7, and thus results obtained using these constructs during hypothesis testing need to be considered with caution. Furthermore, continued use intention, which is the study's dependent variable, had an alpha score of 0.6.

## 4 Solution C PCFA and Reliability Analysis

Table 51: Total Variance Explained

| Component | Initial Eigenvalues | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 6.660 | 25.615 | 25.615 | 4.677 | 17.987 | 17.987 |
| 2 | 3.155 | 12.134 | 37.749 | 3.080 | 11.845 | 29.831 |
| 3 | 1.900 | 7.308 | 45.056 | 2.120 | 8.153 | 37.984 |
| 4 | 1.486 | 5.716 | 50.773 | 1.879 | 7.227 | 45.211 |
| 5 | 1.322 | 5.086 | 55.859 | 1.736 | 6.676 | 51.887 |
| 6 | .944 | 3.632 | 59.490 | 1.510 | 5.806 | 57.693 |
| 7 | .869 | 3.343 | 62.833 | 1.336 | 5.140 | 62.833 |
| 8 | .815 | 3.136 | 65.969 | | | |
| 9 | .784 | 3.016 | 68.985 | | | |
| 10 | .766 | 2.948 | 71.933 | | | |
| 11 | .728 | 2.800 | 74.733 | | | |
| 12 | .668 | 2.569 | 77.302 | | | |
| 13 | .624 | 2.400 | 79.701 | | | |
| 14 | .589 | 2.267 | 81.968 | | | |
| 15 | .554 | 2.131 | 84.099 | | | |
| 16 | .510 | 1.962 | 86.061 | | | |
| 17 | .485 | 1.867 | 87.928 | | | |
| 18 | .447 | 1.720 | 89.648 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 19 | .427 | 1.641 | 91.289 | | | |
| 20 | .394 | 1.516 | 92.805 | | | |
| 21 | .374 | 1.440 | 94.245 | | | |
| 22 | .356 | 1.370 | 95.615 | | | |
| 23 | .304 | 1.169 | 96.784 | | | |
| 24 | .288 | 1.109 | 97.894 | | | |
| 25 | .283 | 1.090 | 98.984 | | | |
| 26 | .264 | 1.016 | 100.000 | | | |

Table 52: Principal Component Factor Analysis and Scale Reliability

| | Component | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| TIC1 | | | | | | | .729 |
| TIC4 | | | | | | | .756 |
| DIS1 | | .689 | | | | | |
| DIS2 | | .736 | | | | | |
| DIS3 | | .670 | | | | | |
| TES1 | | | .783 | | | | |
| TES2 | | | .638 | | | | |
| TES4 | | | .577 | | | | |
| PER1 | | .672 | | | | | |
| PER2 | | .727 | | | | | |
| PER3 | | .712 | | | | | |
| USE1 | | | | | | .831 | |
| USE4 | | | | | | .835 | |
| SAT1 | | | | | .772 | | |
| SAT2 | | | | | .640 | | |
| SAT3 | | | | | .540 | | |
| EXP1 | .714 | | | | | | |
| EXP2 | .687 | | | | | | |
| EXP3 | .782 | | | | | | |
| PEP1 | .716 | | | | | | |
| PEP2 | .758 | | | | | | |
| PEP3 | .740 | | | | | | |
| PEP4 | .730 | | | | | | |
| CUI1 | | | | .536 | | | |
| CUI2 | | | | .699 | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CUI3 | | | | .682 | | | |
| Cronbach's Alpha | 0.893 | 0.796 | 0.659 | .656 | 0.734 | 0.616 | 0.538 |
| *Cronbach's Alpha | 0.9 | 0.8 | 0.7 | 0.7 | 0.7 | 0.6 | 0.5 |

* Computed to 2 significant figures

Although the study had ten defined factors, a seven-component solution was extracted using SPSS. This solution accounted for a majority (62.833) of the variance in the data. The EXP and PEP measurement items loaded highly onto a single component. The DIS and PER items also loaded highly onto one component. Convergent validity was highlighted by items which intended to measure a single construct converging. Each item except SAT3 (.598), CUI1 (.536) and TES4 (.577) had a loading above 0.60 on its component.

The reliability of the solution's measures was assessed using Cronbach's alpha. The value of a construct's Cronbach's alpha should be above 0.7 as this indicates an acceptable internal consistency (Cronbach, 1951). Nunnally (1978) recommends a more modest alpha range and suggests that an acceptable alpha should be 0.7 or above. The solution's scores ranged from 0.538 to 0.893 for Cronbach's alpha. Trust in the City and city e-Service use had Cronbach alpha scores below 0.7, and thus results obtained using these constructs during hypothesis testing need to be considered with caution. Continued use intention, which is the study's dependent variable, had an alpha score of 0.7.

# APPENDIX N – VARIABLE NORMALITY ANALYSIS FOR T-TESTS

## 1 Trust in the City Normality Analysis

Table 53: Descriptive Statistics for Trust in the City

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| CompositeTIC | Mean | | 3.1540 | .02945 |
| | 95% Confidence Interval for Mean | Lower Bound | 3.0961 | |
| | | Upper Bound | 3.2119 | |
| | 5% Trimmed Mean | | 3.1622 | |
| | Median | | 3.0000 | |
| | Variance | | .430 | |
| | Std. Deviation | | .65588 | |
| | Minimum | | 1.20 | |
| | Maximum | | 5.00 | |
| | Range | | 3.80 | |
| | Interquartile Range | | .80 | |
| | Skewness | | -.103 | .110 |
| | Kurtosis | | .179 | .219 |

Table 54: Test of Normality for Trust in the City

| | Shapiro-Wilk | | |
|---|---|---|---|
| | Statistic | df | Sig. |
| CompositeTIC | .980 | 496 | .000 |

Figure 10: Trust in the City Histogram

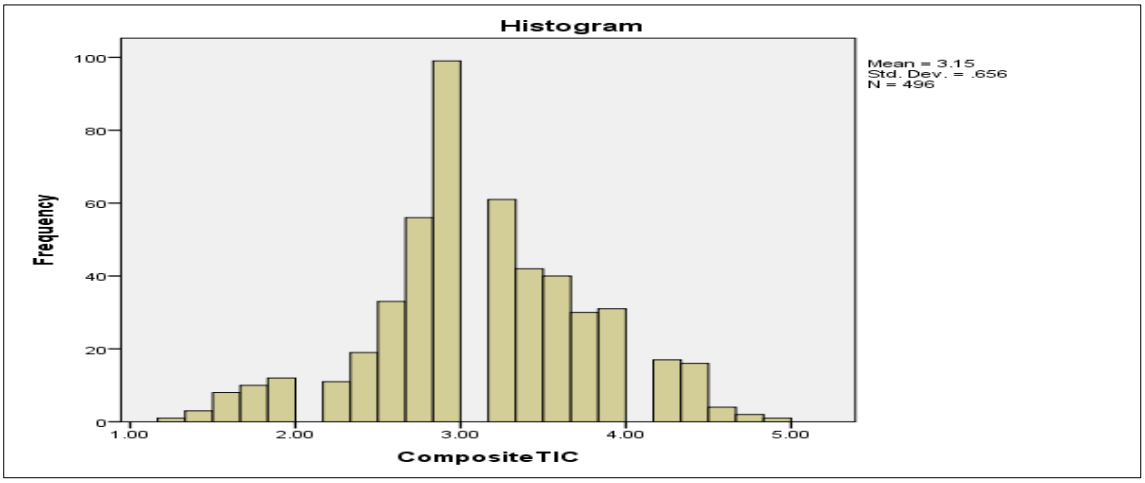



Figure 11: Trust in the City Q-Q Plot

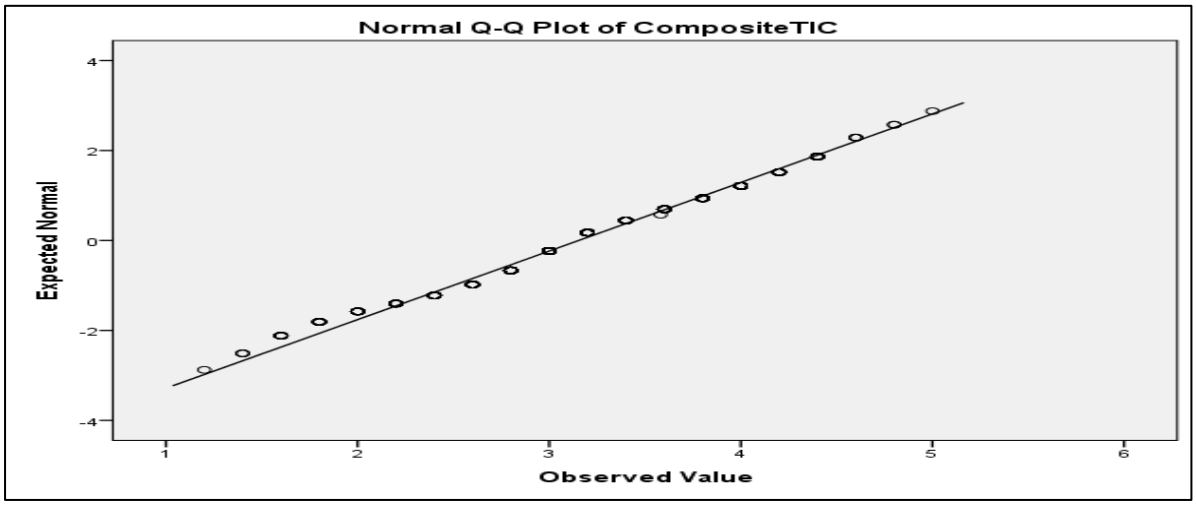
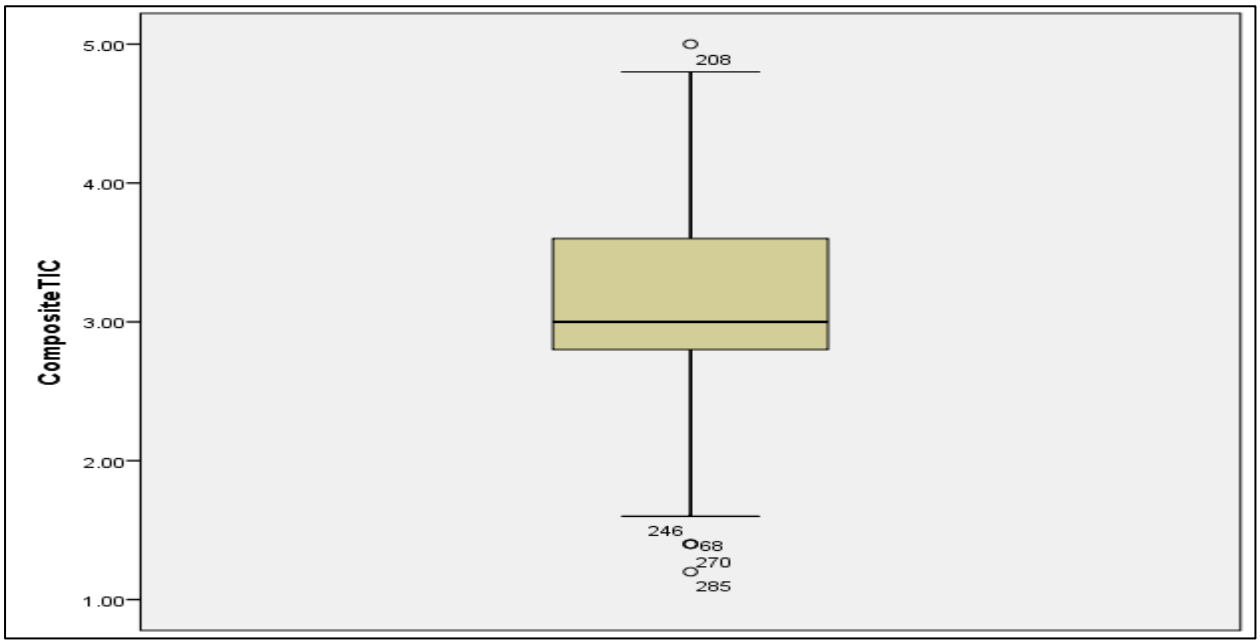


Figure 12: Trust in City Box Plot




A Shapiro-Wilk's test and a visual inspection of the Trust in the City histogram, Q-Q plot and box plot highlighted that the Trust in the City variable differs slightly from a normal distribution. The variable had a skewness of -.103 and a kurtosis of .179. The Trust in the City variable is slightly skewed to the right and kurtotic.

## 2 Distrust in the City

Table 55: Descriptive Statistics for Distrust in the City

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| CompositeDIS | Mean | | 2.9526 | .02952 |
| | 95% Confidence Interval for Mean | Lower Bound | 2.8946 | |
| | | Upper Bound | 3.0106 | |
| | 5% Trimmed Mean | | 2.9629 | |
| | Median | | 3.0000 | |
| | Variance | | .432 | |
| | Std. Deviation | | .65753 | |
| | Minimum | | 1.00 | |
| | Maximum | | 4.75 | |
| | Range | | 3.75 | |
| | Interquartile Range | | .75 | |
| | Skewness | | -.209 | .110 |
| | Kurtosis | | .303 | .219 |

Table 56: Test of Normality for Distrust in the City

| | Shapiro-Wilk | | |
|---|---|---|---|
| | Statistic | df | Sig. |
| CompositeDIS | .980 | 496 | .000 |

Figure 13: Distrust in the City Histogram

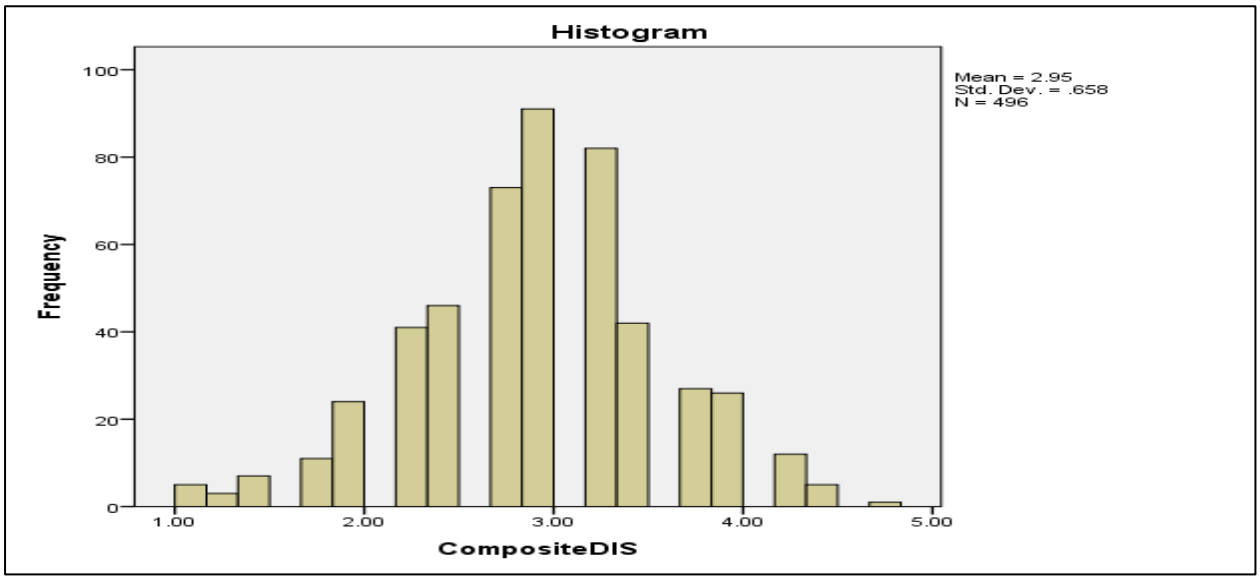



Figure 14: Distrust in the City Q-Q Plot

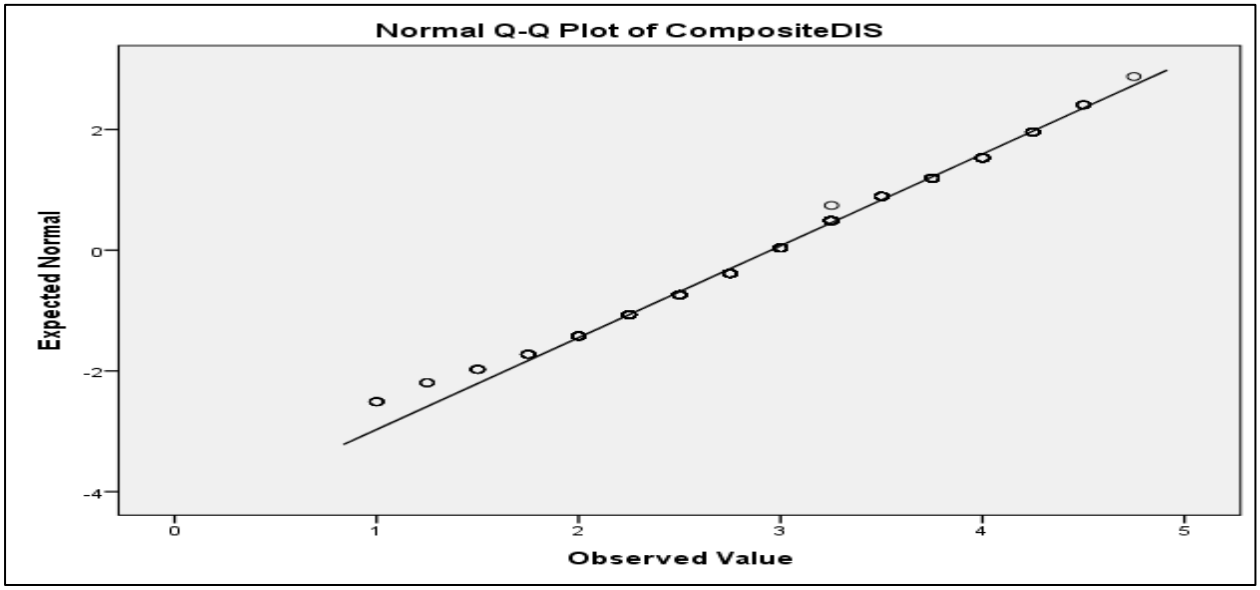
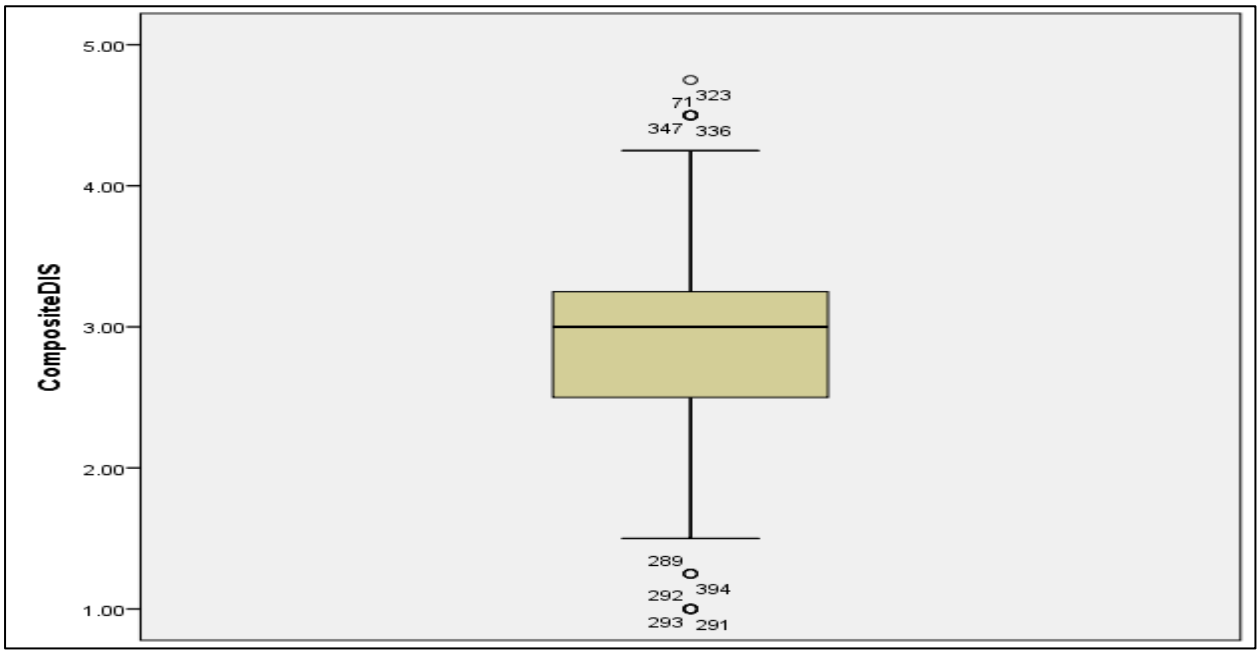


Figure 15: Distrust in the City Box Plot




A Shapiro-Wilk's test and a visual inspection of the Distrust in the City histogram, Q-Q plot and box plot highlighted that the Distrust in the City variable differs slightly from a normal distribution. The variable had a skewness of -.209 and a kurtosis of .303. The Distrust in the City variable is slightly skewed to the right and kurtotic.

# APPENDIX O - VARIABLE NORMALITY ANALYSIS

## 1 Summary of Normality Results

One of the important assumptions in statistical analysis is that the data for a variable should be normally distributed. The reason for this is that data normality is required for statistical methods to be used (Hair et al., 2009). In order to test the normality of the study's variables the following methods were used 1) examining kurtosis and skewness z-values, 2) the Shapiro Wilk's test and 3) examining graphical plots. It was found that the 'distrust in the city and perceived risk' and 'performance beliefs' variables mildly deviated from a normal distribution. The trust in the city, satisfaction, trust in city e-services, city e-service use and continued use intention variables were not normally distributed. Logging and squaring the trust in the city, satisfaction, trust in city e-services, city e-service use and continued use intention variables did not improve their distribution. Results obtained using these variables should be taken with caution. Normality analyses for each variable are highlighted within the next sections of this appendix.

## 2 Trust in the City Normality Analysis

Table 57: Descriptive Statistics for Trust in the City

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| CompositeTIC | Mean | | 3.1823 | .05174 |
| | 95% Confidence Interval for Mean | Lower Bound | 3.0803 | |
| | | Upper Bound | 3.2843 | |
| | 5% Trimmed Mean | | 3.1693 | |
| | Median | | 3.0000 | |
| | Variance | | .543 | |
| | Std. Deviation | | .73712 | |
| | Minimum | | 1.50 | |

| | | | |
|---|---|---|---|
| | Maximum | 5.00 | |
| | Range | 3.50 | |
| | Interquartile Range | 1.00 | |
| | Skewness | .175 | .171 |
| | Kurtosis | -.405 | .340 |

Table 58: Test of Normality for Trust in the City

| | Shapiro-Wilk | | |
|---|---|---|---|
| | Statistic | df | Sig. |
| CompositeTIC | .952 | 203 | .000 |

Figure 16: Trust in the City Histogram

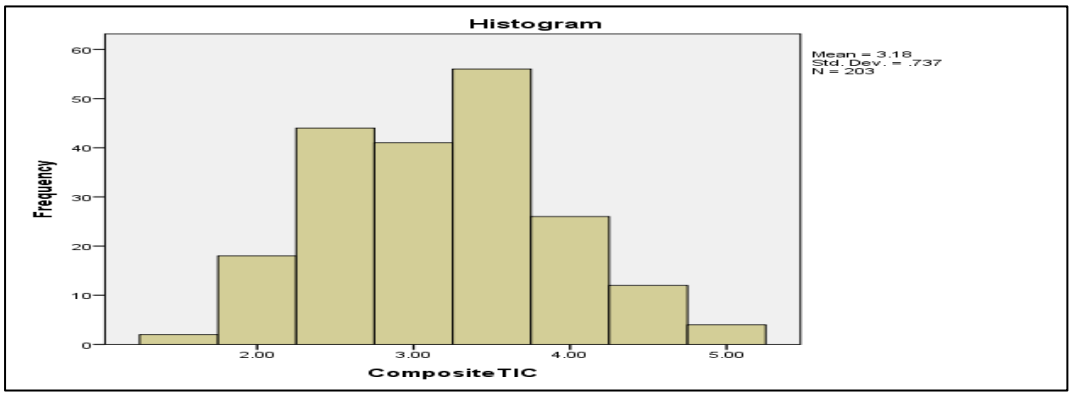


Figure 17: Trust in the City Q-Q Plot

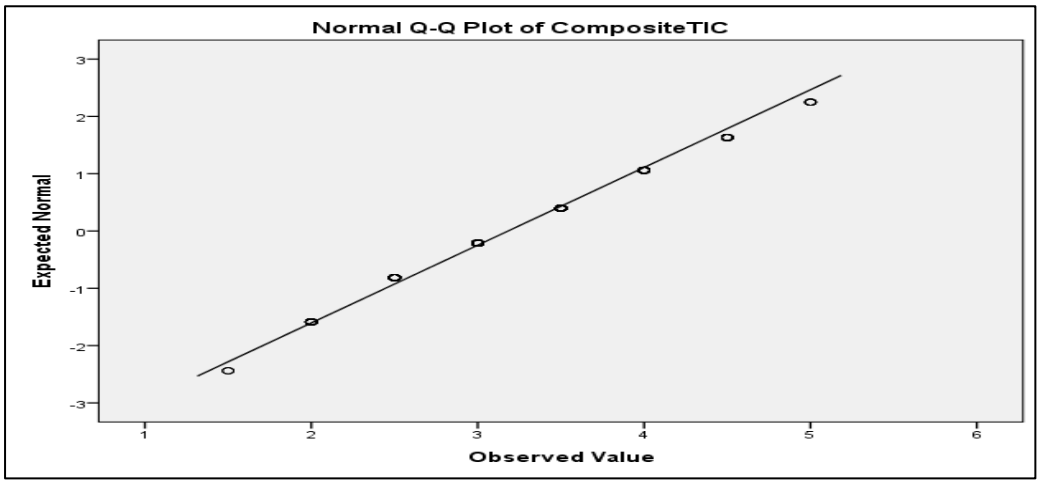
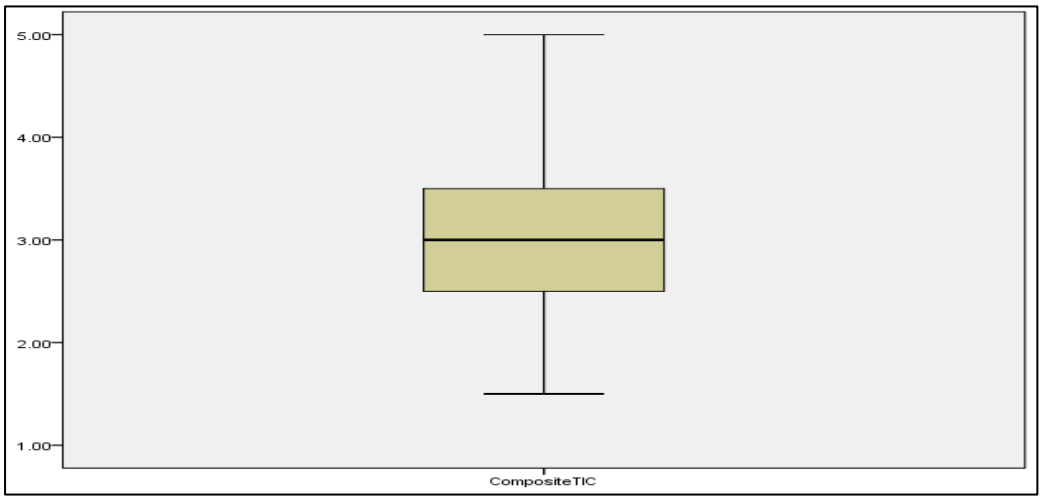



Figure 18: Trust in the City Box Plot




A Shapiro-Wilk's test and a visual inspection of the Trust in the City histogram, Q-Q plot and box plot highlighted that the Trust in the City variable slightly differed from a normal distribution. The variable had a skewness of .175 and a kurtosis of -.405. The Trust in the City variable is slightly skewed to the right and kurtotic.

## 3 Distrust in the City and Perceived Risk Normality Analysis

Table 59: Descriptive Statistics for Distrust and Perceived Risk

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| CompositeDISandPER | Mean | | 3.0435 | .04436 |
| | 95% Confidence Interval for Mean | Lower Bound | 2.9560 | |
| | | Upper Bound | 3.1310 | |
| | 5% Trimmed Mean | | 3.0610 | |
| | Median | | 3.0000 | |
| | Variance | | .400 | |
| | Std. Deviation | | .63207 | |
| | Minimum | | 1.00 | |
| | Maximum | | 4.67 | |
| | Range | | 3.67 | |
| | Interquartile Range | | .67 | |
| | Skewness | | -.417 | .171 |
| | Kurtosis | | .843 | .340 |

Table 60: Test of Normality for Distrust in the City and Perceived Risk

| | Shapiro-Wilk | | |
|---|---|---|---|
| | Statistic | df | Sig. |
| CompositeDISandPER | .975 | 203 | .001 |

Figure 19: Distrust in the City and Perceived Risk Histogram

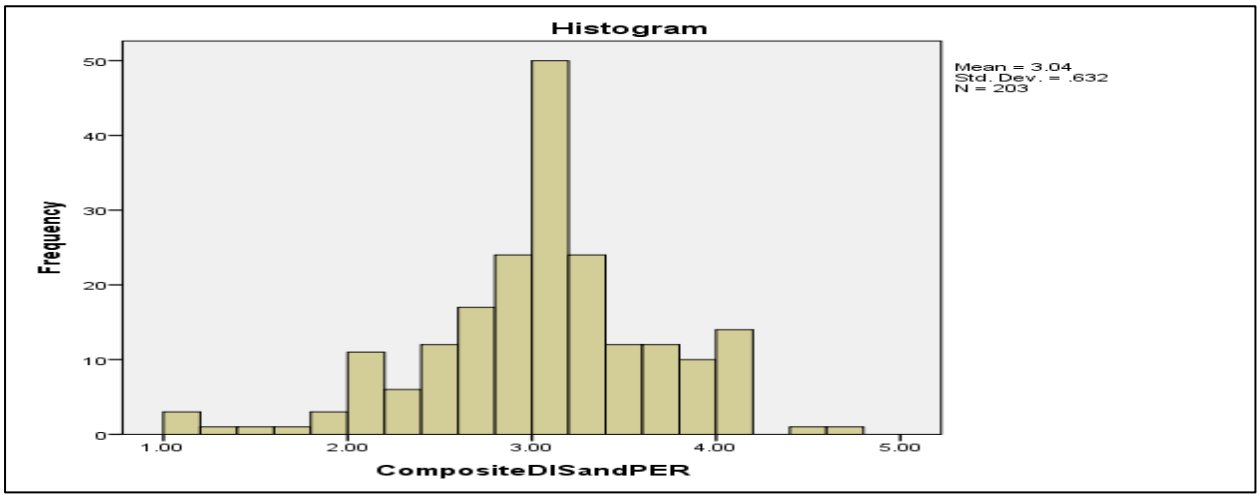



Figure 20: Distrust in the City and Perceived Risk Q-Q Plot

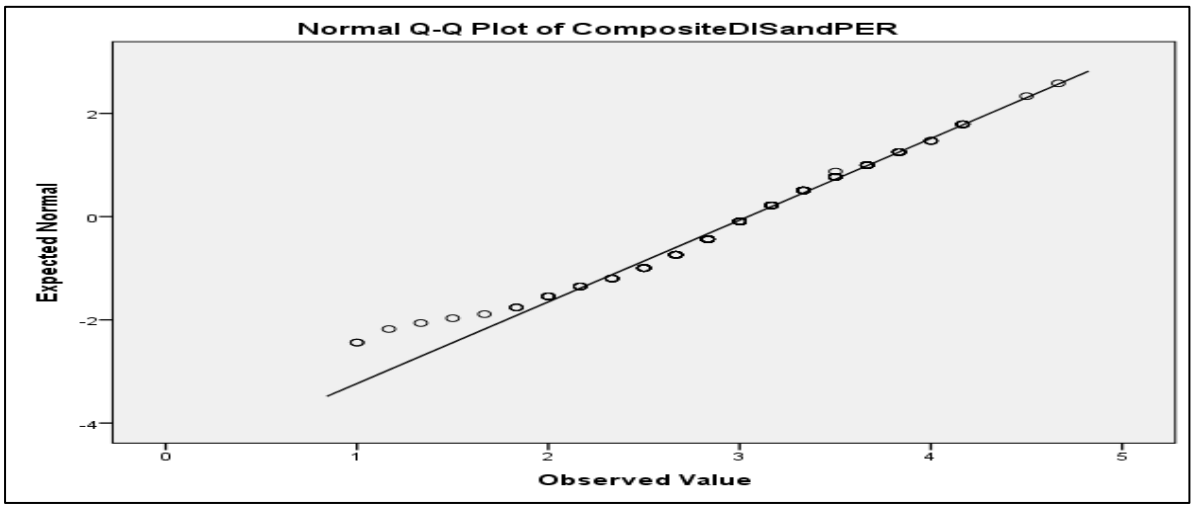
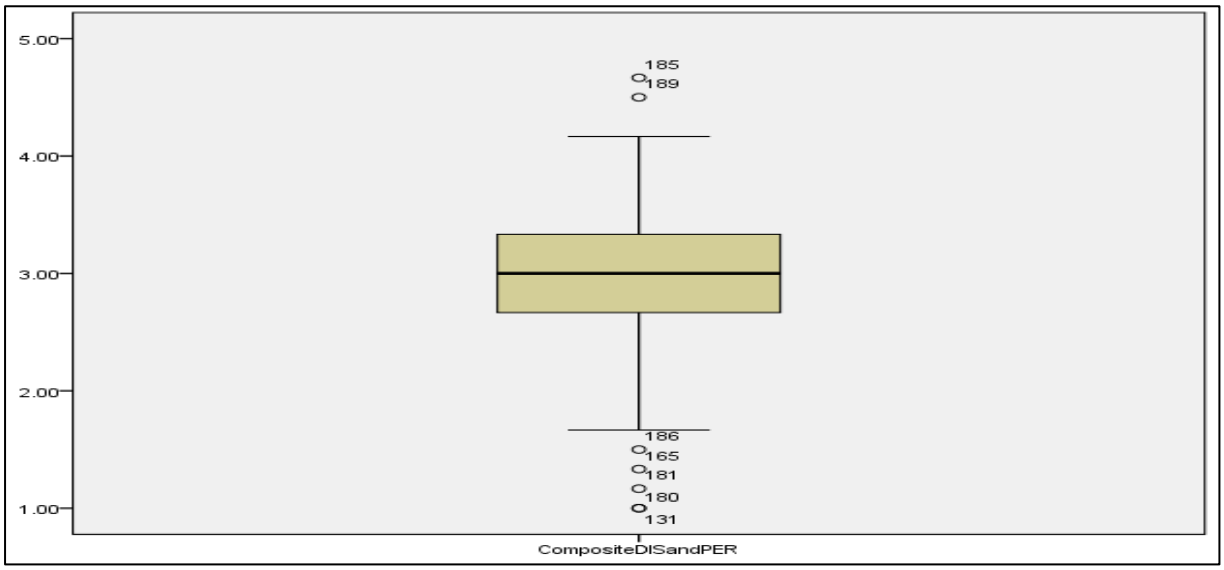


Figure 21: Distrust in the City and Perceived Risk Box Plot




A Shapiro-Wilk's test and a visual inspection of the Distrust in the City and Perceived Risk histogram, Q-Q plot and box plot highlighted that the Distrust in the City and Perceived Risk variable slightly differed from a normal distribution. The variable had a skewness of -.417 and a kurtosis of .843. The Distrust in the City and Perceived Risk variable is slightly skewed to the right and kurtotic.

## 4 Trust in City e-services Normality Analysis

Table 61: Descriptive Statistics for Trust in City e-Services

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| CompositeTES | Mean | | 3.2118 | .04858 |
| | 95% Confidence Interval for Mean | Lower Bound | 3.1160 | |
| | | Upper Bound | 3.3076 | |
| | 5% Trimmed Mean | | 3.2041 | |
| | Median | | 3.0000 | |
| | Variance | | .479 | |
| | Std. Deviation | | .69218 | |
| | Minimum | | 1.67 | |
| | Maximum | | 5.00 | |
| | Range | | 3.33 | |
| | Interquartile Range | | 1.00 | |
| | Skewness | | .228 | .171 |
| | Kurtosis | | -.240 | .340 |

Table 62: Test of Normality for Trust in City e-Services

| | Shapiro-Wilk | | |
|---|---|---|---|
| | Statistic | df | Sig. |
| CompositeTES | .964 | 203 | .000 |

Figure 22: Trust in City e-Services Histogram

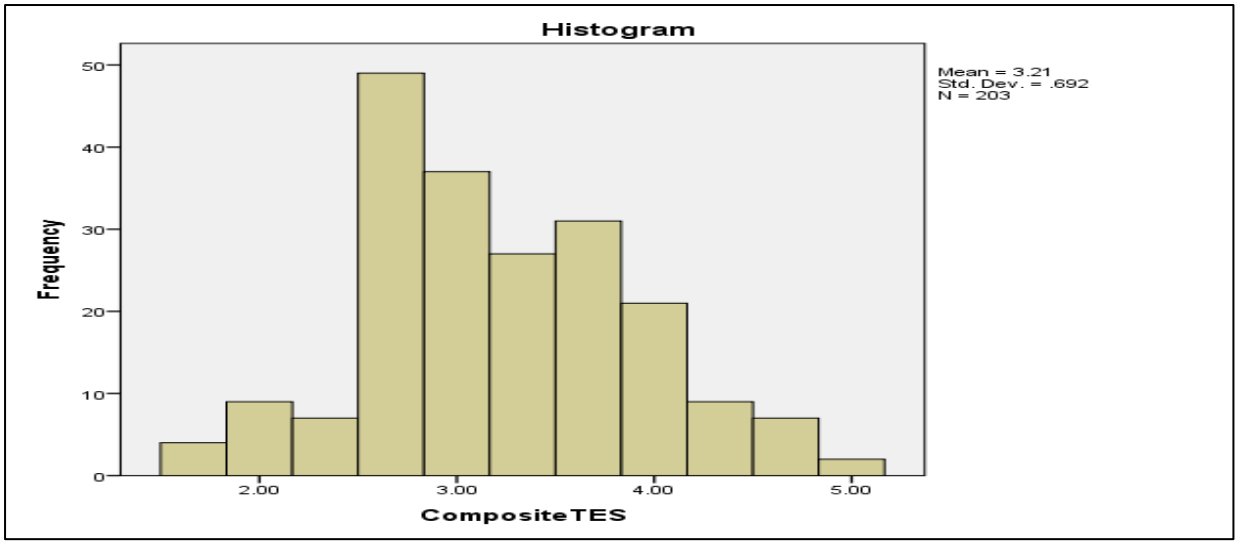


Figure 23: Trust in City e-Services Q-Q Plot

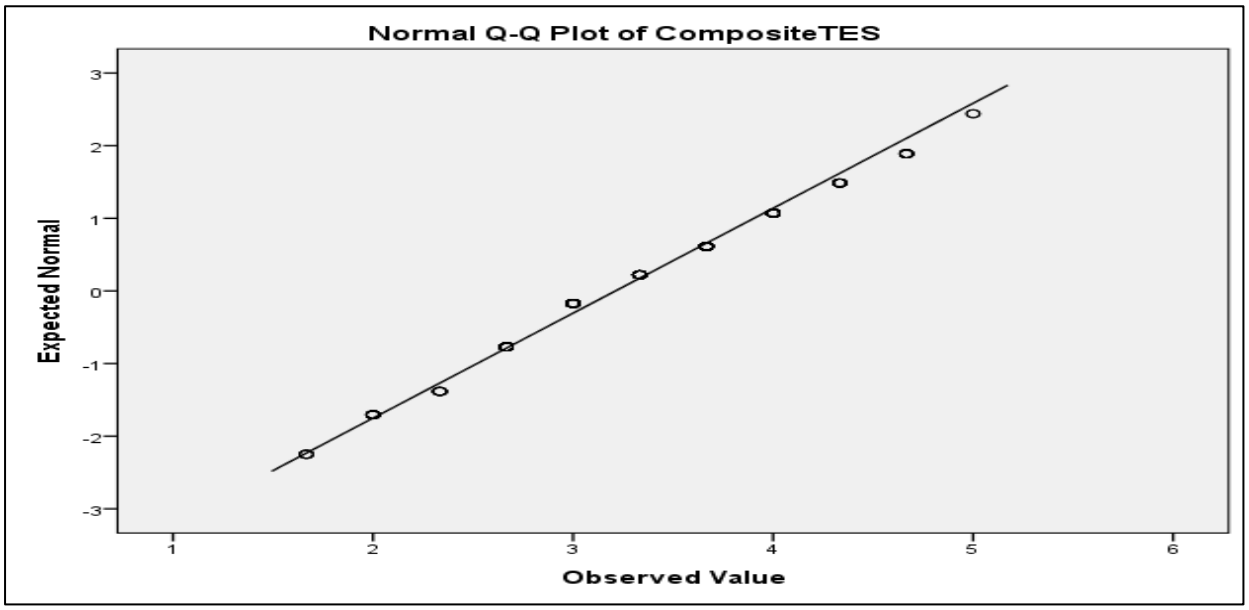
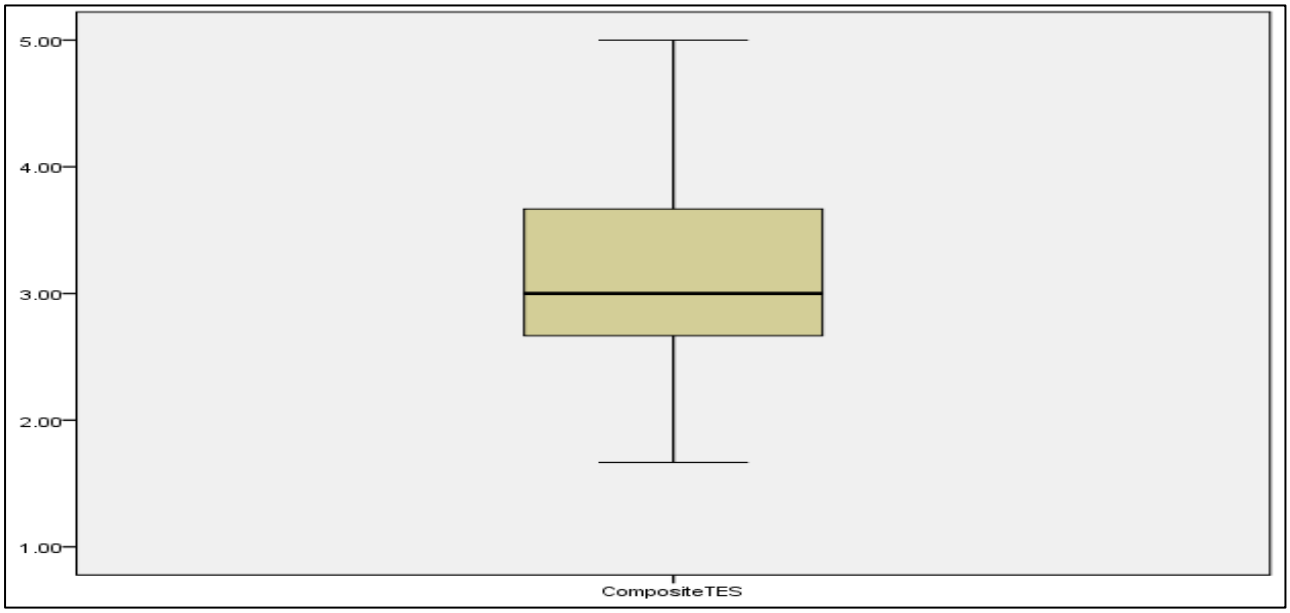



Figure 24: Trust in City e-Services Box Plot




A Shapiro-Wilk's test and a visual inspection of the Trust in City e-Services histogram, Q-Q plot and box plot highlighted that the Trust in City e-Services variable differed from a normal distribution. The variable had a skewness of .228 and a kurtosis of -.240. The Trust in City e-Services variable is slightly skewed to the left and kurtotic.

## 5 Continued Use Intention Normality Analysis

Table 63: Descriptive Statistics for Continued Use Intention

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| CompositeCUI | Mean | | 3.2857 | .04487 |
| | 95% Confidence Interval for Mean | Lower Bound | 3.1973 | |
| | | Upper Bound | 3.3742 | |
| | 5% Trimmed Mean | | 3.2822 | |
| | Median | | 3.3333 | |
| | Variance | | .409 | |
| | Std. Deviation | | .63923 | |
| | Minimum | | 1.00 | |
| | Maximum | | 5.00 | |
| | Range | | 4.00 | |
| | Interquartile Range | | .67 | |
| | Skewness | | .035 | .171 |
| | Kurtosis | | .770 | .340 |

Table 64: Test of Normality for Continued Use Intention

| | Shapiro-Wilk | | |
|---|---|---|---|
| | Statistic | df | Sig. |
| CompositeCUI | .960 | 203 | .000 |

Figure 25: Continued Use Intention Histogram

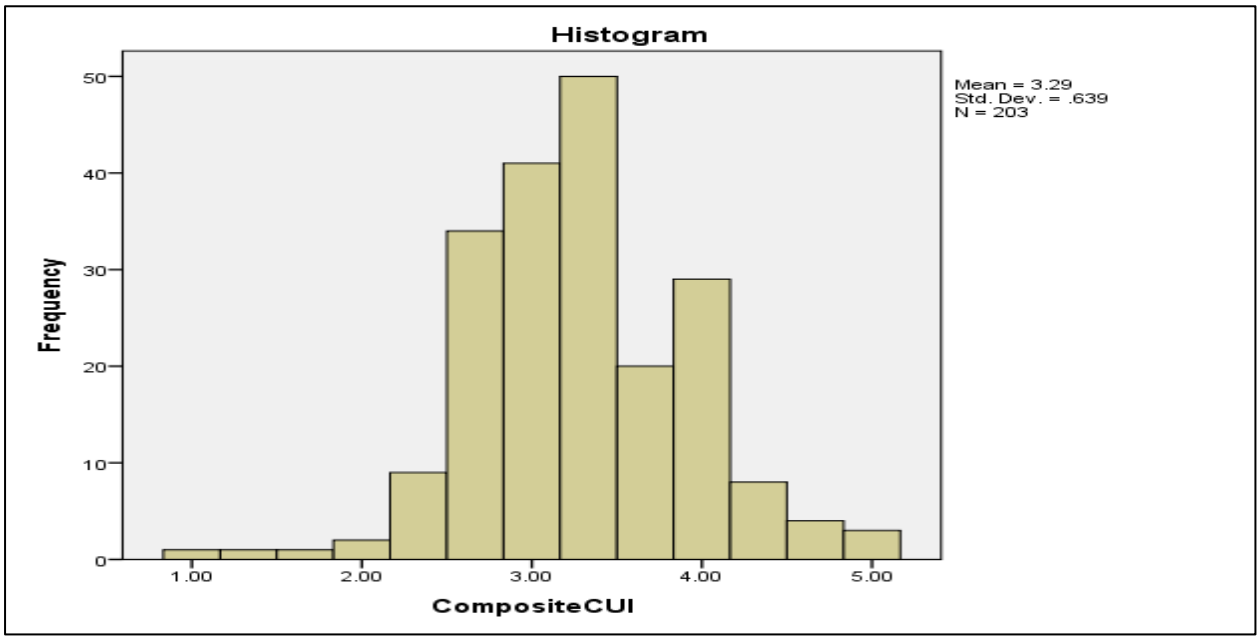



Figure 26: Continued Use Intention Q-Q Plot

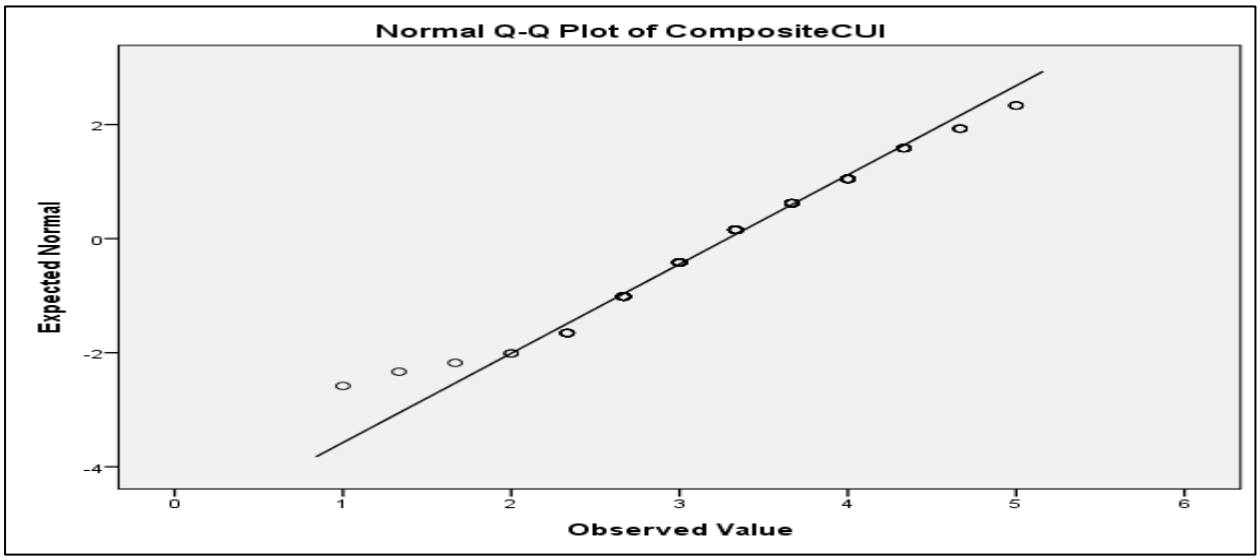
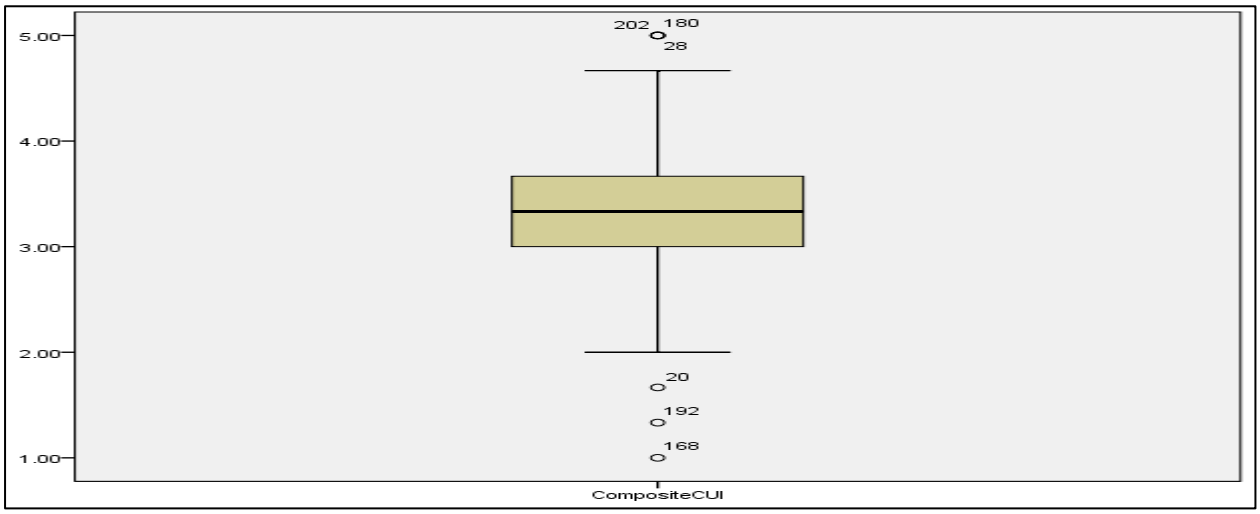


Figure 27: Continued Use Intention Box Plot




A Shapiro-Wilk's test and a visual inspection of the Continued Use Intention histogram, Q-Q plot and box plot highlighted that the Continued Use Intention variable differed from a normal distribution. The variable had a skewness of .035 and a kurtosis of .770. The Continued Use Intention variable is skewed to the right and kurtotic.

## 6 City e-Service Use Normality Analysis

Table 65: Descriptive Statistics for City e-Service Use

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| CompositeUSE | Mean | | 2.1921 | .06058 |
| | 95% Confidence Interval for Mean | Lower Bound | 2.0727 | |
| | | Upper Bound | 2.3116 | |
| | 5% Trimmed Mean | | 2.0946 | |
| | Median | | 2.0000 | |

| | | | |
|---|---|---|---|
| | Variance | .745 | |
| | Std. Deviation | .86318 | |
| | Minimum | 1.00 | |
| | Maximum | 6.00 | |
| | Range | 5.00 | |
| | Interquartile Range | 1.00 | |
| | Skewness | 2.055 | .171 |
| | Kurtosis | 5.512 | .340 |

Table 66: Test of Normality for City e-Service Use

| | Shapiro-Wilk | | |
|---|---|---|---|
| | Statistic | df | Sig. |
| CompositeUSE | .776 | 203 | .000 |

Figure 28: City e-Service Use Histogram

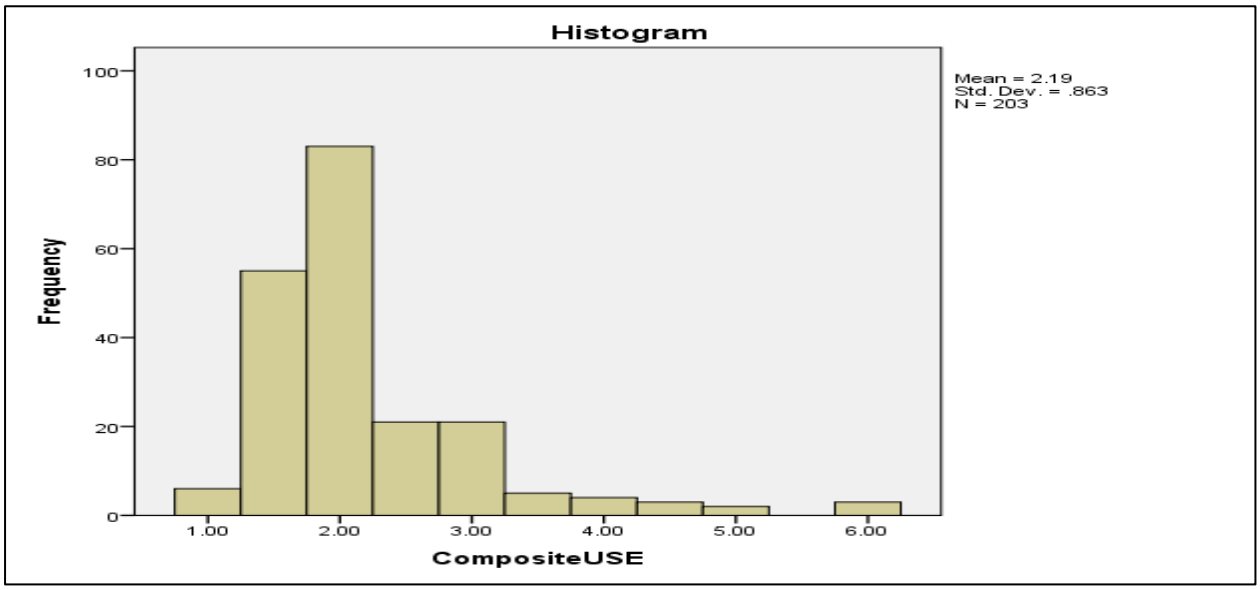



Figure 29: City e-Service Use Q-Q Plot

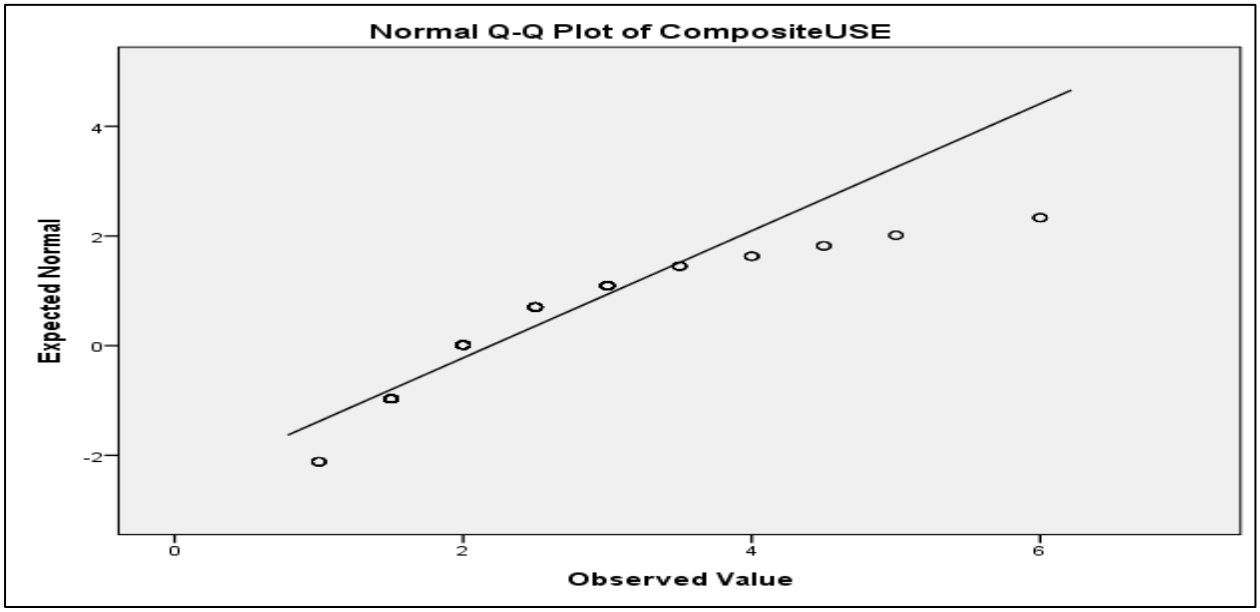
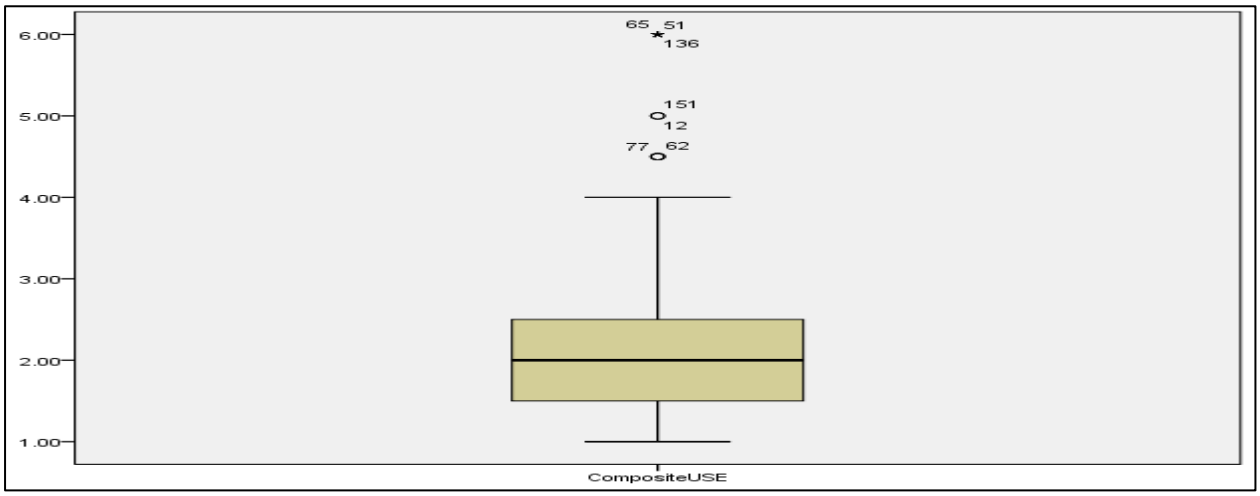


Figure 30: City e-Service Use Box Plot




A Shapiro-Wilk's test and a visual inspection of the City e-Service Use histogram, Q-Q plot and box plot highlighted that the City e-Service Use variable differed from a normal distribution. The variable had a skewness of 2.055 and a kurtosis of 5.512. The City e-Service Use variable is skewed to the right and kurtotic.

## 7 Performance Beliefs Normality Analysis

Table 67: Descriptive Statistics for Performance Beliefs

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| CompositePEB | Mean | | 4.2307 | .05667 |
| | 95% Confidence Interval for Mean | Lower Bound | 4.1190 | |
| | | Upper Bound | 4.3425 | |
| | 5% Trimmed Mean | | 4.2304 | |
| | Median | | 4.1667 | |

| | | | |
|---|---|---|---|
| | Variance | .652 | |
| | Std. Deviation | .80736 | |
| | Minimum | 2.33 | |
| | Maximum | 5.83 | |
| | Range | 3.50 | |
| | Interquartile Range | 1.33 | |
| | Skewness | .073 | .171 |
| | Kurtosis | -.709 | .340 |

Table 68: Test of Normality for Performance Beliefs

| | Shapiro-Wilk | | |
|---|---|---|---|
| | Statistic | df | Sig. |
| CompositePEB | .978 | 203 | .003 |

Figure 31: Performance Beliefs Histogram

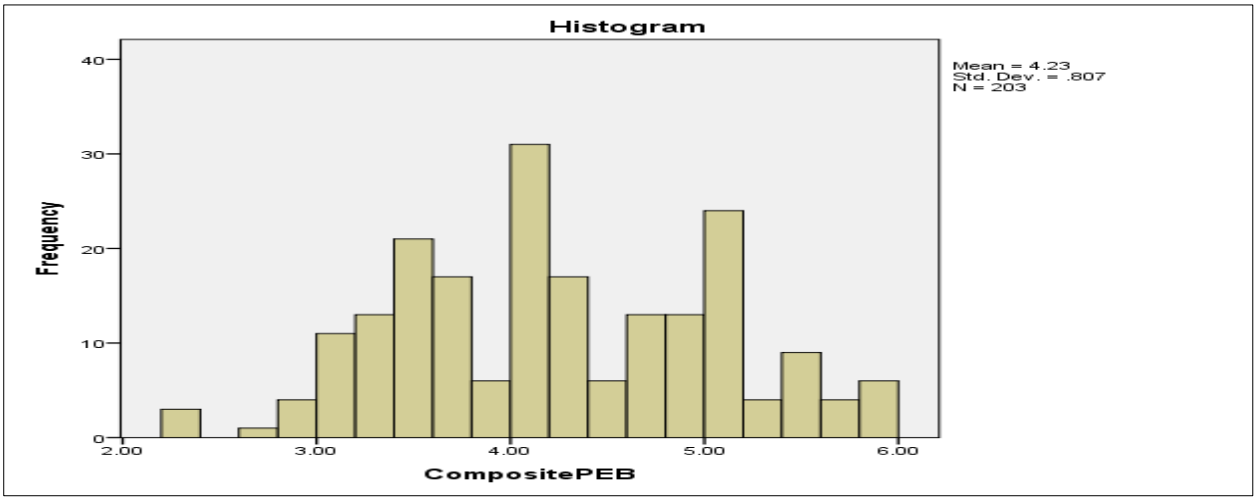



Figure 32: Performance Beliefs Q-Q Plot

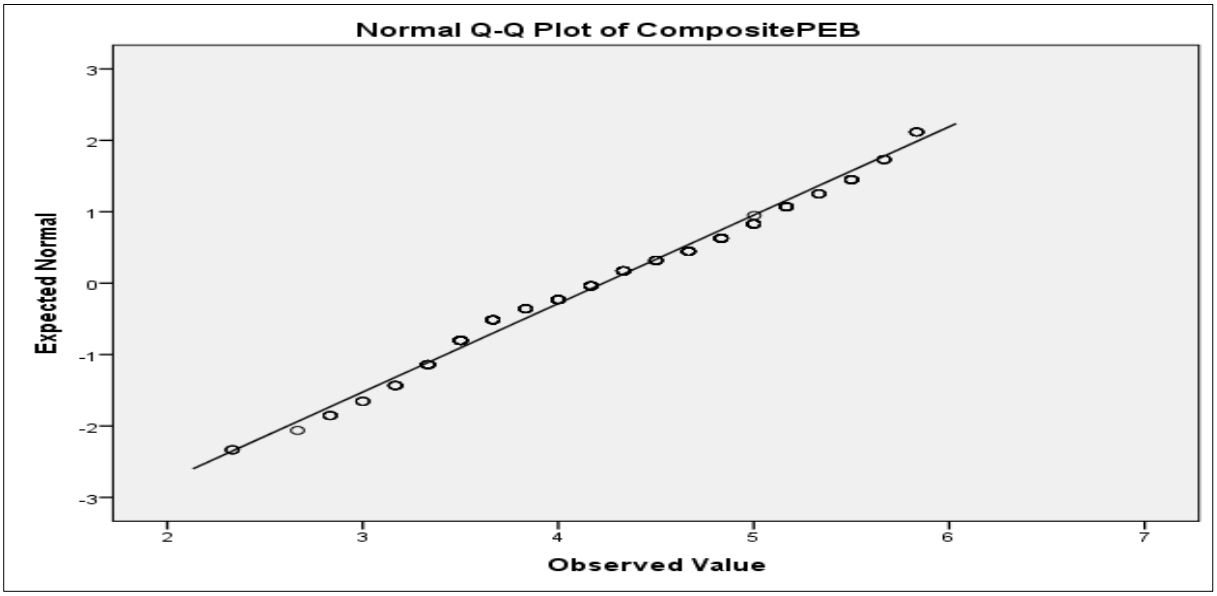
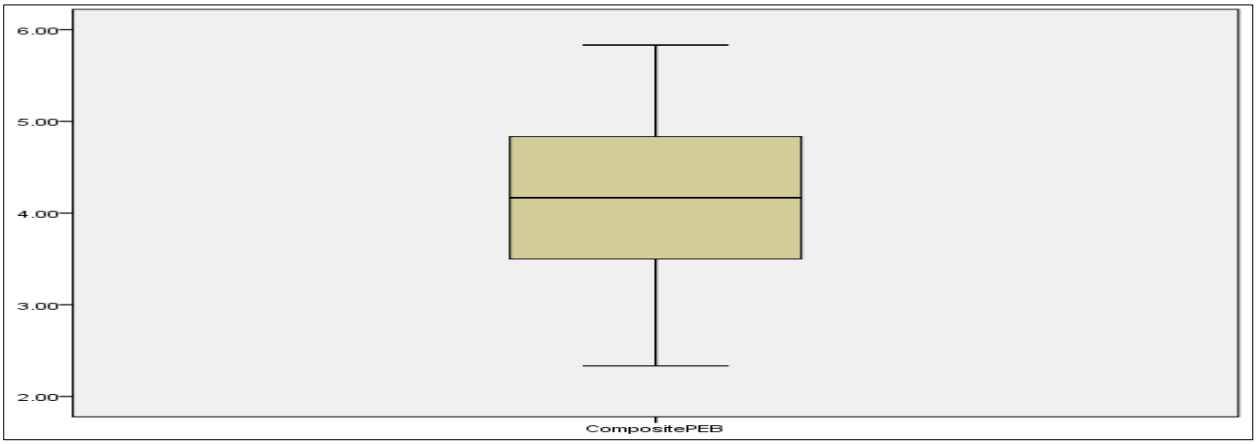


Figure 33: Performance Beliefs Box Plot




A Shapiro-Wilk's test and a visual inspection of the Performance Beliefs histogram, Q-Q plot and box plot highlighted that the Performance Beliefs variable slightly differed from a normal distribution. The variable had a skewness of .0730 and a kurtosis of -.709. The Performance Beliefs variable is slightly skewed to the right and kurtotic.

## 8 Satisfaction Normality Analysis

Table 69: Descriptive Statistics for Satisfaction

| | | | Statistic | Std. Error |
|---|---|---|---|---|
| CompositeSAT | Mean | | 3.4932 | .05053 |
| | 95% Confidence Interval for Mean | Lower Bound | 3.3935 | |
| | | Upper Bound | 3.5928 | |
| | 5% Trimmed Mean | | 3.5088 | |
| | Median | | 3.3333 | |

| | | | |
|---|---|---|---|
| | Variance | .518 | |
| | Std. Deviation | .72000 | |
| | Minimum | 1.00 | |
| | Maximum | 5.00 | |
| | Range | 4.00 | |
| | Interquartile Range | 1.00 | |
| | Skewness | -.359 | .171 |
| | Kurtosis | 1.132 | .340 |

Table 70: Test of Normality for Satisfaction

| | Shapiro-Wilk | | |
|---|---|---|---|
| | Statistic | df | Sig. |
| CompositeSAT | .952 | 203 | .000 |

Figure 34: Satisfaction Histogram

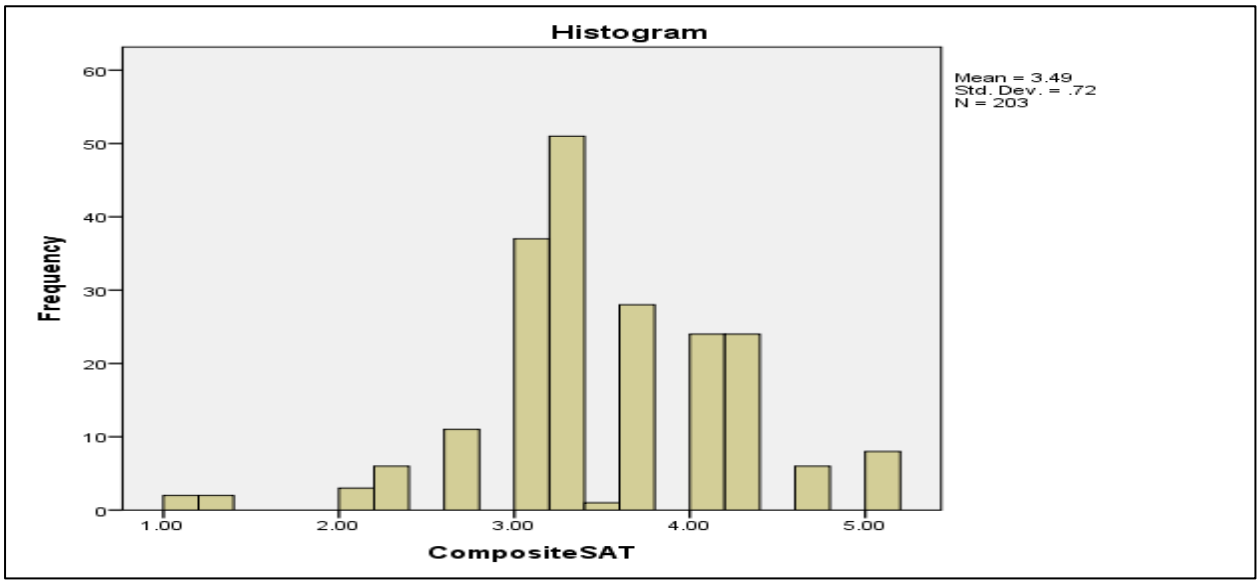



Figure 35: Satisfaction Q-Q Plot

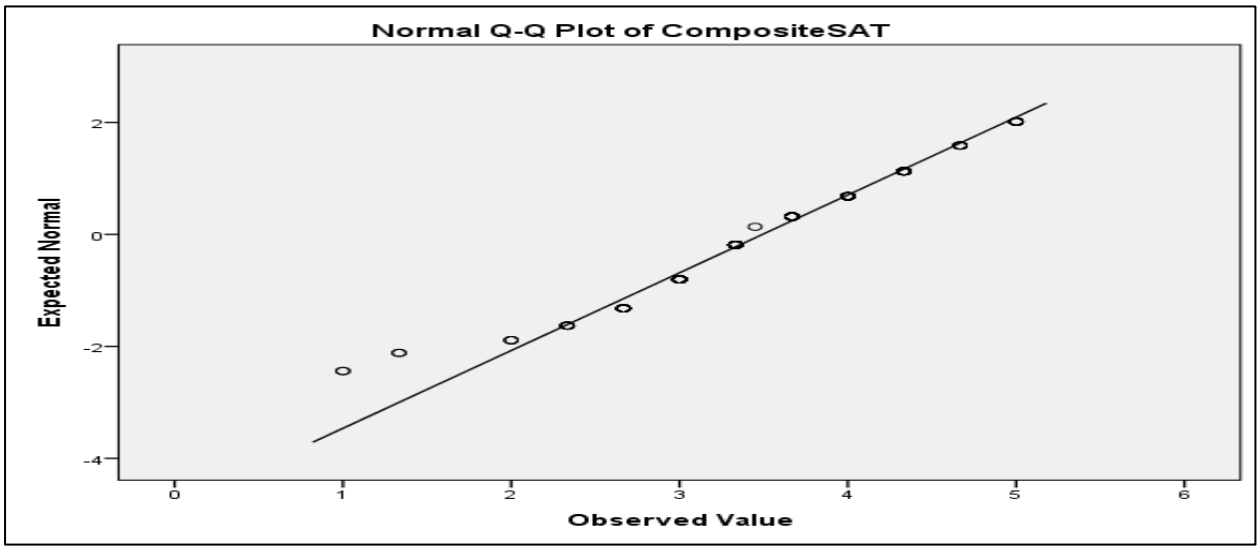
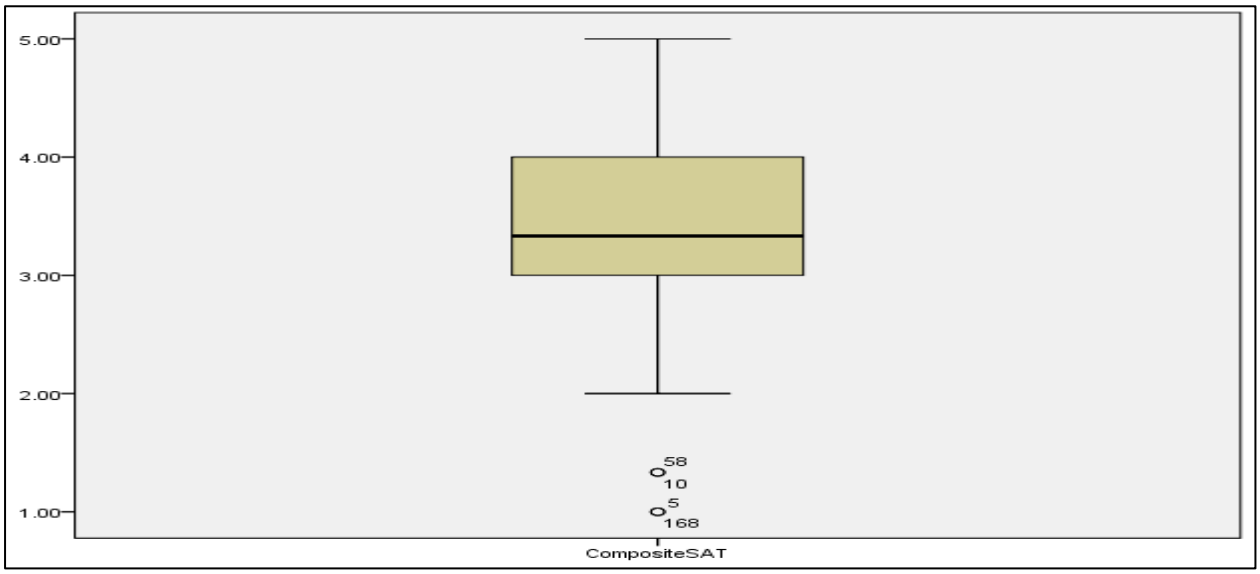


Figure 36: Satisfaction Box Plot




A Shapiro-Wilk's test and a visual inspection of the Satisfaction histogram, Q-Q plot and box plot highlighted that the Satisfaction variable differed from a normal distribution. The variable had a skewness of -.359 and a kurtosis of 1.132. The Satisfaction variable is skewed to the right and kurtotic.

# APPENDIX Q - ASSUMPTION VIOLATION ANALYSIS

Assumptions of: collinearity, linearity, heteroscedasticity and the normality of residuals were tested prior to hypothesis and regression testing. Collinearity refers to the exact or approximate linear association between two explanatory variables (Brannan, Esplen & Gray, 1998). Linearity is defined as the 'patterns of association between each pair of variables and the ability of the correlation coefficient to adequately represent the relationship' (Hair et al., 2009). Heteroscedasticity refers to when the variability of a variable is unequal across a series of values of a second variable that predicts it (Holgersson & Shukur, 2004). Normality of residuals focuses on a variable's data distribution shapes likeness to that of a normal distribution (Hair et al., 2009). Collinearity diagnostics indicated that there were no collinearity violations. Tolerance values were close to 0 and the VIF values ranged from 1.028 to 1.989. When examining the normal distribution plot, the majority of items were in the shape of a normal distribution line. This suggests that the residuals were approximately normally distributed. When assessing the scatter plot, items did not follow a curved pattern or follow a fan shaped pattern. This suggests that there was no violation of the linearity or heteroscedasticity

Table 71: Collinearity Diagnostics

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | .929 | .325 | | 2.860 | .005 | | |
| | CompositeTIC | .143 | .058 | .165 | 2.481 | .014 | .756 | 1.322 |
| | CompositeDISandPER | .002 | .059 | .002 | .040 | .968 | .973 | 1.028 |
| | CompositeTES | .295 | .064 | .320 | 4.600 | .000 | .694 | 1.442 |
| | CompositeSAT | .158 | .067 | .178 | 2.366 | .019 | .593 | 1.686 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | CompositeUSE | -.007 | .044 | -.010 | -.170 | .865 | .966 | 1.036 |
| | CompositePEB | .097 | .065 | .123 | 1.502 | .135 | .503 | 1.989 |

Figure 37: Normal P-P Plot of Regression Standardised Residuals'

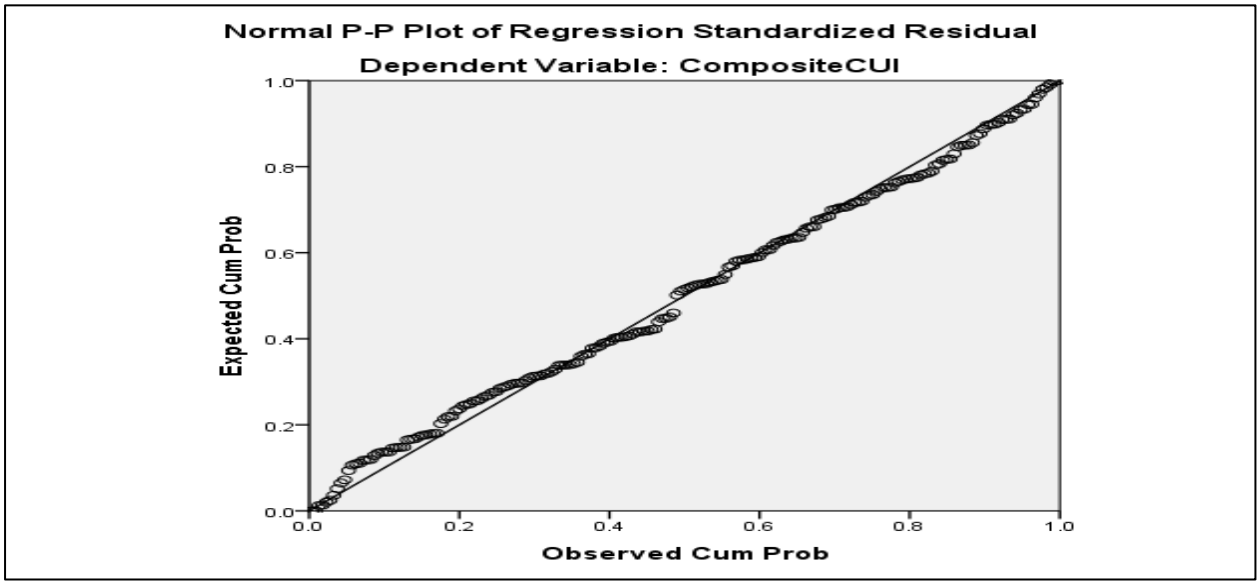
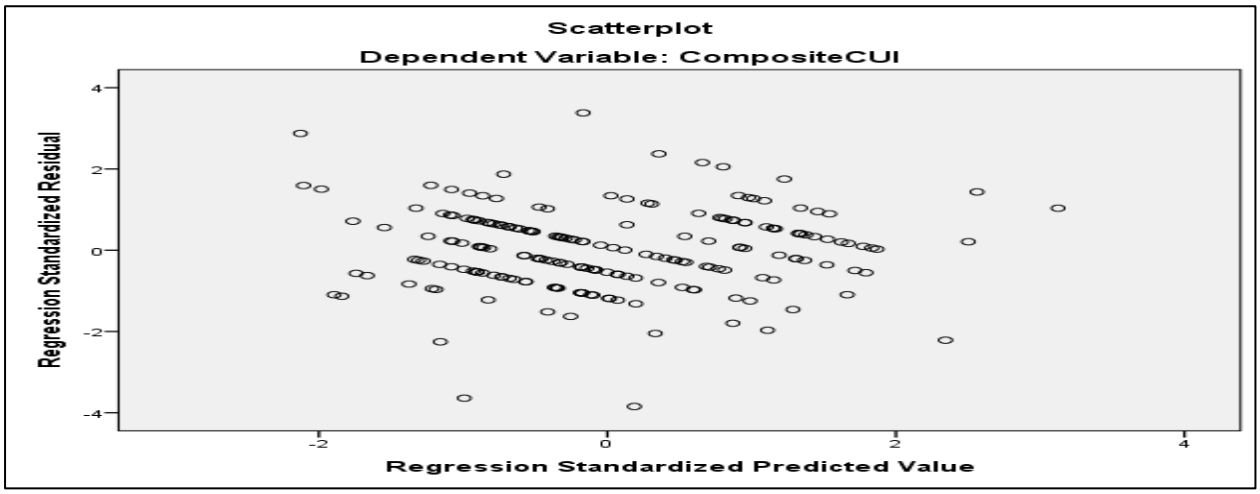



Figure 38: Scatter Plot of Regression Standardised Residuals



# APPENDIX R – PLS RESULTS

Table 72: PLS Results

| Dependent Variable | Independent Variable | Hypothesis (H) | Correlation coefficient | T-value (500 samples) |
|---|---|---|---|---|
| Continued Use Intention | Performance Beliefs | Hypothesis 2b: The performance beliefs of a city e-service positively influence continued use intention. | 0.1266 | 1.0552* |
| Continued Use Intention | Satisfaction | Hypothesis 5b: Satisfaction positively influences intention to continued use. | 0.1560 | 1.1421* |
| Continued Use Intention | Trust in the City | Hypothesis 6c: Trust in the city positively influences continued use intention. | 0.1714 | 1.8647* |
| Continued Use Intention | Trust in City e-Services | Hypothesis 7c: Trust in city e-services positively influences continued use intention. | 0.3349 | 2.7413** |
| Continued Use Intention | Distrust in the City and Perceived Risk | Hypothesis 8c: Distrust in the city and perceived risk negatively influence continued use intention. | 0.0232 | 0.1523 |
| Continued Use Intention | City e-Service Use | Hypothesis 1: City e-service use positively influences continued use intention. | -0.0061 | 0.0659 |
| City e-Service Use | Satisfaction | Hypothesis 5a: Satisfaction positively influences city e-service use. | 0.0231 | 0.2078 |
| City e-Service Use | Trust in the City | Hypothesis 6a: Trust in the city positively influences city e-service use. | 0.0568 | 0.4229 |
| City e-Service Use | Trust in City e-Services | Hypothesis 7a: Trust in city e-services positively influences city e-service use. | -0.1979 | 1.7761* |
| City e-Service Use | Distrust in the City and Perceived Risk | Hypothesis 8a: Distrust in the city and perceived risk negatively influence city e-service use. | -0.0744 | 0.5554 |
| Satisfaction | Trust in the City | Hypothesis 6b: Trust in the city positively influences satisfaction. | -0.0047 | 0.0505 |
| Satisfaction | Trust in City e-Services | Hypothesis 7d: Trust in city e-services positively influences satisfaction. | 0.0168 | 0.165 |
| Satisfaction | Distrust in the City and | Hypothesis 8b: Distrust in the city and perceived risk | 0.0801 | 0.6806 |

| | | | | |
|---|---|---|---|---|
| | Perceived Risk | negatively influence satisfaction. | | |
| Satisfaction | Performance Beliefs | Hypothesis 2a: The performance beliefs of a city e-service positively influence satisfaction. | 0.6234 | 7.7605** |
| Trust in City e-Services | Performance Beliefs | Hypothesis 2c: The performance beliefs of a city e-service positively influence trust in city e-services. | 0.4546 | 5.0417** |
| Distrust in the City and Perceived Risk | Trust in City e-Services | Hypothesis 7b: Trust in city e-services negatively influences distrust in the city and perceived risk. | -0.066 | 0.362 |

(**t>1.96;*t>0.98)

# APPENDIX S - MAP OF EKURHULENI AND MAPS OF SURVEY SITES (SOURCE = HTTPS://WWW.GOOGLE.CO.ZA/MAPS/)

Figure 39: Ekurhuleni




Figure 40: Germiston

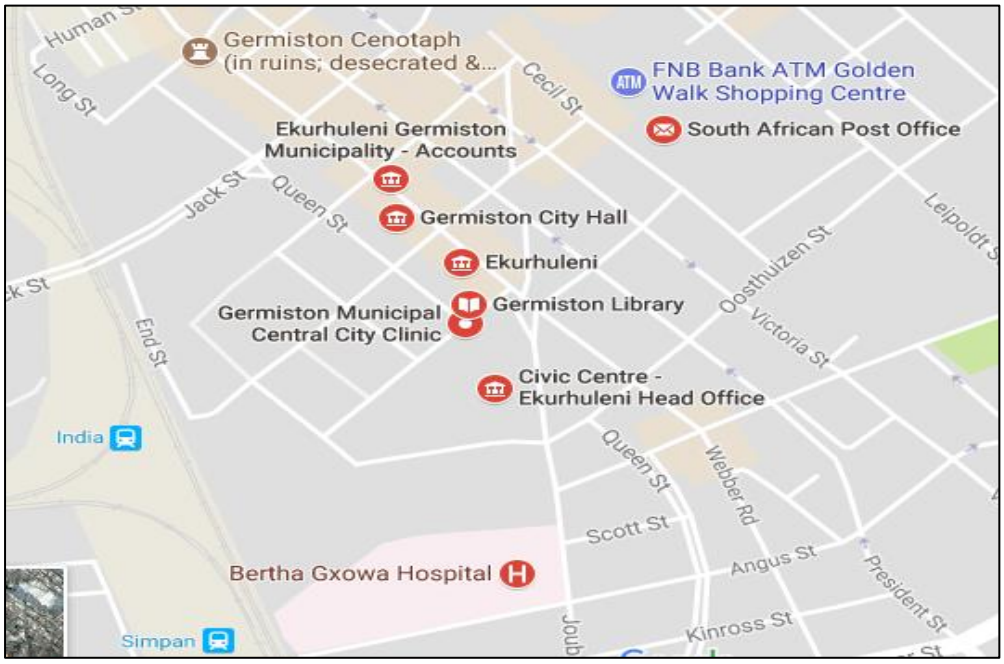


Figure 41: Kempton Park




Figure 42: Boksburg

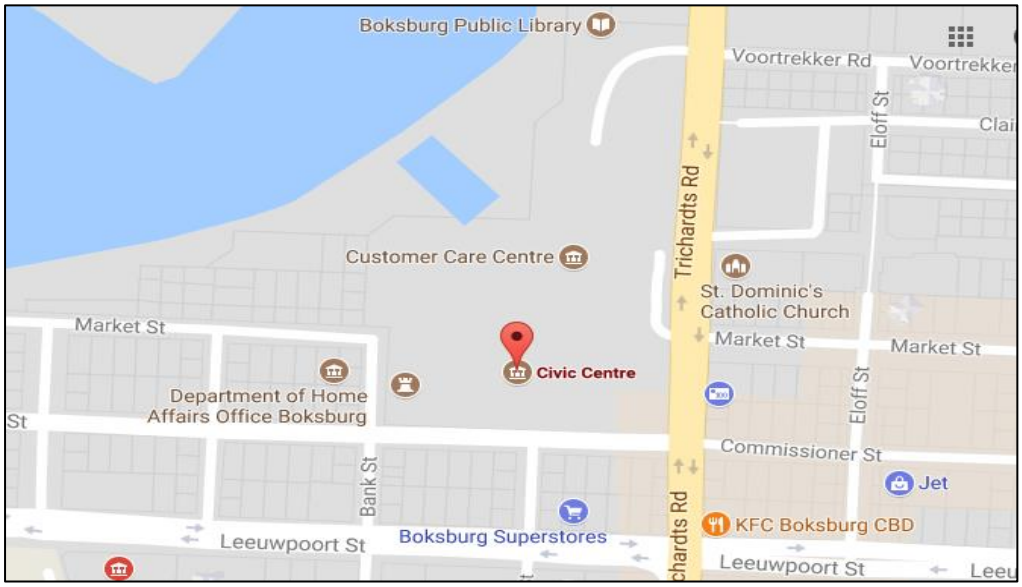


Figure 43: Springs

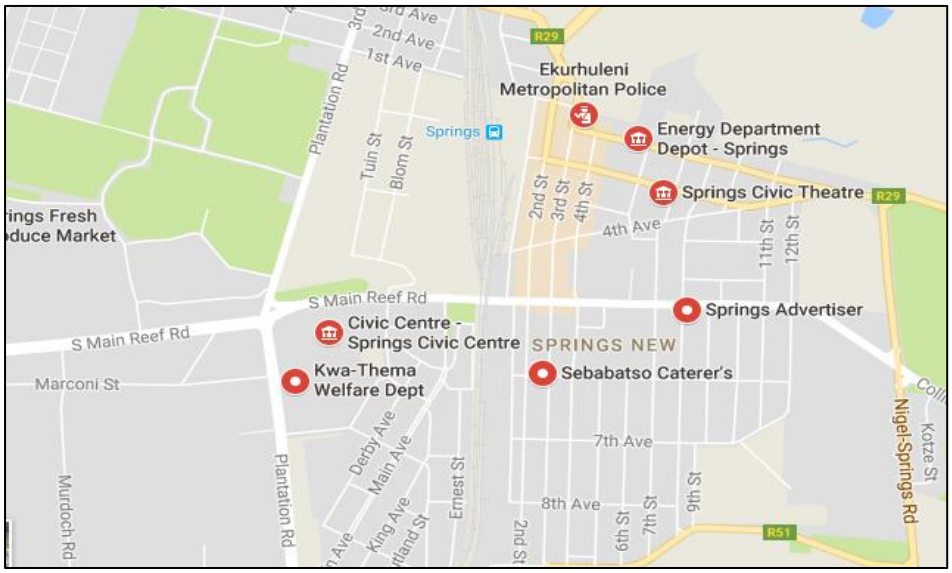



Figure 44: Springs

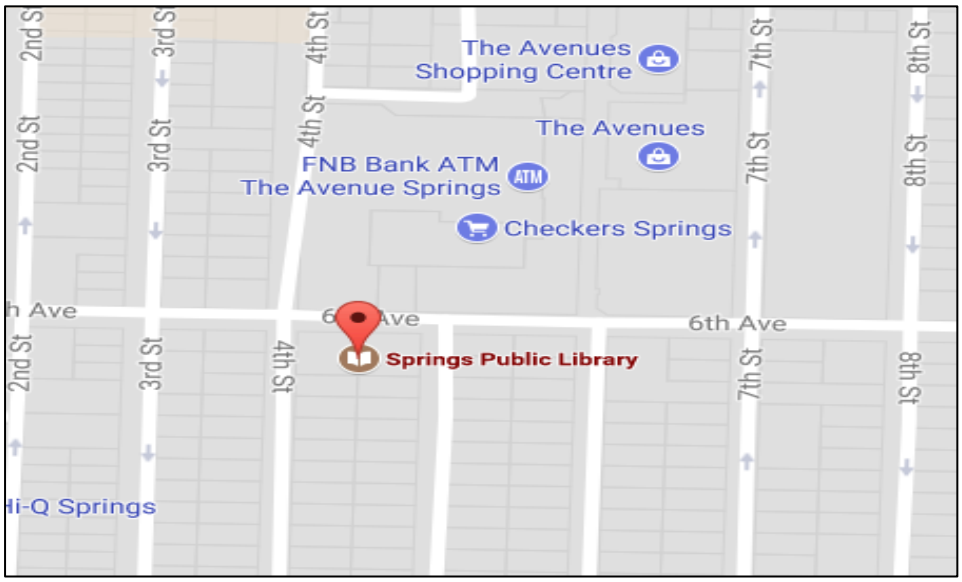


Figure 45: Daveyton

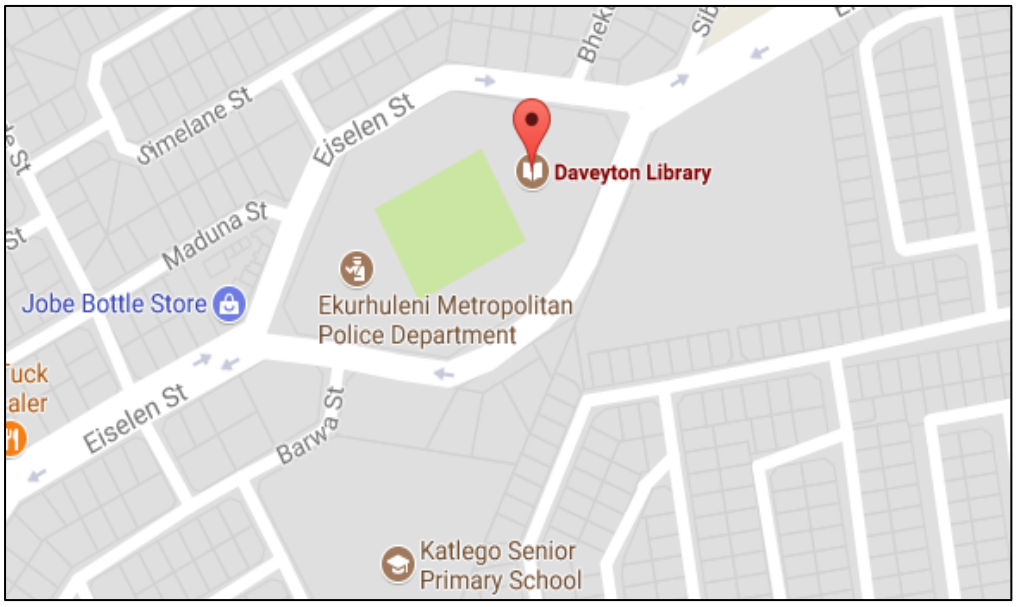



Figure 46: Thokoza

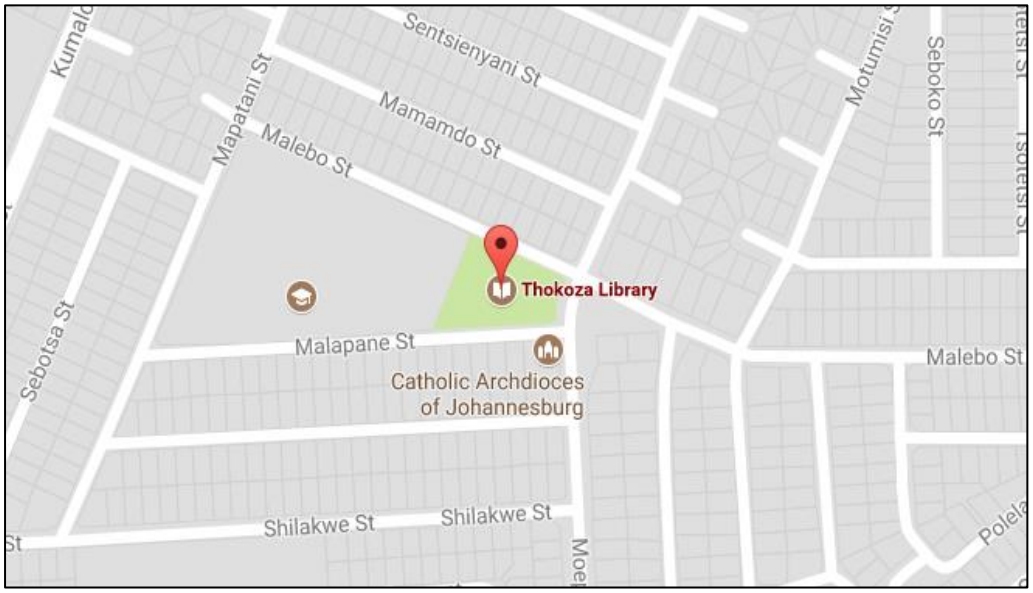


Figure 47: Brakpan

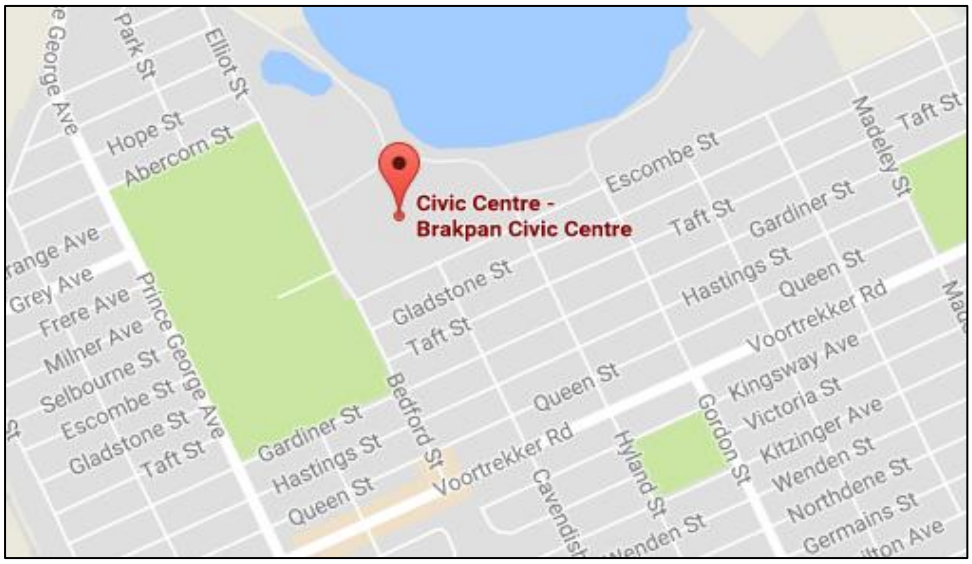



Figure 48: Brakpan

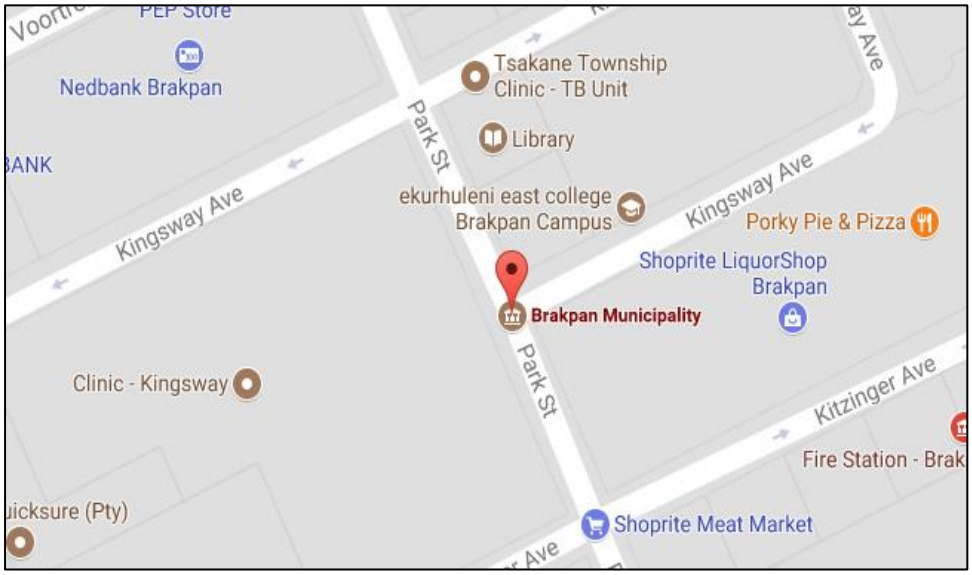


Figure 49: Langavile




Figure 50: Geluksdal

