Cape Peninsula University of Technology

A MULTI-DIMENSIONAL MODEL FOR ASSESSING E-GOVERNMENT SERVICE GAPS IN THE CONTEXT OF A DEVELOPING COUNTRY: A CRITICAL REALIST PERSPECTIVE

By

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DECLARATION

I, Gilbert Mahlangu, declare that the contents of this thesis represent my unaided work and that this thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

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Signed **Date**

ABSTRACT

Literature reports that e-government services have been in use in developing countries for approximately two decades. Hence, consumers of government services would have expected some e-government maturity in the continuum, where e-services would have evolved to some degree. However, despite the deliberate efforts towards the design, development and deployment of e-government projects in developing countries, e-government service gaps still exist. Also, since the emergence of e-government in developing countries, several different measurement metrics in the form of models and frameworks have been utilised to evaluate e-government projects. Nevertheless, while e-government assessment typologies have developed over time, no measurement metrics exist to assess e-government service gaps according to the best knowledge of the researcher. Consequently, a failure to assess e-government service gaps makes it difficult to take well-founded improvement actions since these gaps are not obvious to the designers and implementers of e-government systems. Hence, the purpose of this study was in twofold: to investigate the factors enhancing e-government service gaps in the context of a developing country from multiple perspectives and develop a model for assessing e-government service gaps in the same context.

To accomplish this purpose, the study performed an integrated literature review as well as construct analysis. Also, a conceptual model for assessing e-government service gaps was developed in Chapter Three. The study was grounded on the tenets and assumptions of the philosophy of critical realism. A sequential multi-methodology design was used to collect quantitative and qualitative data. Since the researcher aimed to understand the phenomenon from multiple perspectives, data was collected from three units: government employees; business; and citizens. A total of five hundred and fifty (550) questionnaire surveys were used to examine the factors enhancing e-government service gaps and evaluate dimensions for measuring service gaps while thirty (30) in-depth semi-structured interviews were used to gain a comprehensive understanding of factors enhancing e-government service gaps in a developing context, a purpose that could not be achieved through the use of structured questionnaire survey alone. The findings from questionnaires and interviews together with feedback from expert reviews were used to validate the conceptual model presented in Chapter Three.

The deployment of e-government projects that provide comprehensive e-government services lies in the identification of e-government service gaps and addressing factors that enhance them. The study has revealed several factors that can explain why e-government service gaps exist in the context of a developing county. These include lack of requisite infrastructure; lack of interoperability; lack of access; lack of e-government funding; budget disparity; policy inconsistency; lack of the desire to support and coordinate e-government; design-reality gap; lack of user-involvement; and lack of developed IT human capacity.

The factors identified in this study act as underlying mechanisms of successful implementation and utilisation of e-government in the developing context. For instance, electrical power outages and lack of ICT infrastructure make e-government a difficult goal to achieve. Besides, most of the factors appear to be greatly related to the socio-economic conditions prevailing in many developing countries. Therefore, until these factors are converted into enablers for providing comprehensive services, e-government service gaps will continue to exist in developing countries. Accordingly, the deployment of e-government services in developing countries with a focus on these underlying factors will to some extent reduce e-government service gaps and increase the utilisation of e-government services and user satisfaction. Also, the study envisaged that a multi-dimensional model for assessing e-government service gaps should comprise of four (4) constructs as follows: system functionality; service delivery; service gaps; and user satisfaction.

This study provided novel contributions in a stratified fashion which was informed by the Three Worlds Framework as follows: (a) pragmatic world; (b) knowledge domain; and (c) philosophy of science. Some of the contributions include: enlightening the implementers and funders of e-government projects on factors that obstruct the successful implementation and utilisation of e-government services in the developing context; the model will allow for the identification of service gaps in a particular project that could be otherwise unnoticed during the design phase of e-government projects; thereby, contributing to the continuous improvement of e-government services; the findings provide theoretical knowledge to the body of literature concerning the factors that contribute to e-government service gaps; building on corpus literature on e-government assessment typologies, this study proffers a theoretical model for assessing e-government in the context of a developing country; the use of multi-methodology enabled consistency of reality in the study of e-government service gaps in the developing context; this study informs critical realists on the use of statistical inferences to explain the causal mechanisms of a given phenomenon based on regression analysis and in-depth interviews.

In terms of further research, the study suggests that new insights on factors enhancing e-government service gaps could emerge if the research is undertaken again in more case studies; the study also suggests that future research in investigating e-government service gaps should include the marginalised communities.

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DEDICATION

This Doctoral thesis is dedicated to my family for the encouragement and motivation which helped me to complete this study within the stipulated time. My beloved and supportive wife, Sibonokuhle, who is always available in times of need made immense contribution towards the completion of this study whereas my adorable children Dorothy, Thandolwethu and Thandeka served as an inspiration to me during this study.

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ABBREVIATION/ACRONYMS

BTS	Barlett's Test of Sphericity
DOI	Diffusion of Innovation
ECSF	e-government citizen satisfaction framework
EGDI	E-Government Development Index
EGFIS	E-Government Framework and Implementation Strategy
EJISDC	Information System in Developing Countries
FGDs	Focus Group Discussions
G2G	Government-to-Government
G2E	Government-to-Employees
G2B	Government-to-Business
G2C	Government-to-Citizens
HPCS	High- Performance Computing System
HDI	Human Development Index
ICTs	Information Communication Technologies
IS	Information Systems
IT	Information Technology
KMO	Kaiser-Meyer-Olkin
MDAs	Ministries, Departments and Agencies
MFED	Ministry of Finance and Economic Development
MICTPCS	Ministry of Information Communication Technology, Postal and Courier Services
OPC	Office of the President and Cabinet
OSI	Online Service Index
PCA	Principal Component Analysis
PFMS	Public Finance Management System
PoC	Proof of Concept
PRAZ	Procurement Regulatory Authority
SADC	Southern African Development Committee
TAM	Technology Acceptance Model
TTCS	Twenty Third Century Systems
TI	Telecommunication Index
UTAUT	Unified Theory of Acceptance and Use of Technology
WAN	Wide Area Networks

GLOSSARY

Term	Definition
Context	A context is often defined as a system to explain a location or setting within which something exists or happens (Alabdallat, 2020).
Developing country	A developing country is a country which has comparatively low standards of living; an undeveloped industrial base; a low-to-moderate Human Development Index (HDI) score and per capita income; low technological development and transfer; and requires equitable and sustainable socio-economic growth (Fialho & Van Bergeijk, 2017).
E-government maturity level	E-government maturity level is a phase classification metric that is used to demonstrate the development or evolution of e-government at various stages (Joshi & Islam, 2018).
E-government service	An e-government service is a service that is offered online by the government which can help businesses, citizens, and other government agencies in carrying out and fulfilling their government transactions (Fan & Yang, 2015).
Model	A model is an implementation construct that is built or created from a conceptual framework showing key variables and their relationships and further verified and/or tested for usability in a specific context (Kivunja, 2018).
Multi-dimensional model	A multi-dimensional model is an e-government assessment typology which is constructed from multi-dimensional constructs (Kim, 2017).

CHAPTER ONE

INTRODUCTION

"Research is to see what everybody else has seen and to think what nobody else has thought"
Albert Szent-Gyorgyi

1.1 Introduction

Globally, the deployment of e-government has been undertaken by a majority of government departments (Alabdallat, 2020; Almutairi et al., 2020; Baheer et al., 2020; Danish, 2006; Heeks, 2003; Sifile et al., 2018; Twizeyimana & Andersson, 2019; Witarsyah et al., 2017; Zejnullahu & Baholli, 2017). Alabdallat (2020) revealed that no country has been left untouched in the implementation of e-government. Accordingly, governments the world-over have deployed various e-services in different government departments. The most significant progress in e-government include, but is not limited to, e-procurement; e-invoicing; e-payment; e-licensing; e-archiving; e-tendering; e-taxation; e-voting; e-democracy; e-submission; e-rental; e-compliance; e-assessment; e-participation; e-visa; e-health; e-learning; e-court; online passports, online birth registration and permits applications; online company registration (Ahmad et al., 2019; Baheer et al., 2020; Carter & Belanger, 2005; Khadaroo et al., 2013; Khanra & Joseph, 2019; Lu & Nguyen, 2016; Madariaga et al., 2019; Mellouli et al., 2016; Sarrayrih & Sriram, 2015a; Sifile et al., 2018; Zautashvili, 2018). Indeed, several government services are now provided electronically. However, Alabdallat noted that:

> "Most of the government departments have not provided all of their services electronically or at least the most important ones. This issue seems to be confined to the developing countries, especially among countries with very low incomes" (Alabdallat, 2020: 5).

Thus, this creates a phenomenon of e-government service gaps. There is a range of definitions of this term, but in this study, e-government service gaps refer to the extent to which e-government services are not fulfilled to the intended users (government employees, businesses and citizens) of the e-government system (Herdiyanti et al., 2018) either because the system is constrained to deliver the required services or some of the expected services are not being provided. Nevertheless, it is worth mentioning that e-government service gaps can either be on the system - constraints on the system to deliver the required services or on the services -some expected services that are not provided electronically. Thus, e-government service gaps represent two major fine points: the constraints on the system to deliver e-services and the service deficiencies that the government should put online or deliver to the users electronically.

According to Herdiyanti, Adityaputri and Astuti (2018), service gaps have been widely used as a prescriptive and predictive standard in service quality evaluation and service offerings since it is believed that customers are aware of the services to be offered by the service providers irrespective of their absence. Even so, existing studies in e-government have not considered e-government service gaps as an area of concern; rather the corpus literature has focused on investigating e-government implementation challenges (Aneke, 2019; Munyoka, 2019; Nawafleh et al., 2012; Nurdin et al., 2011); e-government failures (Danish, 2006; Heeks, 2003; Khadaroo et al., 2013; Mercy, 2013) and critical success factors (Abu-Shanab & Khasawneh, 2014; Al-Ghaith et al., 2010; Alabdallat, 2020; Dhonju & Shakya, 2019; Pederson, 2016; Sarrayrih & Sriram, 2015). However, without understanding the e-government service gaps, governments will less likely take strategic actions in deploying comprehensive e-government projects. Thus, this study argues that there is a peril of missing out on the perceived benefits of implementing e-government projects if the assessment of e-government service gaps is not part of the e-government assessment typologies or evaluation effort.

The purpose of this first chapter is to provide a brief introduction about the topic, the motivation of the study, the current state of knowledge about the evaluation of e-government projects in the form of the background of the study and the statement of the problem underpinning this thesis. The central research question and corresponding research objectives are also outlined. This is followed by the significance of the study, limitations, delimitations, and the definition of key terms. The chapter concludes by providing a pictorial and an overview of the chapters of the thesis. The outline of the chapter is presented in Figure 1.1.

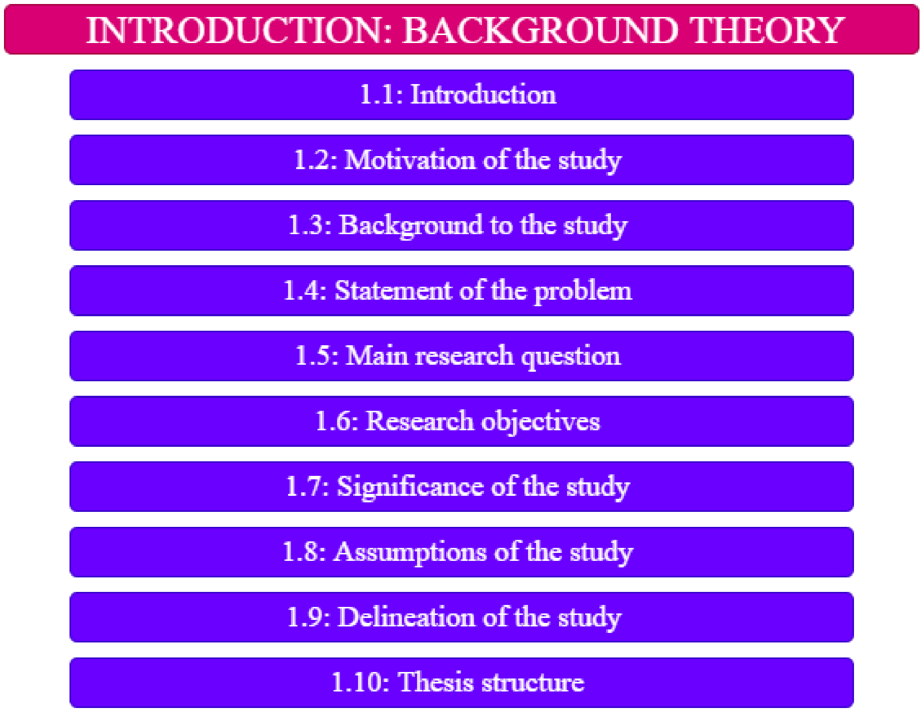


Figure 1.1: Chapter outline

1.2 Motivation for the study

The following reasons form the motivation of the study:

a) Persistent e-government failure in developing countries as reported by several authors (Alabdallat, 2020; Danish, 2006; Elkadi, 2013; Heeks, 2003; Hidayah et al., 2018; Loukis & Charalabidis, 2011; Mercy, 2013; Sharma, 2017; Verkijika, 2018; Verkijika & De Wet, 2018);

b) Recommendations presented by previous studies, for example, Abdallat (2014) suggested that future research should consider assessing e-government services from multiple perspectives (different user-groups) rather than a single perspective;

c) Notably, relative lack of empirical works in e-government research that are grounded on the critical realist perspective; and

d) The following remarks from Sigwejo and Pather:

> "The criticisms of [existing] measures are that they are 'first generation metrics' designed for developed countries, as opposed to developing countries; hence, the need to re-evaluate and customise the [measurement dimensions], establishing which

ones are important and suitable for a typical African e-government service" (Sigwejo & Pather, 2016: 2).

1.3 Background to the study

One of the pertinent issues in the e-government research community is the assessment of e-government projects (Agboh, 2017; Danila & Abdullah, 2014; Gupta & Jana, 2003; Heeks, 2006; Idoughi & Abdelhakim, 2018; Rana et al., 2017; Verkijika & De Wet, 2018). Since the emergence of e-government in developing countries, several different measurement metrics in the form of models and frameworks have been utilised by various scholars to assess e-government projects. These include, but are not limited to, E-Government Development Index (EGDI) (Dias, 2020); SERVQUAL measurement instrument (Parasuraman et al., 1985); DeLone and McLean model (DeLone & McLean, 2003); Technology Acceptance Model (TAM) (Davis, 1989); Diffusion of Innovation theory (DOI) (Rogers, 2003); unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003); and Layne and Lee maturity model (Layne & Lee, 2001).

While these measurement metrics provide a theoretical underpinning for evaluating e-government projects, nevertheless, they have not escaped criticism from e-government scholars. For instance, Kunstelj and Vintar (2004) argued that EGDI is likely to distort e-government measurement since most countries tend to launch e-government through the "quick fix, quick wins" principle to attain high rankings. Besides, EGDI has a limited number of constructs and do not highlight the multi-dimensional nature of e-services such as e-government. Moreover, SERVQUAL, one of the most referenced models in evaluating service gaps is failing to catch up with the continuous developments in information systems such as e-government since the model was designed before the emergence of the e-government concept (Ahmad et al., 2019). Also, the SERVQUAL measurement does not sufficiently clarify the attributes of e-services such as interactivity and intangibility, which are driven by the tremendous advancement of technology.

However, the DeLone and McLean model has been criticised for being incomplete by not including the core dimensions of e-services such as responsiveness and interactivity (Ramdan et al., 2014); whereas, it has been argued that TAM only focuses on measuring the intention to accept technology in a setting where the use of technology is voluntarily determined; thereby, ignoring mandatory technologies such as e-government where citizens have limited choice on whether to accept the technology or not (Ahmad et al., 2019).

Furthermore, maturity models which focus on evaluating e-government based on consistent stages of development such as online presence, interaction, transaction, fully integrated and transformed e-government treat e-government linearly and incremental (Perkov & Panjkota, 2017). Thus, maturity models give an impression that stages in e-government implementation will always develop in a linear model. However, in practice, these stages are likely to develop concurrently depending on the following three major elements: (a) established priorities of a country in the implementation of e-government projects; (b) evolving needs and values of citizens; and (c) where the benefits of e-government is situated. Perkov and Panjkota (2017: 103) argued that "the conceptualisation of e-government maturity no longer holds for evaluating e-government as its goals and targets are constantly evolving in response to evolving values and the needs of citizens". Thus, maturity models are susceptible to linearity since they do not take into consideration the dynamic nature in the deployment and implementation of e-government projects.

From the foregoing, it can be concluded that while e-government assessment typologies have developed over time, no measurement metrics exist to assess e-government service gaps according to the best knowledge of the researcher. Consequently, failure to assess e-government service gaps "makes it difficult [for designers and implementers] to take well-founded improvement actions" (Mukamurenzi, 2019: 2) since these gaps are not obvious to them. Thus, this research is but one of many efforts in actually closing e-government service gaps in developing countries by investigating factors enhancing e-government service gaps and exploring dimensions that could contribute to the development of a multi-dimensional model in assessing e-government service gaps.

1.4 Statement of the problem

Over the past two decades, governments of many developing countries have undertaken initiatives to implement e-government projects (Bwalya, 2009; Chhabra et al., 2018; Danish, 2006; Gebba & Zakaria, 2015; Heeks, 2003; Khaemba et al., 2017; Mukamurenzi, 2019; Munyoka, 2019; Owusu-Ansah, 2014; Sigwejo & Pather, 2016; Singh & Travica, 2018; Zejnullahu & Baholli, 2017). Most developing countries have attained phases 1 and 2 of implementing e-government services, which are classified by Joshi and Islam (2018) as cataloguing and interaction respectively while few are in phase 3, which is commonly referred to as a transactional stage. However, despite the intensive efforts in the design, development and deployment of e-government projects in these countries, e-government service gaps are not closing to reflect such endeavours.

Indeed, significant e-government service gaps have been reported in extant literature (for example, Alabdallat, 2020; Baheer et al., 2020; Danish, 2006; Heeks, 2006; Madariaga et al., 2019; Zejnullahu & Baholli, 2017), and public service delivery is still an incubus in developing countries. In fact, according to Alabdallat (2020: 6), "... traditional transactions still exist and witnessed, especially in developing countries, in many forms such as papers, stamps, seals, and mobilising between departments". Predominantly, public service delivery in developing countries is still characterised by inefficient, rigid and manual systems (Yang, 2017; Singh & Travica, 2018). Hence, citizens are still required to visit respective government departments and agencies to get basic information, complete and submit forms (Agboh, 2017; Madariaga et al., 2019) or get other services that possibly can be offered electronically (Alraja, 2016; Khamis & Weide, 2017).

Furthermore, as reported by Madariaga et al. (2019), citizens still use paperwork in several everyday government procedures, from tax clearance to passport applications. Thus, there is evidence that developing countries are experiencing the existence of e-government service gaps. Accordingly, e-government service gaps in developing countries have not yet been bridged to provide comprehensive e-services. As a result, "dissatisfied citizens do not hesitate to return to traditional methods [of service delivery]" (Holgersson, 2014: 2).

Thus, this study ideated that the cornerstone to closing the e-government service gaps constitutes the development of a multi-dimensional model. This is because such a model can reveal two important aspects: (a) factors enhancing e-government service gaps from a broader perspective and (b) missing e-government services and functionalities. These two aspects are considered as a condition necessary to satisfy various user-groups of e-government and understand underlying factors that affect e-government service quality. Thus, assessment of e-government service gaps is regarded as one of the requisites in the successful adoption, implementation and effective utilisation of e-government services.

Therefore, the problem discussed above can be summarised as follows:

> *Literature reports that e-government services have been in use in developing countries for approximately two decades. Hence, consumers of government services would have expected some e-government maturity in the continuum, where e-services would have evolved to some degree. However, despite the deliberate efforts into the design, development and deployment of e-government projects in developing countries, e-government service gaps still exist.*

1.5 Main research question

Based on the summarised problem above, the central and critical research question of the study is formulated as follows:

> *Why do e-government service gaps exist in developing countries despite intensive efforts into the design, development and deployment of e-government projects?*

1.6 Research objectives

In the quest to answering the central and critical research question, this study was guided by the following objectives:

a. investigate factors enhancing e-government service gaps in a developing country context (Zimbabwe);
b. ascertain measurement dimensions from various e-government assessment typologies applicable in the assessment of e-government service gaps;

c. synthesise measurement dimensions from e-government assessment typologies into a multi-dimensional conceptual model; and
d. validate the conceptual model and modify it to become a theoretical model for assessing e-government service gaps in the context of a developing country

1.7 Significance of the study

The study was conducted to provide a multi-dimensional model for assessing e-government service gaps for a developing country to close inherent gaps within e-government services. The proposed model is multi-dimensional because it aims to combine different measurement dimensions from different evaluation metrics as well as evaluate it using multiple perspectives. Therefore, through this study, the Office of the President and Cabinet (OPC) which is responsible for the implementation, monitoring and evaluation of e-government projects in Zimbabwe will become aware of the e-government service gaps from a multi-dimensional perspective.

Furthermore, assessing e-government service gaps from a multi-dimensional perspective will provide the OPC with critical attributes and features in the implementation of e-government projects. Fundamentally, the input from various user-groups is central for improving e-services through the identification of services lacking from the current e-government systems/projects. Thus, knowing the services and/or information needs of different user groups is also important in developing and deploying successful e-government projects. Governments can use this information to improve the performance of e-government systems.

The other importance of this study lies in the view that no existing studies have proposed a model for assessing e-government service gaps from the context of a developing country. Therefore, this study provides an opportunity for developing countries where e-government is still maturing to avoid mistakes of the early adopters. Thus, the multi-dimensional model is a significant intervention for improving e-government adoption and implementation as well as enhancing the quality of e-government services, user satisfaction and e-government maturity in a developing country. Beyond the scope of this study, the research is significant in advancing knowledge in theories of service quality, service gaps and user satisfaction.

1.8 Assumptions of the study

Every scientific inquiry inevitably takes many things for granted; this makes what is commonly referred to as assumptions (Siddiqui, 2019). Although the need to prove that the assumptions are true might be of minimum value, assumptions must be supported to make them valid. Furthermore, the chain of assumptions must be established to avoid "infinite regress" (*ibid*). As suggested by Hansen and Kræmmergard (2014), the chain of assumptions in a study should include the following: general methodological assumptions; theoretical assumptions; topic-specific assumptions; and assumptions about measures to be used in the study. Besides, the researcher proposes a fifth assumption, which is the researcher's assumption. The assumptions are presented in Figure 1.2 and explained in the following subsections:

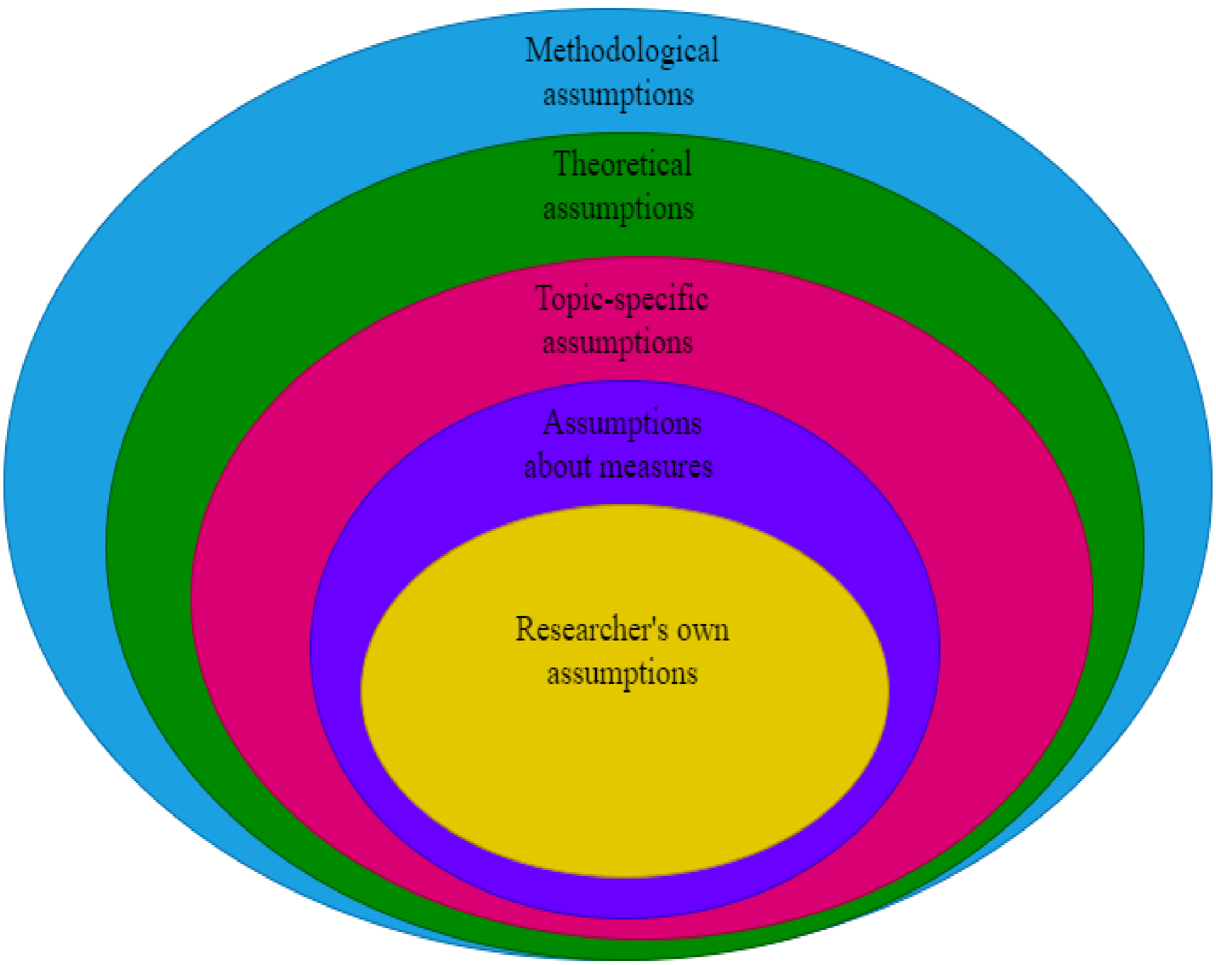


Figure 1.2: Research assumptions

1.8.1 Methodological assumptions

- The use of multi-methodology design will enable consistency of reality in the study of e-government service gaps in the developing context since the object of inquiry/phenomenon could be explored from multiple perspectives.
- Both the researcher and the participants will influence the outcome of the study because data will be collected based on dialogical interactions
- There is a linear relationship among study variables since the dependent variable (e-government service gaps) does not affect both the independent variable (system functionality and service delivery) and moderating variables (factors enhancing e-government service gaps).
- The interview participants will answer truthfully because participation in this study is strictly voluntary and strict confidentiality is guaranteed to participants.
- The respondents will fully understand the questions they will be asked because of the validity of the questions and the high literate rate among the respondents.
- The respondents will make an earnest effort to fill out the questionnaire survey to their best abilities and truthfully because of their ability to read and understand the English language.
- The inclusion criterion of the sample is suitable; as a result, the researcher is assured that all the participants have a shared experience about the phenomenon of the study.
- The number of interview participants and respondents is adequate for reaching data saturation and generalisation of the study findings because the sampling techniques conform to the requirements of both data saturation and generalisation of results.

1.8.2 Theoretical assumptions

- Theories and conceptual models are mandatory ingredients in the development of knowledge in information systems research because they serve as blueprints in designing research.
- The conceptual model developed in Chapter Three is not exhaustive in assessing e-government service gaps in developing countries since it only focuses on the findings of the literature review and not the contextual issues of a developing country.

- There is no model which is exhaustive in assessing e-government services because the expectations and values of users are evolving, dynamic and context-dependent.

1.8.3 Topic-specific assumptions

- Developing countries lag behind developed countries in terms of technological investments, human capacity development, e-readiness, e-participation and e-services due to delayed modernisation.
- E-government assessment typologies from developed countries are not suitable for adoption in developing countries since they lack empirical evidence of developing contexts.
- The study anticipates that some of the factors enhancing e-government service gaps will emerge from the data collected using in-depth semi-structured interviews and expert review because of the open-ended nature of the research instruments.
- The success of e-government projects is influenced by its immediate context. This implies that the factors enhancing e-government service gaps have different intensity.

1.8.4 Assumptions about measures

The data collected using interviews, questionnaires and expert review will make it possible for the researcher to fulfil the objective of the study because the research instruments will be tested for validity and reliability prior data collection phase.

1.8.5 Researcher's assumptions

Our minds have limitations in knowledge acquisition. The explanations and solutions we get depend on the questions we ask. The fact that we do not know that something exists does not mean it is non-existence; hence, we conduct a scientific inquiry to discover what we do not know and gain new knowledge about a phenomenon.

1.9 Delineation of the study and justification of multiple perspectives

Studying several aspects of single research may result in research complexity. Therefore, each phenomenon should be studied with certain confines that enable the researcher to remain focused. Currently, the government of Zimbabwe has implemented several e-government projects in various ministries, departments and agencies (MDAs). These include Online Passport Application System, e-Taxation, and E-health at Chitungwiza, Online Liquor Application System, Public Finance Management System (PFMS), E-Visa and High-Performance Computing System (HPCS). This study, however, does not intend to study the entire e-government in Zimbabwe, rather the study focused on the e-Taxation system. E-Taxation was selected because, among the e-government systems in Zimbabwe that have been implemented to date, e-Taxation is the only system that is being used by government agencies, the business, and citizens (see Figure 1.3). Hence, it presents a relevant case for understanding the e-government phenomenon from a wider perspective.

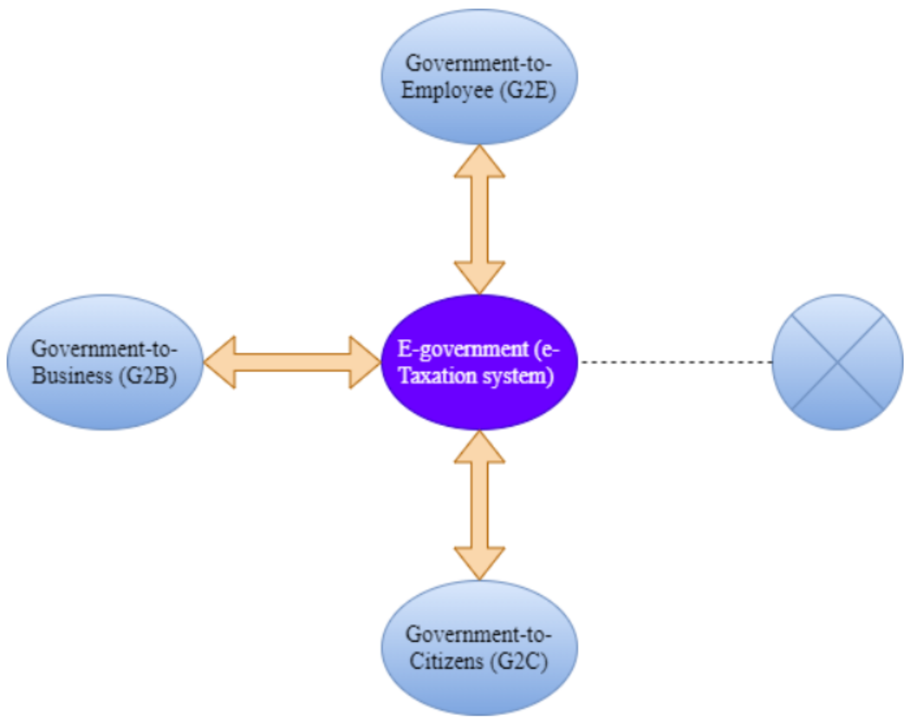


Figure 1.3: Research scope

Accordingly, the study focused on multiple perspectives; shifting from previous studies which have assessed e-government in isolation by focusing their assessment effort on a single perspective (single user-group). Mostly, e-government assessment metrics have been centred on citizens' perspectives despite the importance of other user groups. While it is imperative to develop assessment metrics that address the needs of a specific e-government user-group, focusing on a single perspective does not give a 'perfect' and 'balanced' assessment of an e-government system. This is because a single perspective may be relevant to one group, but not necessarily be regarded as having the same degree of importance and impact on other user groups.

1.10. Thesis structure

The organisation of this thesis is based on the four elements proposed by Estelle and Derek (2005) in their handbook on *"How to get a PhD: A handbook for students and their supervisors"*. Overall, this thesis structure consists of nine unified chapters within four main parts in which apiece they discussed a particular subject related to the objectives of the study stated in Section 1.6. The conceptual structure of the thesis is presented in Figure 1.4 while the overview of the chapters is given afterwards.

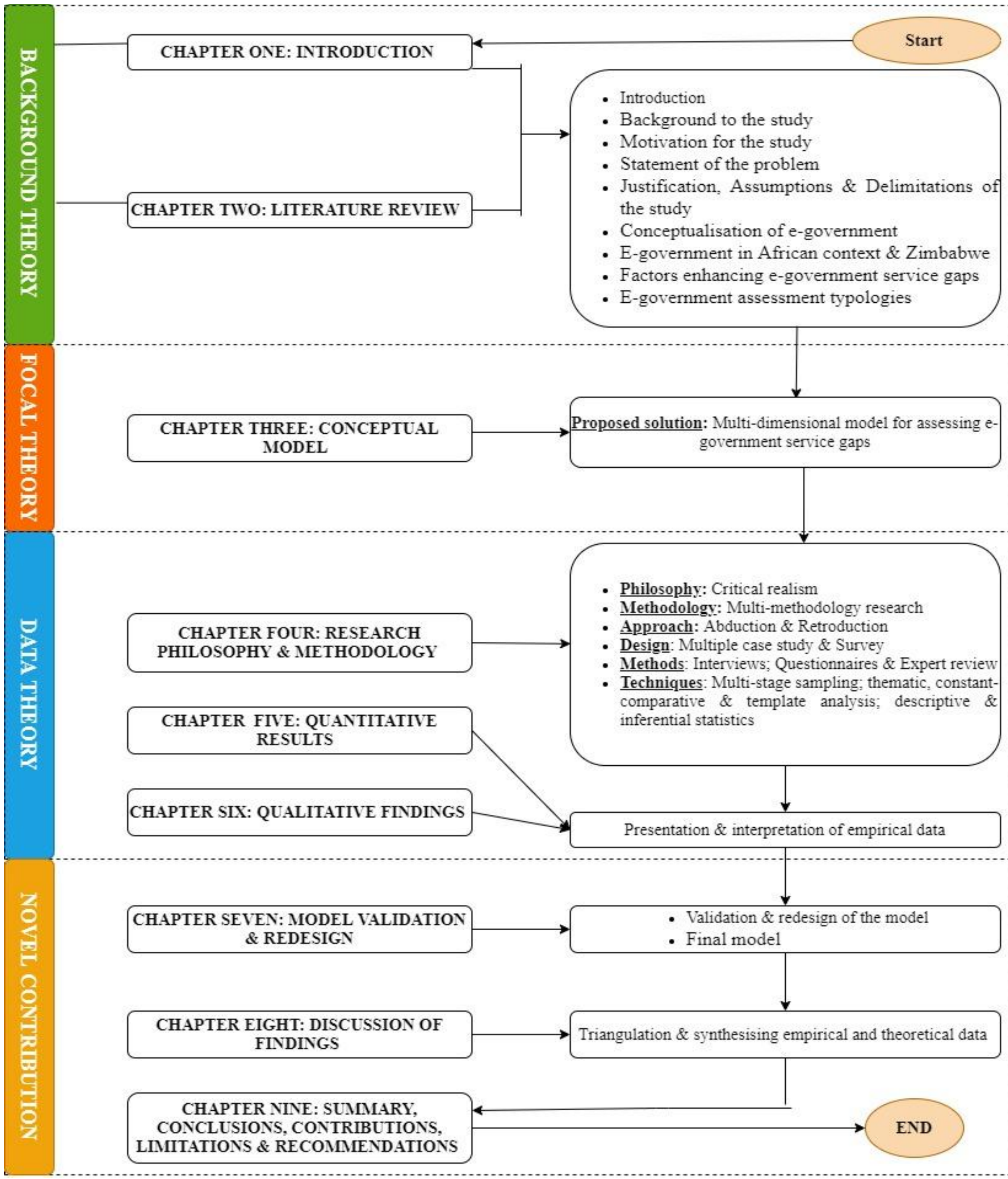


Figure 1.4: Research structure

CHAPTER ONE: INTRODUCTION-BACKGROUND THEORY

Chapter One introduced the topic and provided several motivations for conducting this study. Furthermore, the chapter presented the following items: background to the study; statement of the problem; main research question; research objectives; the significance of the study;

assumptions and delineations. Lastly, the study presented a conceptual structure (organisation) of the entire study.

CHAPTER TWO: LITERATURE REVIEW - BACKGROUND THEORY

This chapter attempts to flesh out the background of the study. The chapter presents a comprehensive appraisal and critical analysis of extant literature on e-government evaluation. The chapter also intended to build a background theory on e-government evaluation to be used in the development of the conceptual model for assessing e-government service gaps in Chapter Three. The chapter begins by discussing how the concept of e-government has evolved to transform the public service delivery system to be efficient and transparent. This is followed by various definitions that explain the concept of e-government. The chapter also presents the service delivery models of e-government based on the broad outcomes and nature of interactions respectively. Furthermore, the chapter presented an overview of e-government in developing countries, particularly in Africa and Zimbabwe. In an attempt to provide preliminary answers to the first research objective of the study, the literature discussed various factors that obstruct the implementation and adoption of e-government in the developing context. To contribute to the on-going research in e-government assessment as well as attempt to answer the second research objective, the chapter also examined the current e-government assessment typologies and their associated dimensions and constructs. In the end, a detailed summary is presented to conclude the chapter.

CHAPTER THREE: CONCEPTUAL MODEL - FOCAL THEORY

In Chapter Three, the study focused on exploring and synthesising dimensions and constructs from various e-government assessment typologies that could contribute to the development of a multi-dimensional model for assessing e-government service gaps. Thus, the synthesis of measurement dimensions from various assessment typologies was expected to result in a conceptual model. Dimensions and constructs from e-government assessment typologies together with factors that obstruct the effective implementation and utilisation of e-government were synthesised to develop the conceptual model of the study. Accordingly, Chapter Three aimed at answering the second and third research objectives of the study; as a result, providing a conceptual model for guiding further inquiry. The conceptual model was examined in Chapters Five and Six while the validation and redesign took place in Chapter Seven.

CHAPTER FOUR: RESEARCH PHILOSOPHY & METHODOLOGY – DATA THEORY

Chapter Four constituted two central components; research philosophy and research methodology. Firstly, the chapter discussed various research philosophies applicable in information systems research before justifying the selection of critical realism and its underlying tenets. Secondly, the chapter looked at the use of the multi-methodology together with its research methods and techniques. The case study and survey strategies were used with an in-depth interview and web-based questionnaires respectively. In-depth interviews were used to gain a comprehensive understanding of factors enhancing e-government service gaps in a developing context, a purpose that could not be achieved through the use of structured research methods. Also, questionnaire surveys were used to examine the factors enhancing e-government service gaps and evaluate dimensions for measuring service gaps. In-depth interviews and web-based questionnaires together with feedback from expert reviews were used to validate the conceptual model presented in Chapter Three.

CHAPTER FIVE: QUANTITATIVE RESULTS – DATA THEORY

Chapter Five presented the findings of the quantitative empirical data obtained using a survey questionnaire. The chapter included an examination of the factors and constructs presented in the conceptual model. Factors enhancing e-government service gaps and constructs for measuring e-government service gaps were presented using descriptive statistics (mean and standard deviation) and validated using principal component analysis, correlation and regression analysis. All the dimensions and constructs presented in the conceptual model were found to be significant; hence, there were considered for inclusion in the final model in Chapter Seven (see Figure 7.2). However, a quantitative study could not offer an in-depth understanding and reflection on these factors in the context of a developing country since it was guided by the findings of previous research. Therefore, it is worthwhile noting that a qualitative study was necessary to reveal new insights about these factors.

CHAPTER 6: QUALITATIVE FINDINGS – DATA THEORY

Chapter Six presented the findings obtained from the analysis of interview data that investigated the factors enhancing e-government service gaps in the context of a developing country. Based on the findings from interview data the following modifications were made: infrastructure to lack of requisite infrastructure; interoperability to lack of interoperability; digital divide to lack of access; and policy to policy inconsistency. Furthermore, the following new factors that were not included in the conceptual model in Chapter Three emerged from the interview data: lack of e-government funding; budget disparity; lack of the desire to support and coordinate e-government; design reality gap; and lack of user involvement. These findings were considered in the modification of the conceptual model (see Figure 7.2).

CHAPTER 7: MODEL VALIDATION REDESIGN – NOVEL CONTRIBUTION

In Chapter Seven, feedback from the expert reviewers were presented and analysed based on quality parameters, strength and weaknesses of the model. During the validation of the model, several weaknesses were observed by experts and this led to model redesign. However, weaknesses of the model that uncovered the areas of improvement were checked with literature to justify the inclusion of the suggested dimensions or constructs. Based on the suggestions of the expert reviewers two dimensions (compatibility and security) were added under system functionality while one factor (lack of developed IT human capacity) was added under factors enhancing e-government service gaps (see Figure 7.2). Thus, chapter redesigned the proposed model depicted in Chapter Three based on the key findings of the questionnaire survey, in-depth interview and expert review.

CHAPTER 8: DISCUSSION OF FINDINGS – NOVEL CONTRIBUTION

Chapter Eight presented the discussion of key results and findings of the quantitative and qualitative empirical data (Chapters Five and Six) by reflecting on the convergence and divergence of views of different cases as well as reflecting prior literature where applicable. Mainly, the chapter attempted to answer the research objectives of the study by discussing the following two major components and their supporting elements: (a) factors enhancing e-government service gaps, and (b) dimensions for measuring e-government service gaps.

CHAPTER 9: CONCLUSIONS AND CONTRIBUTIONS –NOVEL CONTRIBUTION

Chapter Nine sought to provide a summary of the entire study. Furthermore, the chapter offered several conclusions of the study based on the discussion of the results and findings. The chapter also presented novel contributions of the study in three folds: pragmatic world; knowledge domain and philosophy of science. Furthermore, the most important limitations encountered in this study were outlined followed by the suggestions for further research. Lastly, the last section presented a summary of the chapter.

CHAPTER TWO

LITERATURE REVIEW

> "If I have seen further, it is by standing on the shoulders of giants" (Sir Isaac Newton) "… the presence of existing knowledge legitimises a research area by underscoring the intellectual resources devoted to it and, at the same time, provides a theoretical orientation for present investigations" (Locke & Golden-Biddle, 1997: 1029).

2.1 Introduction

This chapter presents a comprehensive appraisal and critical analysis of extant literature on e-government evaluation. The purpose of this critical examination of literature is to mount an argument towards the claim that significant gaps in e-government services exist in developing countries. Primarily, the chapter builds on the studies that have been conducted in developing countries which is the research context of the study. However, part of the literature from developed countries has been included to augment global coherence in advancing knowledge in e-government evaluation. The chapter also intends to build a background theory on e-government evaluation to be used in the development of a conceptual model for assessing e-government service gaps in Chapter Three.

Studies in e-government are characterised by a number of assessment typologies and theories, mostly focusing on adoption, benefits, challenges, implementation and user acceptance. Nevertheless, while e-government research has evolved, no studies have explicitly focused on factors enhancing e-government service gaps as well as developing a model for assessing these gaps according to the best knowledge of the researcher. Therefore, apart from mounting an argument about the persistence of the existence of e-government service gaps, the chapter also intended to summarise and interpret what is already known about e-government evaluation. This is critical in developing the conceptual model for assessing e-government service gaps in the next chapter as well as answering the main research question of the study presented in Chapter One. The literature review in this chapter is delimitated into four fundamental sections or body of knowledge as follows:

The first section provides a conceptualisation of e-government. The purpose is to discuss various critical themes that are related to the e-government phenomenon. These include the e-government concept, definition of e-government, e-government services, and e-government service delivery models. Secondly, the chapter reports on the state of e-government in developing countries, with a focus in the African context. This is followed by the factors enhancing e-government service gaps and a discussion on e-government assessment typologies that are in place and that are used as reference points to develop the conceptual model in Chapter Three. The chapter ends with a detailed summary of what was discussed in this chapter and a glance of the next chapter. Figure 2.1 shows the chapter outline to guide the reader throughout the chapter.

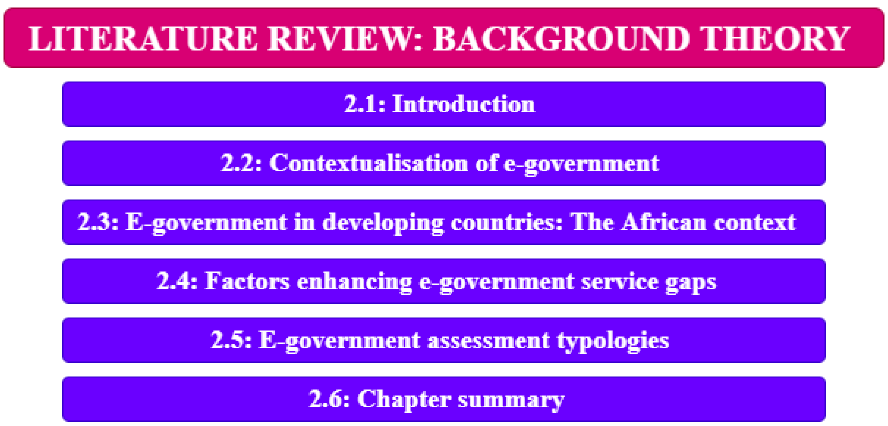


Figure 2.1: Chapter outline

2.2 Contextualisation of e-government

To contextualise e-government, the researcher will present the following four elements: e-government concept; definition of e-government; e-government services; and e-government service delivery models.

2.2.1 E-government concept

Globally, the discourse of e-government has gathered momentum in the public service delivery (Alabdallat, 2020; Almutairi et al., 2020; Jacob et al., 2019; Lee & Porumbescu, 2019; Lindgren et al., 2019; Mukamurenzi, 2019; Sánchez-Torres & Miles, 2017; Twizeyimana & Andersson, 2019). Government departments and agencies are now using ICTs to deliver government services electronically to various stakeholders. Thus, it is no doubt that the use of ICTs has significantly changed the way government services are processed, packaged and delivered to the business and citizens. Hence, the proponents of e-government suggest that the espousal of ICTs in government departments and agencies have revolutionalised public service delivery (Ajibade et al., 2017; Bwalya, 2009; Dibie & Quadri, 2018; Madariaga et al., 2019; Muhammad, 2013; Owusu-Ansah, 2014; Palvia & Sharma, 2007). As a consequence, this gives credence to the fact that the spill of ICTs into the public sector has resulted in the birth of e-government and new models of public service delivery.

By its very nature, e-government constitutes a fundamental transformation in public service delivery (Alabdallat, 2020; Alassim & Alfayad, 2017; Mergel et al., 2019). It enables the government to provide relevant information and services in electronic form and in a timely manner (Carter & Bélanger, 2005; Susanto & Aljoza, 2015; Vejačka, 2018), eliminate paper-based services (Mubuke et al., 2017) and face-to-face interaction with citizens (Kaushal, 2016). Essentially, a common feature of e-government is the automation of existing paper-based procedures to enhance access to and delivery of government services to the business and citizens. Actually, the paperless office improves access to government information and services (Mukamurenzi, 2019). According to Gilmore and Souza (2006: 2), "[the implementation of e-government] enables citizens and other entities to access public services online". Thus, the adoption of e-government is expected to result in improved service delivery.

Not only does e-government transform public service delivery, but also the interaction with government, business and citizens. In simple terms, e-government alters the way governments operate internally and externally. Therefore, by implementing e-government, the emphasis is also put on how to transform both internal and external relationships of governments (Alassim & Alfayad, 2017; Almutairi et al., 2020; Janowski, 2015; Mees et al., 2019). According to Baeuo et al. (2016), the idea of e-government stresses the use of ICTs in improving relations among government departments and agencies; between government and business; and between government and citizens. This is mainly facilitated by e-government delivery models such as Government-to-Government, Government-to-Employees, Government-to-Business and Government-to-Citizens (see Section 2.3.4). Indeed, e-government is playing a critical role in transforming government interactions with businesses and citizens.

Furthermore, another key strategic objective of implementing e-government is to promote efficiency and transparency in public service delivery (Ahmad et al., 2019; Bayona & Morales, 2017; Sánchez-Torres & Miles, 2017). In fact, the emergence of e-government was actually a response to make government departments and agencies more efficient and open in public service delivery by utilising ICTs to provide services electronically (Sharma, Bao & Peng, 2014). Ideally, e-government is expected to decrease travelling costs, reduce waiting time for the service, reduce operational time, decrease corruption and cost in service delivery, increase transactional capabilities and convenience and improve accessibility (Alabdallat, 2020; Dewa & Zlotnikova, 2014; Kalu & Masri, 2019; Nabafu & Maiga, 2012). For these reasons, the concept of e-government is treasured for being evolutionary, transformational, efficient and transparent. All these elements form the underlying global aim for the adoption and implementation of e-government. From this e-government concept, the researcher presents a model that depicts the current concept of e-government (Figure 2.2).

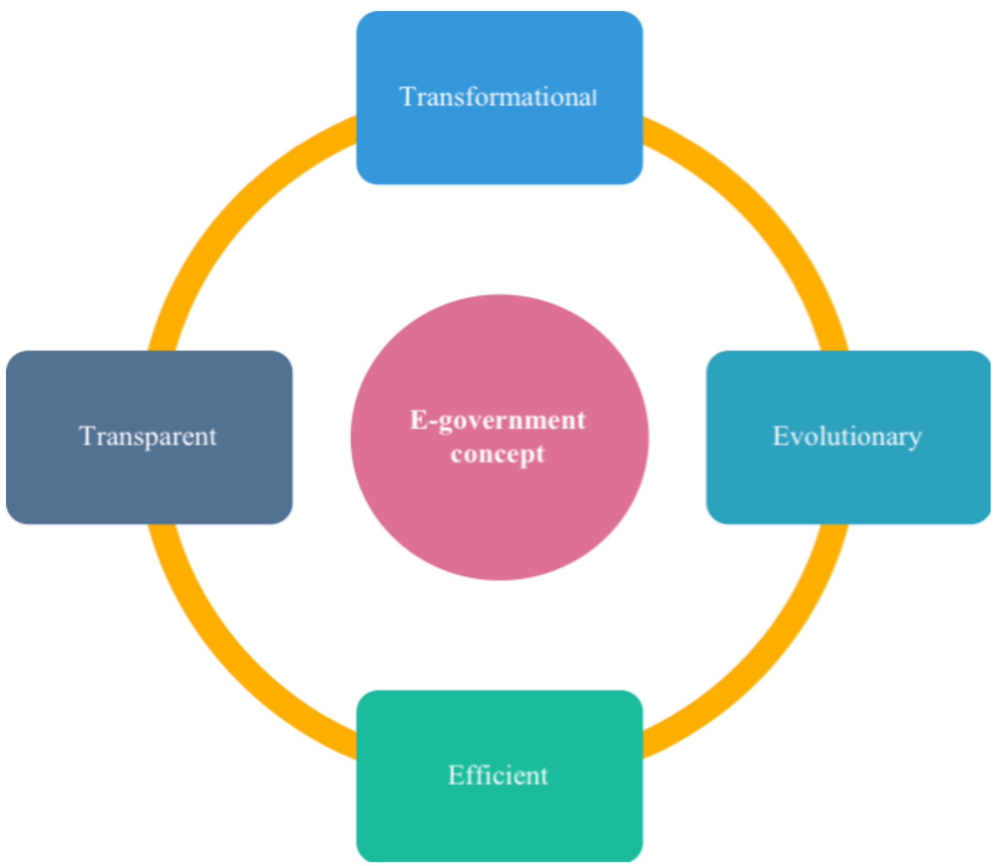


Figure 2.2: The concept of e-government

However, despite the presence of the aforementioned benefits of e-government, Joshi and Islam (2018) argued that citizens in developing countries still prefer to interact physically with government departments and agencies. This practice suggests two important realities: either e-government systems are deployed with substantial service gaps or citizens have little value on e-government services. Subsequently, service gaps and little value discourage the use of e-government services. Thus, the quality of e-government service and value created by the users should exceed traditional services; otherwise, users will not re-use the service. This demonstrates that the desires to use e-government are partly influenced by service quality and value-laden elements. Hence, it is imperative that any e-government project ought to undergo adequate assessment to determine whether or not it is meeting user expectations.

2.2.2 Definition of e-government

For more than two decades, authors and practitioners concerned with e-government have been in a lengthy attempt to define e-government and develop metrics to measure it (Abdelkader, 2015; Abbassy, 2016; Chipeta, 2018b; Nurdin, Stockdale, Scheepers & Stockdale, 2011; Zakaria, 2014). Nevertheless, just what the term means and how it informs measurement metrics remain unclear. Incredibly, the definition of e-government is essential when a new measurement metric for evaluating e-government is to be designed; lack of a clearly defined e-government might contribute to the development of a measuring instrument with narrow dimensions (Abdelkader, 2015). The literature reveals diverse definitions about e-government and it is clear that the phenomenon has different meanings to different people and organisations. However, both in theory and practical terms, no single definition has been more acceptable than others. Researchers usually make sincere efforts to formulate their own definitions or modify the existing ones to suit their objects of inquiry.

According to Nurdin, Stockdale, Scheepers and Stockdale (2011), e-government is a government service that is administered using ICTs, with the internet as a predominant platform. An affix is added to the term government to emphasise the delivery of services and information through electronic means. A more similar definition is provided by Abbassy (2016) who defined e-government as the provision of government information and services using ICTs. As well, Zakaria (2014) considers e-government as the utilisation of technology in public service delivery by defining it as a public system that uses ICTs to provide different services to the citizens.

On the same note, Barthwal (2003) defined e-government as the use of information technologies such as wide area networks (WAN), the internet, and mobile computing by government agencies to relate with businesses, citizens and other arms of government. Besides, Lindgren and Jansson (2013) defined e-government as the use of ICTs and the internet's ability to enhance the access to, and delivery of, government services and operations for the benefit of citizens, businesses, employees and other stakeholders. The common aspect of these definitions is that they all point to the use of technology by the government to deliver public services. Thus, e-government is regarded as simply a process of computerising government systems. Loosely, the definitions presented above focus on the processes rather than the broad objectives of e-government.

Contemporary literature, however, offers more broad definitions. For instance, e-government has been defined in the recent literature as the use of ICTs by the government to transform the internal and external relationships of government (Chipeta, 2018b); deployment of ICTs in the public sector so that citizens and business entities can interact and transact with the government electronically (Abraheem & Adams, 2016); a radical change in public service delivery (Guenduez et al., 2018); the method and arrangement to deliver government services electronically (Twizeyimana et al., 2018). Obviously, while this is not a complete list, both primordial and contemporary literature demonstrates that e-government has no generally accepted definition.

Nevertheless, given the purpose of this study, e-government is defined as follows:

> E-government is a digitally enabled public service and information delivery platform aimed at transforming government structures, functions, processes and procedures so that businesses and citizens can interact and transact electronically, efficiently and seamlessly with government agencies based on various delivery models.

This definition emphasised on digitally-enabled platforms for the following entities: interaction with government agencies, businesses and citizens; service and information delivery and digital transformation; and efficiency and seamlessness in service delivery. In fact, this definition intends to promote the implementation of an e-government system that provides ‘one-stop’ shop which is key in enhancing user satisfaction and closing service gaps.

2.2.3 E-government services

Generally, an e-government service is a service that is delivered electronically by the government to various stakeholders using multiple electronic channels such as internet, email, interactive voice response system and digital television. It is a service that enables government agencies, business and citizens to achieve their transactional needs with the government. Fan and Yang (2015) define e-government service as a service moved from physical access to online so that it can be obtained anytime and anywhere. E-government services include, but not limited to, the following: e-taxation, e-visa, e-police, e-procurement, e-bidding, e-voting, e-planning, e-jobs, e-health, e-democracy, e-forums and e-learning (Khanra & Joseph, 2019; Mellouli et al., 2016; Zautashvili, 2018). The emergence of e-government makes these processes efficient and transparent to the users. Thus, e-government services at this point mainly refer to electronically enabled services provided by various government departments and agencies to businesses and citizens.

The interaction of government with major actors in the society such as business, citizens and many other entities that require government services has led to the creation of e-government services to meet the demands and expectations of all these actors (Danila & Abdullah, 2014; Jacob et al., 2019; Khanra & Joseph, 2019; Li & Shang, 2020; Twizeyimana & Andersson, 2019). Its emergence thus makes the process of service delivery faster, transparent and more convenient and efficient and increases government accountability, too (Dibie & Quadri, 2018; Owusu-Ansah, 2014; Rana & Dwivedi, 2015). More importantly, according to Haider, Chen, Lalani and Mangi (2015), e-government is developed mainly based on three categories of stakeholders: business, citizens and other government agencies.

2.2.4 E-government service delivery models

In this subsection, the researcher gives an overview of different e-government service delivery models that define the interactions among governments, businesses, citizens and employees. Accordingly, the transformation drive in public service is facilitated by the following e-government delivery models: Government-to-Government (G2G); Government-to-Employees (G2E); Government-to-Business (G2B); and Government-to-Citizens (G2C) (Ahmad et al., 2019; Ramdan et al., 2014; Voutinioti, 2014). G2G represents the backbone platform for e-government adoption, implementation and utilisation in the entire country (Voutinioti, 2014). In simple terms, the model refers to the inter-agency and departmental relationships to enhance online collaboration among these units. This model aims to deploy e-government systems in various government departments and agencies so that they can share data and work closely to better serve the citizens (Joshi & Islam, 2018).

In contrast, G2E represents an internal relationship between the government and its employees (Ramdan et al., 2014). The model represents an internal relationship between the government and its employees (Joshi & Islam, 2018). The focus in this model is in twofold: first, the model provides a platform in which employees can interact with the management and among themselves as well as get access to new policy pronunciations and opportunities for growth. Secondly, online services such as application transfers, leave application, among other services are offered to the employees. Thus, G2E is an employee-centric service delivery model.

G2B service delivery model denotes an online platform that enables government and business organisations to do business electronically (Ahmad et al., 2019). It is the most important facet for electronic transactions because it creates a faster, more cost-effective and transparent procedures in handling the routine functions for services such as procurement and taxation. According to Heeks (2006), G2B is the most important e-government delivery model because it enhances the country's economic growth by eliminating burdensome procedures for opening business. This is relatively important for developing countries that are craving for direct foreign investments. This view finds support from Chipeta (2018b) who reported that G2B e-government demonstrates a strong desire by the government to reduce or eliminate unwieldy processes and procedures that are likely to stifle investments in developing countries.

Lastly, G2C ensures that the citizens interact and transact with government far and wide (Ramdan et al., 2014). The model has been perceived by e-government literature as the primary objective of implementing e-government projects (Abu-shanab & Khasawneh, 2013; Alguliyev et al., 2018; Fan & Yang, 2015) because it depicts a citizen-centric e-government approach, although this view was strongly disputed by Heeks (2006). Nevertheless, some proponents of e-government maintain that 'one-stop' shop is one of the aims for deploying e-government systems so that citizens obtain services from various government agencies through a single platform or contact with the government (Butt, 2014; Ramdan et al., 2014).

Various studies have observed that e-government delivery models are widely used to demarcate e-government and form the basic models of assessing, evaluating and delivering e-government services (Bayona & Morales, 2017; Ramdan et al., 2014). However, Al-Balushi et al. (2016) argued that as e-government service delivery models mature, progressively, their services may enter into overlaps. Nevertheless, whether the services overlap or not, the models are susceptible to service gaps if they are not properly implemented. Hence, service gaps are evaluated across e-government delivery models.

In view of that, the study proposes a model that will focus on multiple e-government delivery models (G2G, G2B and G2C); thus, shifting from previous studies which have traditionally evaluated e-government in isolation by focusing their assessment effort on a single delivery model. Mostly, e-government assessment metrics have been centred on G2C even though the majority of e-government systems are designed with multiple delivery models (Ahmad et al., 2019). Hence, assessing e-government service gaps from multiple e-government delivery models are critical in determining service deficiencies from an e-government system in its entirety.

2.3 E-government in developing countries: The African context

This section reports on the state of e-government in developing countries, with a focus in the African context. This is because the researcher takes cognisance of different classification of developing countries. Accordingly, developing countries are classified into four regions as follows: Latin America and the Caribbean; East Asia; South Asia; and Africa (Fialho, & Van

Bergeijk, 2017). This classification is important in focusing the review to a particular context of the developing countries; thereby, avoiding an ‘overly’ generalised reporting on e-government services in developing countries.

E-government services have been in use in developing countries for approximately two decades (Enaw et al., 2016; Verkijika, 2018). Developing countries have been initiating e-government strategies and projects as a way to promote a “connected government” or at the very least, a “digital government” (Kasadha, 2018). Most governments in developing countries have made significant progress in deploying services online with varying outcomes and impact. Almost every country have running websites in various ministries and government departments and agencies (Kirui & Kemei, 2014; Rorissa & Demissie, 2010).

According to Ruhode (2013), e-government for developing countries presents some hopes and opportunities for improving public service delivery. Certainly, e-government has also gained visibility in developing countries and according to Enaw, Check and Teke (2016: 352) it is expected to “enhance greater efficiency, improve public service delivery, reduce corruption and enhance engagement with citizens”. However, slow progress in the deployment of e-government services has been reported as a topical issue in e-government research. Studies have confirmed that most of the government services are still unavailable online (Humphrey et al., 2016; Rabaa et al., 2018; Sarrayrih & Sriram, 2015; Singh & Travica, 2018; Twizeyimana et al., 2018). Even though the implementation of e-government in developing countries varies from country to country, the majority of countries are at stages 1 and 2 while few have reached stage 3 (Perkov & Panjkota, 2017). According to Perkov and Panjkota (*ibid*), no developing country has reached stages 4 and 5 in the implementation of e-government systems. This finds support in El gohary's (2017) survey in that the development stage of e-government services in Africa has hardly reached the integration stage. In that context, e-government services in developing countries are less integrated compared to those in developed countries (Joshi & Islam, 2018). Thus, this suggests that there are e-government service gaps in developing countries.

Meaningful steps have not been taken to scale up e-government services (Joshi & Islam, 2018). Developing countries are ranked lowly in globally EGDI due to deficiencies in e-services. In fact, El gohary's (2017) report on EGDI reveals that about 87 per cent of African countries are in Low-EGDI-level group. According to the same report, only six African countries are in the High-EGDI level group. These include Ghana, Mauritius, Morocco, Seychelles, South Africa, and Tunisia. On average, African countries have an EGDI of 0.3433 which is not only below the expected average of 0.5 but below the rest of the world (El gohary, 2017). Thus, the report concluded that the African region lags in e-government development compared to the rest of the world.

In the same vein, Chipeta (2018a) and Aneke (2019) revealed that developing countries are still lagging in delivering government services online; there is limited conquest in Africa in the development and deployment of the e-government services. The implementation of e-government in developing countries are either slow or stagnant (Enaw et al., 2016). Basic e-government services are still not easy to find in African countries; only limited services are offered online (Agboh, 2017; Mukamurenzi, 2019; Owusu-Ansah, 2014; Twizeyimana et al., 2018; Verkijika & De Wet, 2018). In reality, e-government services are partially delivered and little progress has been done to scale the deployment of e-services. As a consequence, most government services are still provided manually and they are not comprehensive enough to satisfy the needs of the users. Probably, this is the reason why developing countries have the lowest e-government service development intensity.

2.3.1 E-government services in Zimbabwe: The research context

Zimbabwe is a developing country currently focusing on the deployment of ICT infrastructure and e-government services. Like many other developing countries, Zimbabwe is implementing e-government projects/systems as part of the public sector reforms to improve service delivery among government departments, agencies, businesses and citizens (Munyoka, 2019; Nhema, 2016). Recognising the critical role of ICTs in public sector transformation, the government of Zimbabwe has made several remarkable strides in the deployment of e-government projects. The major target of the public sector reforms in the context of e-government is to exterminate institutional constrictions related to the conventional methods of public service delivery. In implementing e-government, the government also sought to reduce government institutions' operational costs, bring government closer to the business and citizens and avoid fragmentation and duplication of services (Atef & Al Mutawkkil, 2019). This would ensure that the focus of the country is to achieve a connected government amongst many other objectives. The implementation of the e-government programme was also anticipated to bring convenience to the business and citizens as these are anytime and anywhere services

The development of e-government services is coordinated by OPC. The E-Government Framework and Implementation Strategy (EGFIS) of 2011–2015 have been the key reference and guiding policy for the implementation of e-government projects in Zimbabwe. The Government of the Republic of Zimbabwe through OPC, the Ministry of Information Communication Technology, Postal and Courier Services (MICTPCS) and the Ministry of Finance and Economic Development (MFED) agreed to develop and implement nine (9) e-Government Flagship Projects in 2012. A contract was signed between the Government and Twenty Third Century Systems (TTCS) through the OPC. This meant that the implementation of the e-government project will be driven by four institutions mentioned above.

The development of the nine flagship projects started at the end of 2013 and the following flagship projects was identified as the Proof of Concept (PoC):

- Chitungwiza Hospital – Industry Solution for Health Care System;
- Public Service Commission – Human Capital Management System;
- Liquor Licensing Board – Online Liquor Licensing;
- Zimbabwe Investment Authority – Online Investor Licensing;
- State Procurement Board (SPB) Now Procurement Regulatory Authority (PRAZ) – Supplier Relationship Management and Online Procurement;
- Ministry of Mines and Mining Development – Fleet Management and Online Mine and Mining licensing;
- Ministry of Lands, Agriculture, Water, Climate and Rural Resettlement – Real Estate Management;
- Cabinet Secretariat –Office Automation; and

- Registrar of Deeds, Companies and Intellectual Property – Customer Relationship and Online Company Registration

The purpose of the flagship projects was to demonstrate the feasibility of implementing e-government in Zimbabwe. Apart from the flagship projects, the following systems have been deployed: e-visa application, online passport application system, e-taxation and central vehicle registry. Nevertheless, most of the flagship projects and many other e-government projects deployed in Zimbabwe are still in the initiation phase; that is, phase 1; they are yet to scale-up beyond this phase. Even though the country seems to be committed to the implementation of e-government projects, still, the progress towards e-government does not reflect the objectives of the country's e-government framework, that of networked and seamless services which are the ultimate maturity levels of any e-government. The ability to provide comprehensive e-services is still not attainable; hence, the existence of e-government service gaps.

Thus, Zimbabwe compares relatively low with other countries in the world, the African continent as well as in the Southern African Development Committee (SADC) region (Munyoka, 2019). In fact, by 2018, the country was ranked 146 out of 193 in EGDI and last in SADC while the Online Service Index (OSI) stood at the mean value of 0.3246 (Dias, 2020). This shows that the country is lagging in the deployment of e-government services; thus, this ranking reflects serious concerns in providing comprehensive e-government services in Zimbabwe. Besides, it has been observed that people continue to visit government offices physically to get basic services that could be provided remotely using online platforms or mobile applications. This fact implies that a step forward should be made to establish factors that cause e-government service gaps to exist in developing countries as well as assess these gaps. Thus, the reasons for the low ranking of e-government in developing countries can only be understood if the various factors enhancing e-government service gaps are investigated. Hence, the next section discusses factors enhancing e-government service gaps in developing countries.

2.4 Factors enhancing e-government service gaps

Practically, e-government systems are considered successful, partially successful, partially failure or total failure depending upon the magnitude of service gaps. Actually, according to Heeks:

> "E-government success and failure depend on the size of the gap that exists between 'current realities' and 'design of the e-government project'. The larger this design-reality gap, the greater the risk of e-government failure; equally, the smaller the gap, the greater the chance of success" (Heeks, 2003: 3).

In an attempt to provide preliminary answers to the first research objective of the study, this section examines various factors that obstruct the implementation and adoption of e-government in the developing context. An understanding of the factors enhancing e-government service gaps is crucial for the development of intervention mechanisms for improving the design and deployment of e-government projects. However, since no studies have explicitly focused on exploring factors enhancing e-government service gaps, this study zoomed on the following literature: challenges in the implementation of e-government services (Aneke, 2019; Munyoka, 2019; Nawafleh et al., 2012; Nurdin et al., 2011); challenges to the successful implementation of e-government initiatives (Abu-Shanab & Khasawneh, 2014; Al-Ghaith et al., 2010; Alabdallat, 2020; Dhonju & Shakya, 2019; Pederson, 2016; Sarrayrih & Sriram, 2015); success factors on e-government implementation (Idoughi & Abdelhakim, 2018; Le Blanc & Settecasi, 2020; Nawafleh et al., 2012; Shatat, 2017; Yera et al., 2020); the failure of e-government in developing countries (Danish, 2006; Heeks, 2003; Khadaroo et al., 2013; Mercy, 2013); e-government development issues and challenges (Abu-Shanab & Khasawneh, 2014; Bwalya, 2009; Rehman et al., 2012); human factors in implementing e-government in developing countries (Apleni & Smuts, 2020; Farzianpour et al., 2015; Hamner et al., 2010); success and failure factors for e-government projects (Alateyah, 2014; Elkadi, 2013; Voutinioti, 2014); factors for successful e-government adoption (Chen et al., 2006; Kumar et al., 2007; Susanto & Aljoza, 2015); e-government and developing countries; digital governance success factors and barriers to success (Dibie & Quadri, 2018; Khadaroo et al., 2013; Melamu, 2012); and critical success factors for e-government service delivery in developing countries (Ayoung et al., 2016; Mercy, 2013; Zejnullahu & Baholli, 2017). Based on literature review, five (5) factors drawn from the aforementioned studies were partly considered as factors enhancing e-government service gaps. These are infrastructure, interoperability, digital divide, human factor and policy. The subsections below discuss the aforesaid factors.

2.4.1 Infrastructure

Infrastructure has persistently prevailed in research on the challenges to the successful implementation of e-government initiatives in developing countries (Al-shboul et al., 2014; Heeks, 2006; Khaemba et al., 2017; Makau et al., 2015; Olumoye & Govender, 2018). This notion supports the view that lack of infrastructure hinders the provision of comprehensive e-government services in these countries. Likewise, many studies have concluded that developing countries do not have adequate infrastructure to successfully deploy e-government projects infrastructure (Al Mudawi et al., 2020; Chhabra et al., 2018; Dhonju & Shakya, 2019). Most governments in developing countries lack the required infrastructure to drive e-government forward; initiate or scale-up e-government projects. For instance, developing countries face the predicament of lack of resources to deploy robust ICT infrastructure (Chandra, 2018), low penetration of the fixed-line telecommunications; inadequate electricity supply (Richardson, 2011) and low teledensity (Sareen et al., 2013); making it difficult to deploy e-government countrywide. Thus, many developing countries are unable to deploy appropriate infrastructure to support the implementation of e-government.

Besides, Ajibade, Ibietan and Ayelabola (2017) submitted that lack of infrastructure in most developing countries stands as a barrier in the implementation of e-government projects. In the same note, Heeks (2003) revealed that the implementation of e-government in developing countries is disrupted by lack of infrastructure because there is no reliable electricity and internet access. As a result, some citizens in developing countries do not have access to electronically enabled government services. Thus, with no firm ICT infrastructure, the intent in developing countries to implement e-government can be rarely achieved.

Likewise, Khaemba et al. (2017) mentioned that infrastructure is still inaccessible in most parts of Botswana which is a great challenge to e-government implementation. This situation has resulted in e-government service gaps. The service gaps are created in twofold: first and foremost, lack of infrastructure hinders the delivery of e-government services by acting as an obstruction for government departments and agencies to provide e-services; secondly, lack of infrastructure obstructs the demand for e-government services by impeding citizens to access e-government services. Furthermore, Al Mudawi et al. (2020) assert that unreliable infrastructure has a possibility to degrade the performance of e-government systems. Therefore, for e-government projects to be successful, developing countries should ensure that adequate ICT infrastructure is put in place in government departments and across the country.

2.4.2 Interoperability

The general underlying prerequisite to realising the benefits of e-government is to make the systems interoperable (Nakakawa & Namagembe, 2019). In the context of e-government, interoperable depicts the ability of independent systems and devices to communicate with each other and share data (Apleni & Smuts, 2020; Sulehat & Taib, 2016). An interoperable e-government setting promotes information sharing and generates sustainable e-government adoption. Also, interoperability of e-government systems supports data sharing within and between government departments and agencies. This obviates redundant data and reduces duplication of effort in providing e-government services since citizens do not need to hop from one department to the other. Thus, interoperability is one of the factors within the e-government domain that needs to be managed by any government intending to achieve seamless integration and derive added value from e-government initiatives.

The notion of interoperability has been driven by the spread of independent e-government systems which often have inadequate coherence and information sharing capabilities (Shuib et al., 2019; Waller et al., 2014); however, with limited success. Most of the e-government systems deployed in developing counties operate in 'silos'; e-government landscape is fragmented within and across ministries, departments and agencies (Apleni & Smuts, 2020; Baheer et al., 2020; Mohlameane & Ruxwana, 2020; Nakakawa & Namagembe, 2019; Sulehat & Taib, 2016). According to Nakakawa and Namagembe (2019: 67), “e-government initiatives in developing countries still suffer from a lack of interoperability, despite the existence of interoperability frameworks in literature". This situation has made the realisation of e-government benefits merely a delusion. In consequence, the lack of interoperability results in the loss of entirely reaping the prospective benefits of e-government such more efficiency; enhanced services to better serve citizens; and better accessibility of public services.

2.4.3 Digital divide

The digital divide is a dynamic and complex problem that is creating service gaps in developing countries particularly in the utilisation of e-government services. The digital divide is defined by Abu-Shanab and Khasawneh (2014) as the gap between people who have access to the internet and those who do not. Whereas, Kumar (2018: 111) defines the phrase 'digital divide' "as the division of society into two groups: one connected to digital services and the other who cannot access digital services at all". In the context of e-government, digital divide reflects the lack of and/or limited access to electronic services by citizens; the realisation of e-government benefits is nearly impossible in communities that experience digital divide

The digital divide has been reported in e-government literature as a significant barrier to the implementation e-government in developing countries since many communities and citizens do not have access to the internet and computing devices (Alabdallat, 2020; Ayoung et al., 2016; Chipeta, 2018a; Danish, 2006; Gupta et al., 2008; Haider et al., 2015; Hamner et al., 2010; Idoughi & Abdelhakim, 2018; Mellouli et al., 2016; Twizeyimana & Andersson, 2019; Venkatesh et al., 2014; Verkijika & De Wet, 2018); as a result, the majority of citizens are unable to benefit from the deployment of electronic services. Also, Gibreel and Hong (2017) stated that the digital divide is certainly the prohibiting factor in access to e-government services. The majority of the population, particularly, in developing countries still have limited or no access to e-government services despite the fact that these countries have moved a great stride in e-government adoption. Thus, the digital divide in developing countries makes it difficult for citizens to effectively utilise e-government services.

In the same vein, Alabdallat (2020) uphold that digital divide prevents citizens from utilising e-government services based on inaccessibility and lack of skills; thereby creating some service gaps. Furthermore, various researchers (Ahmad & Campbell, 2015; Le Blanc & Settecasi, 2020; Nurdin et al., 2014; Owusu-Ansah, 2014) reported that digital divide is a joint barrier between technology and human factors; some citizens do not have the means to access e-services and others do not know how to use the technology. As a result, this restricts the adoption of e-government to those who have access to the technology and the requisite skills to utilise e-services. Therefore, those who do not have access to ICTs and necessary ICT skills cannot access e-services; and thus fail to benefit from e-government projects implemented in their service constituencies (Haider et al., 2015; Twizeyimana & Andersson, 2019; Verkijika & De Wet, 2018). Hence, the researcher concludes that the digital divide can result from deficiencies in ICT infrastructure and ICT skills.

Several approaches have been proposed to explore and measure the digital divide. For instance, Alassim and Alfayad (2017) proposed a three-level approach which includes: technology access, technical silks and demographic characteristics. Likewise, Alateyah (2014) maintains that infrastructure, access and usage are the three dominant dimensions for assessing digital divide. In presenting these dimensions, Aneke (2019) argued that even if the infrastructure is adequately built, factors such as costs and geographical spread of infrastructure may hinder the target community in accessing the services.

Still, even though the infrastructure may be adequate and the means to access that infrastructure is available, there is no guarantee that the citizens will use the e-service. In the same vein, Sipior and Ward (2005) categorised the digital divide into two main groups: access and skills divide. According to them, access divide pertains to the physical barriers to technology while the skills divide is the lack of competencies required to utilise e-services. These two dimensions hamper the usage access of e-government, too. Hence, it can be further reasoned that digital divide hinders citizens from using the e-government services based on lack of infrastructure accessibility and low ICT skills level.

However, Abu-Shanab and Khasawneh (2014) considered the digital divide from users' perspectives, where it concerns to access to technology, the availability of appropriate content, and the perceived usefulness of technology and its content as well. Besides, Gibreel and Hong (2017) put forward that the type of technology used to deploy e-government projects and its associated cost can also shape the digital divide of a country. Hence, countries with prosperous economies are ordinarily linked with heightened access to ICTs compared to those whose economies are doing poorly. Thus, the implementation of e-government comes with accessibility concerns particularly to those who cannot afford to own mobile devices, lack ICT skills, not literate or have no access to the internet.

In addition, Scott and Seth (2013) mentioned that the power crisis, particularly in developing countries is another dimension that contributes to the digital divide. More often than not power outage especially for prolonged hours makes e-government services to be unavailable to the citizens, businesses and government employees. However, Gibreel and Hong (2017) argued that power outage represent confounding variable and have a limited impact on the cause-effect of the digital divide.

More recently, Roberts and Hernandez (2019) introduced the 5'A's of Technology Access model to guide the reflection about possible barriers to inclusive technology access: availability, affordability, awareness, ability, and agency. The model stipulates that e-government should be available to citizens living in remote areas and those who are living with a disability. Roberts and Hernandez also argued that all the same, technology access may be available to some citizens, but not affordable due to high costs. Furthermore, the authors argued that availability and affordability alone do not guarantee the usage of e-government services; a lack of awareness also contributes to levels of non-use of certain technologies (*ibid*).

Similarly, even when availability, affordability, and awareness are high, Nkohkwo and Islam (2013) reported that lack of digital literacy, skills, or knowledge may limit the citizens' abilities to make effective use of technology. Again, the model by Roberts and Hernandez shows that even for those living in remote areas with available and affordable technology and for whom there are no limits in awareness and abilities, the agency may remain a formidable barrier. Hence, every citizen should be a change agent in the deployment of e-government systems.

Therefore, to reconstruct the digital divide, the proposed multi-dimensional model should encompass only four dimensions (*availability, affordability, awareness and ability*) of the

5’A’s of Technology Access model proposed by Roberts and Hernandez (2019). This is because these dimensions adequately address the aspect of access and effective usage of e-government services which in turn minimises the digital divide gap.

2.4.4 Human factor

The human factor is critical in the success of e-government. According to Farzianpour, Amirian and Byravan (2015), once the infrastructure has been established, there is a need for ICT skills to enhance the effective implementation and utilisation of online services. Nevertheless, a range of studies have reported that the lack of ICT skills is the dominant human aspects under the barriers to e-government initiatives (Abu-Shanab & Khasawneh, 2014; Ahmad & Campbell, 2015; Aneke, 2019; Chhabra et al., 2018; Hamner et al., 2010; Mensah, 2019; Myeong et al., 2014; Owusu-Ansah, 2014). For instance, Owusu-Ansah (2014) reported that e-government has failed in developing countries due to inadequate ICT skills within government employees and citizens. In practical terms, incompetent employees are appointed to develop and maintain e-government systems. As a consequence, e-government projects are outsourced from developed countries which according to Heeks (2003) fuels design-reality gap if the project is adopted in its entirety by a developing country. So, e-government cannot be successfully deployed and utilised if citizens and government employees do not have adequate ICT skills.

Apart from lack of skills, various studies on critical success factors in the implementation of e-government in developing countries have reported the lack of expertise by government employees to develop, operate and maintain e-government systems (Aneke, 2019; Khadaroo et al., 2013; Khaemba et al., 2017; Layne & Lee, 2001; Lupilya & Jung, 2015; Ohemeng & Ofosu-Adarkwa, 2014; Zaied et al., 2007). In addition, lack of experience in designing usable e-government services is another human factor affecting the deployment of comprehensive e-services in developing countries (Ahmad et al., 2019; Myeong et al., 2014; Napitupulu et al., 2018; Owusu-Ansah, 2014). Other factors include poor project management (Elkadi, 2013; Holgeid & Thompson, 2013; Mphale et al., 2016), lack of collaboration (Pederson, 2016) and lack of end-user involvement (Holgersson et al., 2018; Khadaroo et al., 2013). Thus, it can be concluded that e-government cannot be successfully deployed when there is a lack of ICT skills, lack of experience, poor project management and lack of collaboration among stakeholders.

2.4.5 Policy

According to Dias (2020), a policy is a premeditated plan of action aimed at guiding decisions and accomplishing judicious outcomes. Usually, governments develop and implement policies to undertake essential socio-economic matters that are articulated based on laws, budgetary actions, international agreements, declarations, contracts or campaigns. The issue of policy as well forms part of the factors that affect the implementation of e-government (Apleni & Smuts, 2020). This is because the deployment and use of e-government systems call for a variety of policies to regulate electronic activities. However, Islam (2013) noted with great concern that in developing countries there is a lack of clearly defined policy for e-government implementation. Very few countries have stand-alone policies for implementing e-government (Alabdallat, 2020; Apleni & Smuts, 2020; Asogwa, 2011; Bwalya, 2009; Dhillon & Laxmi, 2015; Dias, 2020; Heeks, 2006; Layne & Lee, 2001; Nurdin et al., 2014; Twizeyimana et al., 2018; Zaied et al., 2007; Zaied et al., 2017); the implementation of e-government is either driven by national ICT policies or it is the sole responsibility of the ministries, departments and agencies. This factor demonstrates a major policy gap in the implementation of e-government projects in developing countries. As a result, the lack of clearly defined e-government implementation policy results in the duplication of effort, wastage of resources, lack of standardisation, lack of collaboration and independent operation of e-government systems.

Besides, within the policy dimension, studies have reported the slow pace in e-government reforms in developing countries (Zaied et al., 2017), lack of vision and strategy (Zaied et al., 2017) and reluctant by the government to modify workflows (Nabafu & Maiga, 2012). Zaied et al. (2017) reported that a number of countries have no clear vision and strategic plan for implementing e-government projects. Even if it was there, the vision was found to be optimistic or impractical. In addition, according to Holgeid and Thompson (2013), existing visions and strategic plans did not accurately reflect the overall impact of e-government. Thus, without a clear vision and strategic plans, the adoption and implementation of e-government will remain low.

2.5 E-government assessment typologies

To contribute to the on-going research in e-government assessment as well as an attempt to answer the second research objective, there was a need for a comprehensive understanding of the current e-government assessment typologies. Actually, Faizan and Zaidi (2017) suggested that before a proposed model for assessing e-government is developed, it is important to systematically review existing assessment measures, their associated dimensions as well as their contexts of measurements. In this regard, the researcher observes this suggestion by presenting several e-government assessment typologies that are found to be relevant to this study. The synthesis of dimensions from various assessment typologies is expected to result in a comprehensive model for assessing e-government service gaps.

Extant literature on assessment of e-government projects reveals that, fundamentally, there are six (6) broad assessment typologies as follows:

- e-government readiness or e-readiness;
- service quality gap models;
- information systems success models;
- information systems adoption/acceptance models;
- e-government maturity models; and
- e-government evaluation models and frameworks

2.5.1 E-readiness/e-government readiness measure

The need to assess the country's capacity to adopt e-government has been enormously imperative for governments to plan for the design and deployment of e-services. According to Patsioura (2014), any country intending to adopt e-government should assess its state of e-readiness. Hosseinpour et al. (2013) define e-readiness as the measurement of the country's capability to adopt Information Technology (IT) before the implementation of ICT projects. The emergence of e-readiness instruments has been influenced by entities such as research development and agencies, institutions of higher education and business enterprises (Hosseinpour et al., 2013). E-government readiness mainly assesses the state of readiness (equipment and preparedness) of governments to provide various public services online and utilise ICT for the internal operation of the government (Ostasius & Laukaitis, 2015).

Furthermore, e-readiness is used to evaluate the quality of ICT infrastructure at the national or organisational level as well as the ability of citizens, businesses and governments to utilise ICT to their benefit. Thus, e-readiness is regarded as a significant indicator of the quality of a country's technological and telecommunication infrastructure and the ability of its citizens, businesses and government employees to adopt, use and benefit from modern technologies.

So, e-readiness assessment tools are meant to provide the best possible indication about measurable variables affecting e-government deployment and usage (Abdelhafez & Amer, 2014; Zaied et al., 2007). This helps decision-makers in deciding what to focus on and to what extent improvements should be made to the different aspects measured to enhance the overall e-readiness of the country or part of it or just an organisation. In the same vein, Hosseinpour et al. (2013) claim that countries can employ e-readiness assessment models to determine their state of preparedness to implement e-government projects. Thus, by using e-readiness measures, countries can plan more accurately on the deployment of e-services and pay particular attention to factors that have a possibility of hindering the digitisation of public services.

However, according to Manenji and Marufu (2016), e-readiness models do not have similar emphasises in measurement metrics. Some of the models emphasise on the availability of infrastructure and technology while others stress the human facets and others on robust policies. Nonetheless, the most common and dependable measurement metric under the e-readiness category is EGDI. This is a composite measurement metric that consists of three dimensions: Online Service Index (OSI), Telecommunication Index (TI) and the HCI (Human Composite Index) (Anu & Varghese, 2015). First, OSI shows the power of the government to deliver services to citizens electronically. Secondly, the TI relates to the capacity of the country's infrastructure to support the deployment of e-government projects. In essence, TI is widely used to measure the country's 'technological power' to use ICTs in delivering public services (Dias, 2020). Lastly, HCI indicates the state of readiness for the citizens to embrace 'e-transformation'.

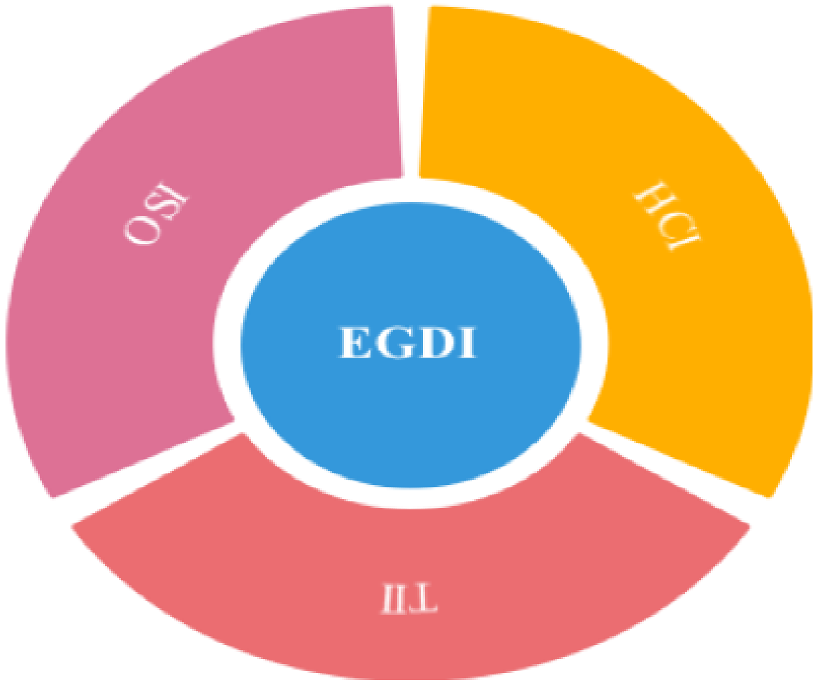


Figure 2.3: Consolidated e-readiness dimensions

The dimensions presented in Figure 2.3 are weighted equally through a normalisation process and attempt to measure a wide range of e-government themes. In fact, governments can use the survey results derived from the EGDI to assess the 'e-performance' of the country. As a result, they may consider either prioritising the deployment of backbone infrastructure or investing in 'e-literacy' to embrace e-government adoption. However, e-readiness does not provide a clearly defined purpose of measurement since it only focuses on benchmarking e-government adoption. Furthermore, higher ranking in e-readiness does not predict e-government performance and user satisfaction which in any case would determine the presence of service gaps or not. Again, because every country has different needs and priorities, there is no one model for e-government and no universal standard for e-government readiness. As a result, the assessment of e-government readiness does not guarantee the successful implementation of e-government.

Moreover, developing countries do not have the same readiness in the deployment of e-government systems because of delayed modernisation and different access to donor funding to deploy ICT infrastructure. Similarly, a study by Saleeb (2016) shows that developing countries lag behind developed countries in terms of technology, human capacity, e-readiness and e-participation due to delayed investments in technology and IT human capacity. These attributes more certainly constitute contextual factors of a developing country.

2.5.2 Service quality gap models

The measurement of service quality has gained momentum in the IS domain due to the rise in the service constituent of information technology. Service quality is a measure that is used to determine the level of users' satisfaction from a service based on their opinions or attitudes (Alanezi et al., 2012; Rodr et al., 2018; Sharma, 2017; Ulewicz, 2014). It shows the degree of meeting or exceeding users' needs in providing a service; the more users are satisfied, the less the service gap. In simple terms, service quality is a service which conforms to customer requirements. In consequence, the aspect of service quality is important for e-government to ascertain if citizens are getting the expected value of the service.

A study by Pena et al. (2013) claimed that users employ the same measure to determine service quality, irrespective of the type of service. However, such a claim completely ignores the fact that services have different characteristics; some are tangible while others are intangible. Besides, users have different opinions and values, too, which could result in different output.

Various models have been developed and used to determine service quality gap of offline and online services. These include, but not limited to, SERVQUAL model (Parasuraman et al., 1985), SERVPERF model (Cronin & Taylor, 1994), RATER model (Czaplewski et al., 2002) and Design-Reality gap (Heeks, 2003). However, the SERVQUAL model has been glorified by many researchers as a successful measure to determine the perception of users about service quality in different sectors (Adulalem & Ali, 2016; Datta & Vardhan, 2017; Handrinos, 2015; Herdiyanti et al., 2018; Mastrogiacomo & Torino, 2018; Mwongoso, 2015; Pakurár et al., 2019; Williams, 2016; Yousfani et al., 2019). This is because knowing customers' expectations is necessary for improving the quality of service. In fact, Yousfani, Solangi and Lakhiar (2019) claim that it is rare to come across an e-government evaluation model that does not make reference to the SERVQUAL model, but this does not mean that other quality gap models are not useful in assessing e-government service quality.

The SERVQUAL model comprises of five (5) basic dimensions that cause satisfactory or unsatisfactory delivery of service: Responsiveness, Reliability, Tangibility, Assurance and Empathy as shown in Figure 2.4. For the purpose of this study, the dimensions are defined based on e-service quality attributes.

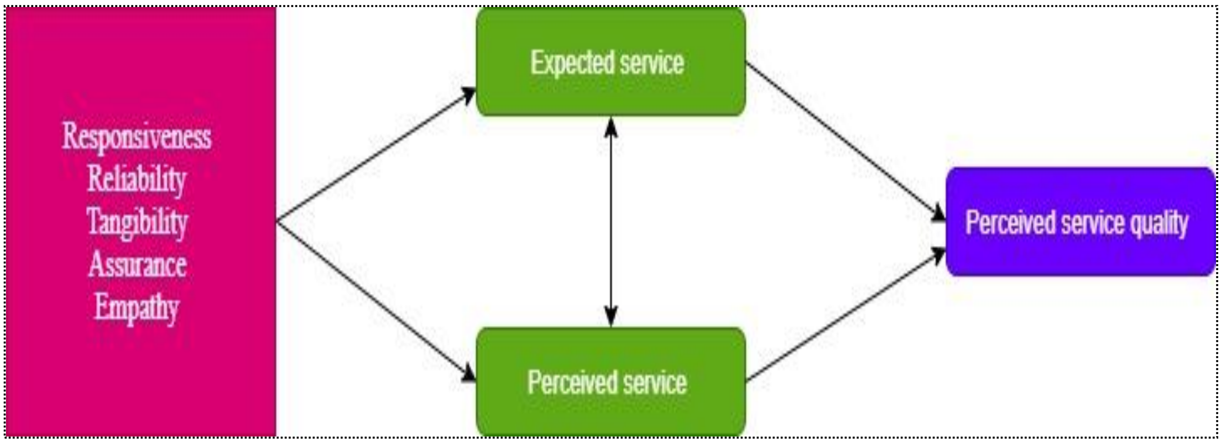


Figure 2.4: SERVQUAL model
(Source: adapted and modified from Parasuraman, Zeithaml & Berry, 1985)

<u>Responsiveness:</u> refers to the ability of the web site to provide information and services timeliness (Neupane & Devkota, 2017). This dimension creates a positive perception if customers get services in time and good quality.

<u>Reliability:</u> Refers to the ability of the web site to function reliably and dependably in providing information and/or services to the users (Adulalem & Ali, 2016). In short, reliability means that services are provided to the customers without delay and free of errors. Hence, Yousfani, Solangi and Lakhiar (2019) indicate that the user's reliability perception of the web site is determined by its 'correct' functionality.

<u>Tangibility:</u> refers to the appearance of the web site to the citizens, businesses and government employees. This means that the web site should have an appearance that is appealing to the user because of its influence on the user's overall quality perception (Handrinos, 2015).

Assurance: refers to the ability of the web site to demonstrate that the information about the user is protected from unauthorised access (Abu-Shanab & Khasawneh, 2014). Thus, users should have trust and confidence in the use of an e-service

Empathy: refers to a system that provides personalised attention to the customers. E-services should be given with empathetic considerations (Adulalem & Ali, 2016). Since citizens have a right to services, they should find the e-services easily packaged and accessible.

The SERVQUAL model has made significant contributions in service literature and Parasuraman, Zeithaml and Berry (1985) argued that this model with slight adjustments on measurement dimensions is far more effective, and better adapted in service organisations. However, the claim is challenged by Yarimoglu (2014) who mentioned that the dimensions of SERVQUAL model possibly will not fit well in all organisations; hence the need for the development of specific measurement dimensions. Another point of the argument is presented by Ulewicz (2014) who argued that SERVQUAL cannot be loosely applied to whichever service because the number of dimensions of quality depends on the service being offered.

Furthermore, even though the SERVQUAL model has proved to be effective to many service providers in measuring service quality and facilitating the assessment of service gaps, the model is less likely to give a comprehensive reflection on the satisfaction of users in a larger context such as the e-government. Besides, the SERVQUAL model can be criticised for neglecting the broader outcomes of e-government systems such as user satisfaction since the model was designed before the emergence of e-government concept. Therefore, it could not catch up with the continuous developments in IS such as e-government.

Also, the SERVQUAL measurement does not sufficiently clarify the technical attributes of e-service such as interactivity and intangibility, which are driven by the tremendous advancement of technology. Therefore, the model faces new-fangled challenges since users interact with organisations electronically. Moreover, the quality of e-government services according to Hartwig and Billert (2018), comprises of unique and multi-dimensional constructs yet its service quality dimensions are not complete in SERVQUAL. Once more, by measuring service gaps using quantitative analysis only, the SERVQUAL model does not reveal generative mechanisms of service gaps. Hence, Verkijika (2018) declared that e-government projects fail because of a lack of in-depth understanding of factors hindering its implementation.

In addition, while dimensions of the SERVQUAL model provide considerable impact on the quality of service, the model largely focused on physical elements (tangibility) of services whose measurement is relatively straightforward as compared to e-government. Consequently, since e-government services are perceived to be intangible, they need dedicated assessment models that take into consideration their intangibility disposition.

2.5.3 Information Systems (IS) success models

Another category for assessing e-government is drawn from IS success models such as the updated DeLone and McLean model (DeLone & McLean, 2003). This model has been widely used to explain why some IS projects are regarded as successful. In fact, DeLone and McLean's model is regarded as a valuable measurement metric for understanding the multi-dimensionality of IS success; hence, it is commonly referred to as the IS success model. The model consists of six (6) mutually dependent dimensions that are presumed to adequately measure the success of IS: system quality; information quality; service quality; intention to use; user satisfaction; and net benefits as shown in Figure 2.5.

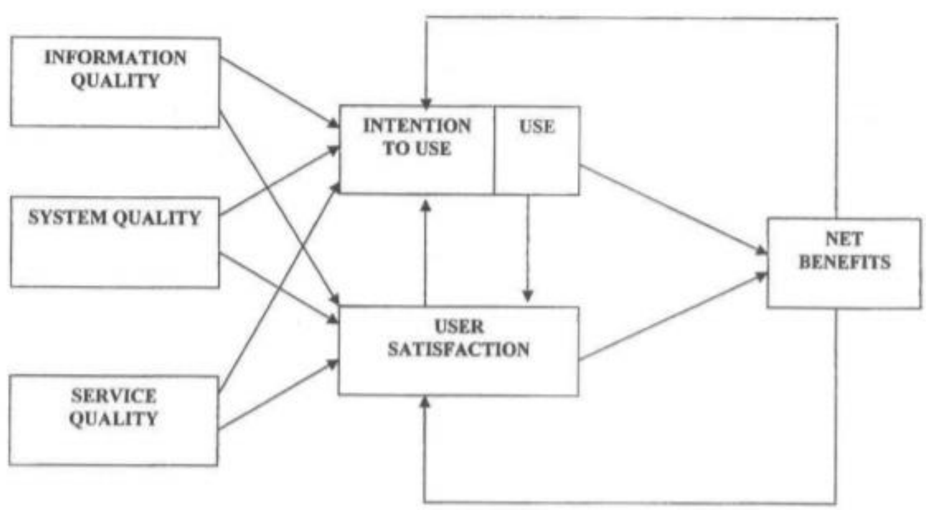


Figure 2.5: Information Systems success model
(Source: Adapted from DeLone & McLean, 2003: 24)

System quality

System quality refers to an e-government system that is perceived by citizens as user-friendly (DeLone & McLean, 2003; Faizan & Zaidi, 2017). Attributes such as responsiveness, reliability, usability and navigability are used to measure the multi-dimensionality construct - system quality. Moreover, Rodr, Isabel and Cristina (2018) claim that system quality is the primary determinative factor of e-government service; hence, it plays an important role in the partial assessment of e-government services.

Information quality

Information quality is the ability of the government website to offer timely, accurate, complete, concise, and appropriate information in line with the needs of the citizens (DeLone & McLean, 2003). Information quality is regarded by Venkatesh and Morris (2003) as an essential element of high-quality online public service and good user-experience. It can be measured using elements such as accuracy, timeliness, reliability, completeness and relevance. Nonetheless, many authors report that the majority of government websites have failed to maintain high-quality information (Lu & Nguyen, 2016; Mellouli et al., 2016) more often than not, most of the information found in government websites is outdated and incorrect.

Service quality

Service quality refers to the degree of service provided to users comparative to their expectations in terms of reliability, responsiveness, assurance and empathy (DeLone & McLean, 2003). In e-government evaluation, service quality denotes the level of consistency between citizens' perceptions and expectations. In simple terms, service quality means providing the best service to users. This shows that service quality can be achieved when the system provides comprehensive services. Service quality, thus, reflects the entire attributes associated with the performance of an e-government system. As indicated in Figure 2.5, information quality, service quality and system quality have a direct influence on intention to use and user satisfaction.

Intention to use

Intention to use is the willingness and the desire of employees, citizens and business to utilise the capabilities of an information system (Abu-Shanab & Khasawneh, 2014; Wadie & Hasan, 2015). Basically, the willingness and desire are usually influenced by the attributes of a system such as reliability, responsiveness, usability and navigability.

User satisfaction

User satisfaction is another factor which has long been utilised to assess the continual usage of e-services. The factor of satisfaction is used in many studies to ascertain how the degree of satisfaction to e-services will impact citizens' adoption rates (Ali, 2017; Mohamed et al., 2009; Patsioura, 2014; Ramdan, Azizan, & Saadan, 2014). It is worth noting that improved quality of e-government will increase citizens' satisfaction, which, in turn, will increase the utilisation of e-government services.

Net Benefits

Like user satisfaction, net benefits are significant elements in assessing the quality of services, as this perception covers more issues than user satisfaction (Komba-Mlay, 2016; Ramdan et al., 2014). It is the main thrust of assessing the degree of success of information systems. In e-government evaluation, net benefits influence the development of a citizen-centric e-service. Above all, a net benefit is one of the most decisive factors in e-government adoption. Regardless of its prominence in evaluating several e-services in the e-commerce domain, researchers in the e-government research community (Ojo, 2017; Ramdan et al., 2014; Zolotov et al., 2018) have warned that the DeLone and McLean model is context-dependent. Therefore, its dimensions should be carefully selected taking into consideration contextual variables such as the type of technology and the values of the users.

In addition, the model has been criticised for being incomplete by not emphasising on the service quality implications of e-government projects (Ramdan et al., 2014). Even though DeLone and McLean (2003) argued that e-government service can be evaluated by the six dimensions of the DeLone and McLean model, none of these dimensions seems to predict e-service gaps. Another criticism is that more often than not the IS success model gives users a false impression of the outcome because many systems fail to meet users' expectations. Specifically, DeLone and McLean's model has been criticised for lack of explanatory power on the causal structure of its dimensions. This raises concern on the validity of the model in evaluating IS in general and e-government in particular. In the same vein, Osmani (2014) posits that the DeLone and McLean model is more of a behaviour than a success measure. Hence, Holgeid and Thompson (2013) suggested that more dimensions should be added to reflect on the outcomes of e-government.

2.5.4 Information Systems (IS) acceptance and adoption models

Furthermore, e-government has been assessed using IS adoption and acceptance models such as technology adoption model (TAM), diffusion of innovation theory (DOI), or unified theory of acceptance and use of technology (UTAUT). Indeed, adoption and acceptance are indispensable to the success of IS because the lack of these two concepts prevents new IS from being successful. Moreover, if information systems are not accepted or adopted by users, their benefits cannot be utilised.

2.5.4.1 Technology Acceptance Model (TAM)

TAM has been widely adopted and used to evaluate the adoption of technology from a user's perspective as well as to provide a sufficient explanation of the causative factors of technology acceptance. Technology acceptance is defined by Rabaa et al. (2018) as the emotional state of an individual which drives his or her intention to use technology voluntarily. The acceptance model posits that the actual usage of technology is underpinned by five (5) variables as follows: External variables, perceived usefulness, perceived ease of use, attitude towards use and users' intention to use the technology in the future (Ajibade, Ibietan & Ayelabola, 2017). A schematic model of TAM showing the sequence of causal relationships is presented in Figure 2.6.

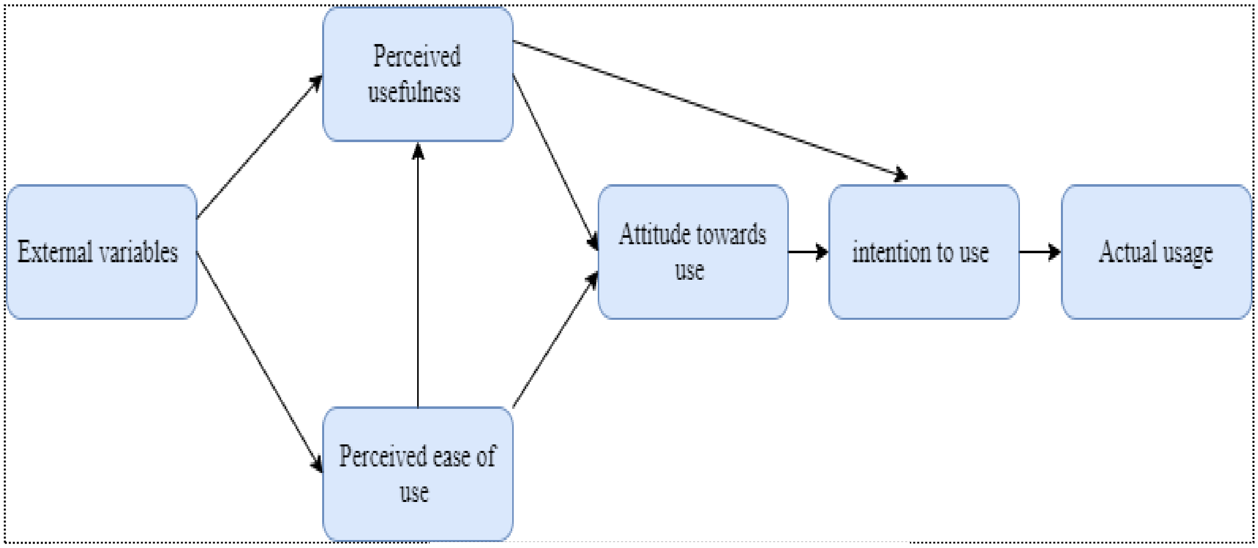


Figure 2.6: Technology Acceptance Model

(Source: Adapted and modified from Davis, 1989)

TAM postulates that an individual needs to have a voluntary intention to use a given piece of technology before such an individual can accept to adopt the technology. This voluntary intentionality is driven by two key factors, namely: perceived usefulness and perceived ease of use. Perceived usefulness is the level of value attached by the individual to the use of technology (Zolotov et al., 2018). On the other hand, perceived ease of use is the extent to which an individual believes that using a particular technology to accomplish a task and fulfil certain needs would require less effort (Kanaan et al., 2016); that is, there are no complexities in the use of technology. According to Sebetci (2015), the measurement criteria for ease of use include user-friendliness, ease of access and ease of navigation of the system. These measurement criteria give assurance that the system will be understood easily. Thus, TAM suggests that acceptable technology is the one which is believed to be useful and easy to use.

Although extensive research has proved that the perceived usefulness and perceived ease of use affect the behaviour intention, research has shown that their degree of influence is not similar (Hidayah et al., 2018). Munyoka (2019) reported that perceived usefulness has a higher degree of explanatory power compared to the perceived ease of use. Also, according to Liu and Bing (2017), users tend to consider the use of technology first before thinking about its ease of use. However, Zabadi (2016) challenged the correctness of this assumption by claiming that people have different levels of proficiencies in evaluating the usefulness of technology; as a result, their intention to accept and adopt technology is determined by ease of use rather than usefulness.

Even though TAM is among the most illustrious theories in explaining user acceptance in IS adoption, the model is still not complete in evaluating technology adoption due to several limitations. First, subjective norms may compel users to use a system like e-government even if they perceived it as not useful. This shows that subjective norms precede usefulness. Also, Sio, Lai and Pires (2015) mentioned that TAM only focuses on measuring the intention to accept technology in a setting where the use of technology is voluntarily determined; thereby, ignoring mandatory technologies such as e-government where citizens have limited choice on whether to accept technology or not (Saleeb, 2016). Again, the focus of TAM in predicting technology usage makes it ignore the barriers to usage. Once more, the fact that changes have been continuously made in the use of TAM suggests that the model is incomplete in the evaluation of technology.

2.5.4.2 Diffusion of Innovation (DOI) theory

Diffusion is a process which explains the spread of technology to the intended target group. According to Rogers (2003), when a new technology emerges, it is important to use a diffusion of innovation theory to determine how the new technology is implemented by those targeted for adoption. This is because the adoption of new technology is complex even if its advantages may be apparent; hence, Rogers developed the DOI theory to demonstrate how certain innovations diffuse in social systems.

The DOI theory is widely used to explain attributes that influence users to accept and utilise information systems. The theory contends that the adoption of new technology is not a given but it is influenced by five (5) user-perceived attributes: relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003). So, according to the DOI theory, the perception of individuals on whether to adopt technology or not is collectively influenced by these five attributes. Figure 2.7 shows the relationship between the adoption of technology and determinant factors.

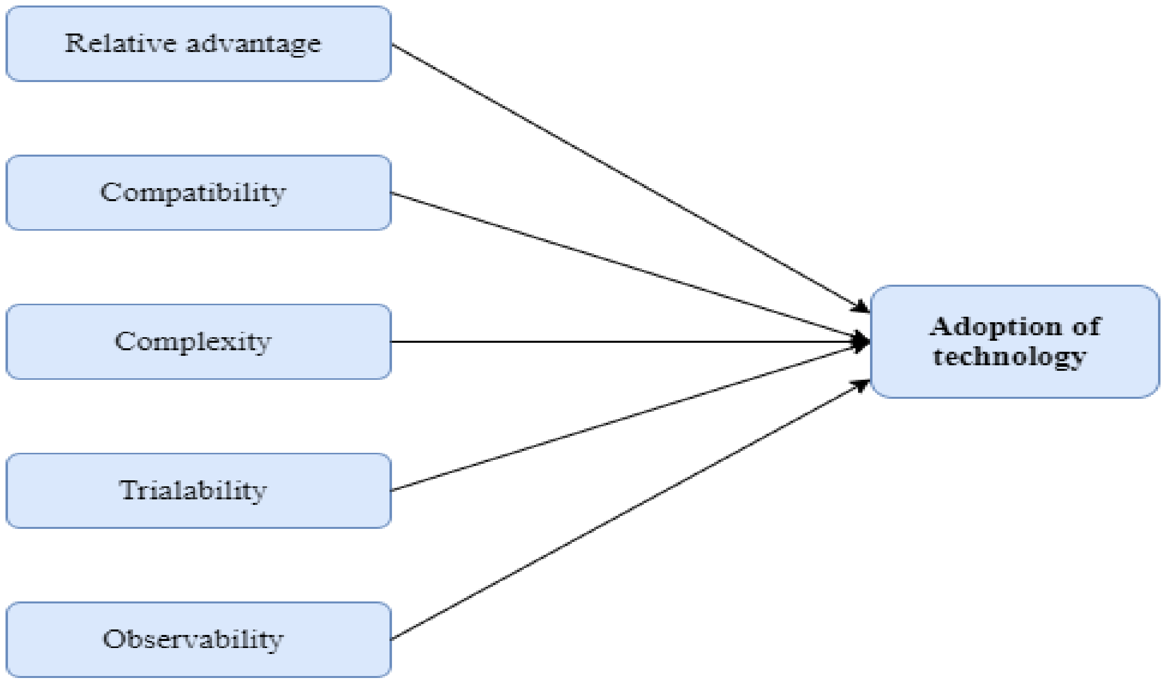


Figure 2.7: The five user-perceived attributes of DOI and technology adoption
(Source: Adapted and modified from Rogers, 2003)

Relative advantage is a measurement dimension that seeks to determine the extent to which the users perceive the benefits of the new system (Rogers, 2003; Rokhman, 2011). Similarly, relative advantage is regarded as the belief that the benefits of the new system go further than the existing system. Simply put, the relative advantage is an extent to which technology considered for adoption has a better benefit. Notably, relative advantage shares similar perception with the perceived usefulness of TAM (Kaur & Singh, 2015). Thus, technology is considered useful if it can provide greater benefits to users.

Compatibility, on the other hand, measures the degree to which technology is consistent with the present values, demands and previous experiences of the prospective users (Brooks et al., 2014; Rogers, 2003). This implies that technology that is compatible with expectations of the users will increase the chances of adoption while decreasing the probabilities of rejection. In contrast, the technology that is not compatible with the existing values of citizens, businesses and employees will face resistance. This shows that e-government services should be provided in a way that is consistent with the values, needs and experiences of the users. Thus, it can be concluded that values, needs and experiences form the dimensions of measuring the compatibility of technology. Therefore, any measuring metric for evaluating e-government should include these dimensions to develop and deploy a citizen-centric e-government system.

The attribute of complexity intends to measure the extent to which technology is perceived to be difficult to comprehend, implement or utilise (Rogers, 2003). Comparably, complexity is related to the TAM's perceived ease of use factor. And, generally, users will accept less complex technology; that is, a technology which is easy to learn and use. Complexity has a negative correlation with technology adoption (Brooks et al., 2014; Papachristos & Adamides, 2016; Waller et al., 2014) and the extreme complexity of technology will deter users to adopt it.

Trialability on the other front is the ability of technology to be placed on trial or experiment exclusive of total committal of resources and with least possible investment (Rogers, 2003). Normally, individuals will adopt technology with higher trialability. As well, there is a positive correlation between trialability and technology adoption (Alateyah, 2014; Dwivedi et al., 2019; Zabadi, 2016); the more technology is tried out, the more rapidly its adoption is. Further, trialability enables potential users to test a system on a limited base before implementation. Most probably, trialability makes individuals aware of the advantages of using a system.

Finally, observability is the degree to which the benefits of a system are visible to potential users (Abu-Shanab & Khasawneh, 2014; Nilsen, 2015; Ononiwu, 2015; Zabadi, 2016). Observability entails that trial cases of technology are visible to the potential user. Along with, when individuals perceive the results of trialability cases as advantageous, visible and tangible, they will adopt the technology. This suggests that observability depends on the trialability factor. As a result, it cannot be used separately in determining the diffusion of technology.

To this end, the DOI theory suggests that technology offering higher relative advantages, trialability, compatibility, observability and lower complexity will be adopted faster. Likewise, most of the researchers in the field of IS, e-government included (for example, Carter & Bélanger, 2005; Ramaswamy, 2007; Richardson, 2011; Rokhman, 2011; Zhang, 2015) have confirmed that relative advantage, complexity and compatibility are considered the main constructs influence the diffusion of technology in DOI theory. However, others (for example, Lin & Bautista, 2017; Rasool, 2018) have argued that observability and trialability were not appropriate for measuring the perception of individuals on new technology adoption.

In the same vein, the researcher argues that the trialability construct of the DOI theory which denotes the experimentalism of a system cannot be applied to complex systems like e-government due to the nature of data stored by the system and the magnitude of users involved. Although, this does not imply that e-government systems should not be tested and validated. Consequently, researchers on e-government evaluation have focused only on relative advantage, complexity and compatibility as determinant factors for technology adoption within the DOI theory.

2.5.4.3 The unified theory of acceptance and use of technology (UTAUT)

UTAUT is regarded as the modern model in the study of behavioural intentions of individuals to adopt and use technology (Alraja, 2016; Jacob et al., 2019; Khan & Ahmad, 2015; Mensah, 2020). It is considered to be a unified model because it was developed by integrating the independent variables of technology acceptance, adoption and use models among them the TAM and DOI. The use of the UTAUT model in evaluating technology adoption is based on its perceived inclusiveness and high illustrative and predictive powers as compared with other theoretical models. Actually, in developing this model, Venkatesh, Thong and Xu (2016) observed that earlier models have not been successful in explaining the behavioural intention of the users. The model is believed to show a strong explanatory power, which is approximately 70% of the variance in usage intention *(ibid)*. Hence, it is considered the most predictive model for technology acceptance.

The UTAUT model consists of four key constructs: performance expectancy, effort expectancy, social influence and facilitating conditions (Venkatesh et al., 2016). Social influence, effort expectancy and performance expectancy are regarded as direct determinants of behavioural intention to use the technology, whereas, facilitating conditions and behaviour intention represents direct determinants of the actual use of technology (*ibid*). Also, the model contains four moderating variables that affect the direct determinants, which are age, gender, the voluntariness of use and experience as shown in Figure 2.8 below.

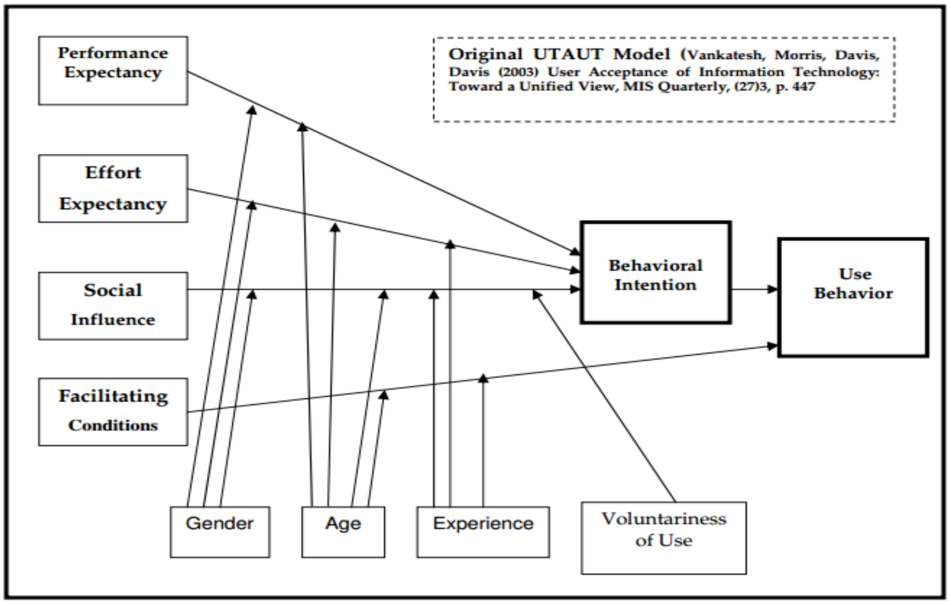


Figure 2.8: The unified theory of acceptance and use of technology model
(Source: Adapted from Venkatesh, Thong & Xu, 2003: 447)

Performance expectancy refers to the extent to which individuals believe that using a system will help them improve their job performance (Lu & Nguyen, 2016; Venkatesh, Thong & Xu, 2003; Liebenberg, Benade & Ellis, 2018). The construct is related to perceived usefulness factor within the TAM or relative advantage within the DOI theory. However, perceiving performance expectancy in this manner (improving job performance) does not provide a unified view of the entire users of the system such as those of e-government since users can be grouped into government employees, business and citizens. This view only predicts the behavioural intentions of employees rather than the entire system users. Therefore, it is imperative to define performance expectancy as the extent to which individuals believe that using a system will help them realise numerous benefits.

On the other hand, effort expectancy refers to the extent of ease associated with the use of the system (Venkatesh et al., 2003). Accordingly, effort expectancy denotes the perceptions on the ease of use of the system as well as ease of learning how to use the system. Effort expectancy construct is made up of three factors: perceived ease of use, complexity and actual ease of use. The factors are also included within the TAM and DOI theory. The effort expectancy constructs within each model are believed to be significant in both voluntary and mandatory usage settings (Ibrahim et al., 2017). A voluntary setting is a context in which individuals have the freedom to choose whether to use technology or not, whereas in a mandatory setting individuals are compelled to use technology (Munyoka, 2019). However, Venkatesh, Thong and Xu (2016) argued that effort expectancy is only significant during the early stages of technology adoption and becomes insignificant as users get conversant with the system. Thus, effort expectancy is more important in the emergent phase of the behavioural intention to use technology. Therefore, the researcher concludes that effort expectancy is more appropriate to novice users of technology, yet it is used to experienced users.

Social influence refers to the extent to which an individual which peers influence use of the system either positive or negative (Venkatesh et al., 2003). It is a perception that others believe that an individual should use a new system. The social influence construct seeks to explain the effect of social factors in the adoption of technology. The relation between social influence and technology adoption has been extensively studied. Many studies reported that peers, family and friends influence the adoption of technology. However, not much research has been conducted to show the sources of social influence in the adoption of e-government systems.

Facilitating condition, on the other hand, is defined as the extent to which an individual believes that an organisation has adequate infrastructure to support the use of the system (Venkatesh et al., 2003). Thus, facilitating condition provides an environment that is conducive for easy use of technology. In contrast, behavioural intention refers to the user's intention to accept and make use of technology (Venkatesh et al., 2003). In the study of e-government, behavioural intention is usually defined as the extent to which citizens are willing to use the e-government service (Alateyah, 2014).

Accordingly, the UTAUT model has attempted to deal with some limitations inherent in early models of technology acceptance and adoption. However, the model is still far from being effective in the evaluation of e-government since like early models UTAUT was mainly developed to evaluate the organisation's IS. Therefore, it is prudent to note that information systems for organisations are developed and deployed for use by a limited number of users. Likewise, e-government systems are dissimilar from systems used in organisations because of their complexity and magnitude. More so, even if the UTAUT model appears to be suitable for evaluating e-government, the researcher argues that acceptance of e-government is complex and not the same across user-groups; hence, the need for models that take into consideration the complexity and the magnitude of e-government services.

2.5.5 E-government maturity models

Another significant category of e-government assessment topology is composed of the e-government maturity models. The general idea of maturity models remains the same; benchmarking the development of e-government using a staged approach. The models pertain to the actual state which shows the level of e-government progression based on the assessment (Atef & Al Mutawkkil, 2019). The vital element of e-government maturity models is that e-government develops sequentially and successively (Ostasius & Laukaitis, 2015). This presents a linear progression in the development of the e-government; the implementation of e-government is regarded as an ongoing process; hence, its development is conceptualised in stages.

Even though there is no agreed number of stages that e-government's development life-cycle should follow, e-government models are scoped between four-staged and six-staged maturity levels (De et al., 2016; Fath-allah et al., 2014; Joshi & Islam, 2018; Layne & Lee, 2001; Perkov & Panjkota, 2017). For instance, Layne and Lee proposed a four-staged model consisting of cataloguing, transaction, vertical integration and horizontal integration. In the same year, Deloitte and Touche introduced a six-staged model consisting of information publishing, official-two way transaction, and multi-purpose portal, portal personalisation, clustering of common services and full integration and enterprise transaction. More recently, Perkov and Panjkota (2017) synthesised e-government maturity into five main stages as follows: online presence, interaction, transaction, fully integrated and transformed e-government and digital democracy. On the other hand, Joshi and Islam (2018) consider four implementation stages of e-government as follows: basic e-government services, streamlined services, transaction services and automated services. The stages are distinguished by the scale of services offered and the technological complexity in the deployment of e-government.

According to Fath-allah et al. (2014), a staged approach gives impetus in the deployment of e-government which can be further maintained by generating mechanisms that encourage citizens, businesses and government employees to use e-government services. Also, the idea behind levels of maturity is that e-government development is incremental beginning with the presence of an information system or website and progressing until it reaches the level where there is a connected or seamless environment (Joshi & Islam, 2018). Consequently, the successive phases show that e-government development is not a one-time activity; rather, it is an ongoing process that follows a step-wise approach. For this study, the discussion of e-government maturity models will follow a five-staged maturity level. The stages include (1) Presence, (2) Interactive, (3) Transactional, (4) Networked and (5) Seamless (Figure 2.9).

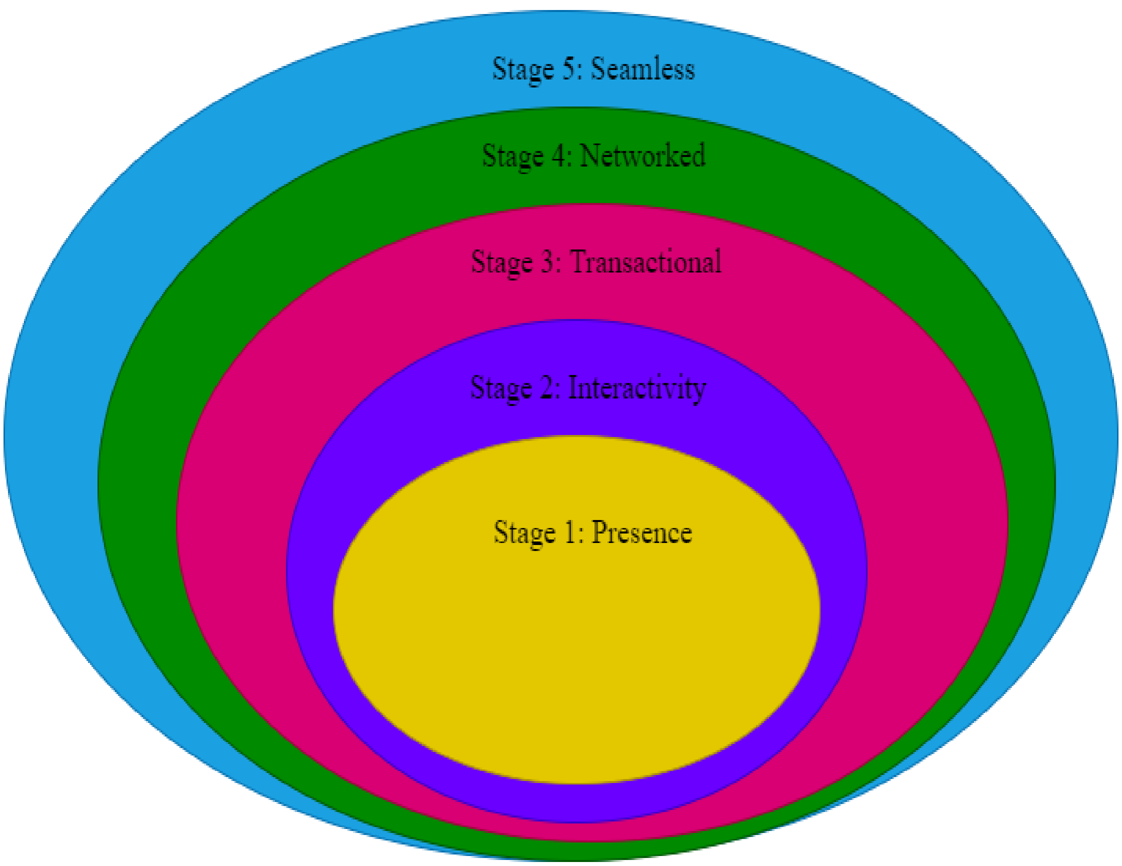


Figure 2.9: A five-stage e-government maturity model

Firstly, the *Presence stage* represents the basic level of e-government systems (Atef & Al Mutawkkil, 2019; Khaemba et al., 2017; Khanra & Joseph, 2019; Zautashvili, 2018). The development of an e-government system begins with efforts of establishing online presence; putting information on websites so that citizens and businesses can have access without visiting government offices. Usually, at this stage, government departments and agencies develop and deploy informational websites that provide one-way communication. Services provided also include access to official documents; downloading of forms; and using e-mail to communicate with government officials (Ahmad et al., 2019; Perkov & Panjkota, 2017). Information provided includes basic announcements and updates on government programs. In addition, citizens and businesses can search for information and services provided by government agencies using search engines (Oni et al., 2016; Perkov & Panjkota, 2017). Thus, the e-government approach at this phase is only concerned with an online presence and the provision of basic e-government services and information.

The interactive stage is the second phase of the e-government development process (Ahmad et al., 2019; Atef & Al Mutawkkil, 2019). According to Perkov and Panjkota (2017), many developing countries fall in the first and second phases of e-government maturity. At this phase, the e-government service aims to provide interaction between the citizens, businesses and the government. This phase not only provides search capabilities and downloadable forms and documents but also links to other websites to enhance interactivity. Furthermore, G2C and G2B interaction is accelerated by different applications and technologies so that citizens and businesses do not need to visit government offices or call the offices to get information. However, this stage presents some service gaps because citizens are required to visit government offices to complete transactions and other processes. This is because services that span the boundaries of a single government department or agency are not available as a result of lack of interconnectedness between government departments and agencies at this stage.

At a *Transactional stage*, the e-government system matures towards providing a transactional platform between the government, business and the citizens (Janowski, 2015; Joshi & Islam, 2018). The Transactional stage is achieved when the government provides means that enable citizens and businesses to transact electronically with the government without the need to visit government offices. The development of ICT infrastructure at this phase is meant to promote online transactions between government, citizens and businesses as well as across government agencies. Electronic transactions such as payments, applications or license renewal are made possible. Thus, this phase focuses on providing transactional capabilities between government, business and citizens. However, one of the main challenges faced at this stage is the issue of the fulfilment of government needs to make sure that online enquiries are addressed duly and timely as the off-line ones. Furthermore, the transactional stage is difficult to achieve because of security and personalisation issues (Al-shboul et al., 2014; Waziri & Yonah, 2014).

On the other hand, the *Networked stage* is aimed at providing vertical integration among the government systems (Nurdin et al., 2014; Perkov & Panjkota, 2017). This phase ensures that local systems are linked to systems of higher administrative levels of similar functionality. This stage represents the most sophisticated level in online e-government initiatives. It is characterised by an integration of G2G, G2B, G2C and C2G (and reverse) interactions. The government encourages participatory deliberative decision making and is willing and able to involve the society in a two-way open dialogue (Atef & Al Mutawkkil, 2019; Kofi Mensah, 2017; Palvia & Sharma, 2007).

Finally, the *Seamless stage* constitutes full integrated e-government services across administrative boundaries (Dombeu & Huisman, 2011; Makoza, 2016). Seamless integration signifies the highest and last phase in the implementation of an e-government project in which government provides a 'one-stop' window for elements to expediently access the entire e-government services (Makoza, 2016). The concept of 'one-stop' shopping is crucial to the seamless stage. The general idea is that citizens and businesses shall be able to access all government services through a single window. In the same vein, these constituencies should experience personalised and customised services through a virtual counter. In this stage, the ICT infrastructure that supports e-government services is integrated to provide an architecture that supports vertical (within departments) and horizontal (across ministries) integration. The aim is to break down the 'silo nature' in government services and replace it with an integrated view. So, this is achieved when the government has closed the inherent e-government service gaps and departmental boundaries are erased (Zautashvili, 2018). Thus, the seamless stage demands a high level of collaboration that aims to join government ministries, departments and agencies as well as businesses and citizens into a seamless network.

According to a study conducted by Alfarraj et al. (2011), Sweden, United States, Denmark, Iceland and Norway are among the few countries that have reached the Seamless stage. While few countries have reached Networked and Seamless phases, Hasan (2016) and Rooks (2017) argue that problems such as lack of suitable e-government assessment models, poor governance and lack of interoperability stand as a barrier to embracing a connected and seamless government in developing countries. Although the maturity models exhibit huge similarities, the attributes included in those models vary from a maturity model to another. For instance, Perkov and Panjkota's model shows that a well-maturated e-government system should offer integrated services, transformed e-government and e-democracy whereas, the model proposed by Joshi and Islam shows that mature e-government should provide automated services. Therefore, the researcher argues that by simply providing automated services it does not mean that e-government has reached a high degree of maturity because services may be automated but not integrated.

Maturity models also focus on checking on the presence of services without measuring their quality (Atef & Al Mutawkkil, 2019). It seems that, primarily, the descriptions of these models give a realistically correct picture of e-government in its early stages of maturity such as online presence and interaction. Nevertheless, according to Joshi and Islam (2018: 5), "beyond this, the models become both predictive and prescriptive and their empirical correctness declines abruptly".

In addition, maturity models also linearly treat e-government and incremental (Fath-allah et al., 2014), while in practice these stages are likely to develop concurrently depending on established priorities of the country in the implementation of e-government. In support of this view, Perkov and Panjkota (2017: 103) argued that "the conceptualisation of the e-government maturity no longer holds for evaluating e-government as its goals and targets are constantly evolving in response to evolving values and user needs". The deployment of e-government depends on where benefits are significant. Even so, linear progression in developed countries may not be applicable since these countries can use best practise from developed countries to leapfrog certain stages by implementing e-government service delivery models simultaneously. Therefore, given the leapfrogging opportunities, it is not prudent for developing countries to follow a linear fashion in the development of e-government. In addition, Atefand Al Mutawkkil (2019) reported that the objectives of e-government can be pursued simultaneously, so there is no need for a rigid progression of e-government developmental phases. Hence, Joshi and Islam (2018) claim that e-government does not necessarily mature in a linear fashion due to several interrelated constructs influencing every maturity stage.

Also, maturity models can be seen as measurement metrics that push countries to focus on providing e-services to attain high rankings without giving due consideration on whether citizens and businesses are utilising the services or not. Likewise, according to Zahran, Rutter and Benyon (2016), most developing countries implement e-government focusing on immediate outcomes to attain high rankings without considering citizen-centricity and user satisfaction. However, this study argues that a higher ranking does not mean service quality. Thus, simply moving public services from the traditional channels to online platforms does not mean the quality of service will be attained or all citizens will benefit from online services.

This is more likely to distort the e-government measurement; hence, metrics for measuring e-government rankings should be critically scrutinised for their validity, relevance and usability if they are to adequately predict the service gaps. Besides, maturity models are based on the modernisation theory (Hout, 2016) which posits that both developed and developing countries go through the same stages of development; thereby, ignoring the fact that developing countries are lagging from developed countries due to delayed modernisation. Hence, there is a grim need to developed context-based assessment metrics.

2.5.6 E-government evaluation models and frameworks

More recently, researchers have developed e-government evaluation models and frameworks to add to the existing e-government assessment typologies. These include, but not limited to, e-government assessment model from a citizen perspective (Barbosa, Pozzebon & Diniz, 2013); citizen-centric framework for assessing e-government effectiveness (Sigwejo & Pather, 2016);

e-government services effectiveness evaluation framework (E-GEEF) (Faizan & Zaidi, 2017); conceptual framework for evaluating e-government systems success; and evaluation of e-government services quality (Abdallat, 2014).

The e-government assessment model by Barbosa, Pozzebon and Diniz was developed to complement existing performance assessment models such as BSC and the BSC models so that new dimensions can be incorporated and make the models relevance to e-government evaluation. The model is used to assess the performance of a single e-government project and comprises of eight dimensions: (1) understanding of citizens' needs, (2) portal convenience, (3) quality of the service portal, (4) portal communication channel, (5) quality of in-person services and (6) relationship between citizens and the government agency, (7) efficiency of public administration and (8) management transparency. Although useful in assess e-government, the model is still limited because it could not incorporate the functionality dimensions of e-government systems; hence, it lacks appropriate linkages between functionality and e-government performance. Thus, by focusing only on service delivery, the model ignored other important dimensions of determining service gaps such as system functionality and service delivery.

On the contrary, Abdallat (2014) developed a model for evaluation of e-government services quality based on a business perspective (see Figure 2.10). The proposed model used the SERVQUAL questionnaire and the Barriers/Enablers questionnaire to reveal various gaps between the actual and expected e-services from the business firms' perspective. The SERVQUAL model comprised of four dimensions: (1) website design, (2) responsiveness, (3) reliability and (4) personalisation. On the other hand, Barriers/Enablers model consisted of two dimensions: Barriers and Enablers.

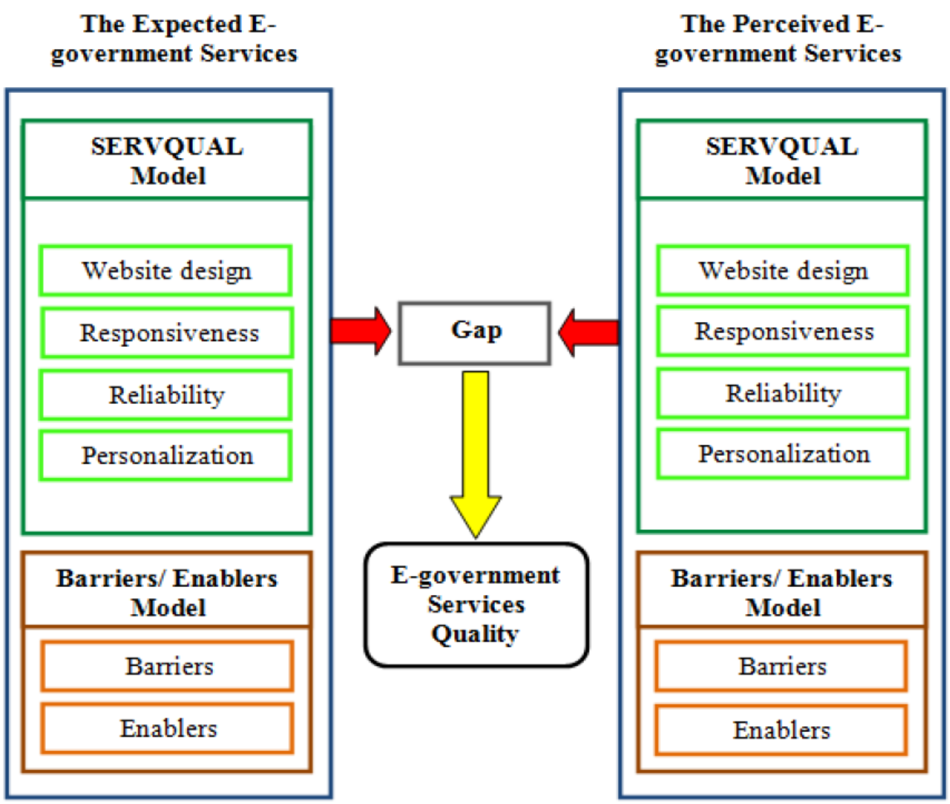


Figure 2.10: Model for evaluating the quality of e-government services: Business perspective (Source: Adapted from Abdallat, 2014: 160)

The study revealed various gaps between the actual and expected e-government services from the business perspective. All the gaps except security/privacy were found to be significant in evaluating e-government. However, the model lacks a multiple perspective approach in evaluating e-government because it focused on a single user-group (business). Actually, the author acknowledged this limitation by suggesting that future researchers should consider evaluating e-government from multiple perspectives. Moreover, the model could not suggest the causes of the gaps between the actual services and the expected. Furthermore, while the model made effort to show that e-government projects are susceptible to service quality gaps, the model only considered gaps from the system constraints; thereby, ignoring the fact that gaps can arise from the service deficiencies that the government should put online or deliver electronically to the users.

2.6 Chapter summary

An understanding of the factors enhancing e-government service gaps is crucial for the development of intervention mechanisms for improving the design and deployment of e-government projects. However, from the corpus literature, no study has explicitly focused on exploring factors enhancing e-government service gaps. In addition, it is observed that existing e-government assessment typologies have a predisposition to evaluate e-government from a universal context; they treat the adoption and implementation of e-government as the same across countries and regions. Furthermore, "most of the e-government assessment typologies assume a fixed and 'one-size-fit-all' measurement metric that does not take into consideration the unique features of the individual countries ... at the time of assessments" (Sigwejo & Pather, 2016: 2). Yet, in reality, the success of e-government is context-dependent; it does not flourish consistently across countries and regions. Thus, the need to develop a context-driven model or framework is unavoidable.

In conclusion, drawing from the suggestion made by Badewi (2014) in his presentation on "*The art of discovering knowledge gap"*, a Doctoral thesis should have at least two (2) knowledge gaps that can be converted to research papers, the researcher declares the following gaps:

- No one study has investigated the factors enhancing e-government service gaps in the developing context or across contexts.
- No measurement metric exists to assess e-government service gaps in the developing context, let alone a model informed by a critical realist perspective.

Thus, the aforesaid gaps demonstrate the need for further research as well as the novel contribution of the study. The next chapter will provide a detailed description of the conceptual model for assessing e-government service gaps. The study's conceptual model discussed next, attempts to address the abovementioned concerns by drawing upon various factors that obstruct the implementation and adoption of e-government in the developing context and e-government assessment typologies to develop a multi-dimensional model.

CHAPTER THREE

CONCEPTUAL MODEL FOR ASSESSING E-GOVERNMENT SERVICE GAPS

"Developing theories and models is what we are meant to do as scientific researchers and it sets us apart from practitioners and consultants" (Gregor, 2006).

3.1 Introduction

The previous chapter reviewed the extant literature to recognise research on the current progress and emerging issues in e-government evaluation. The review of the literature indicated that e-government evaluation has either been done by existing models and frameworks or new measurement metrics. Furthermore, the reviewed literature also acknowledged the ongoing research for the quest of alternative measurement metrics in evaluating e-government in developing countries. Nevertheless, while e-government assessment typologies have developed over time, no measurement metric exists to assess e-government service gaps according to the best knowledge of the researcher. The assessment of e-government service gaps is still missing in corpus literature and requires particular attention.

To fill the gap in knowledge, this research, therefore, proposes a conceptual model (multi-dimensional model) for assessing e-government service gaps. Theoretically, the conceptual model draws from constructs/dimensions of various e-government assessment typologies. The integration of various constructs/dimensions may provide a more comprehensive model for understanding and measuring e-government service gaps in Zimbabwe and other developing countries that share similar context. Practically, the model will be refined to become a theoretical model for assessing e-government service gaps based on empirical data.

This chapter aimed to develop a conceptual model that can be used to assess e-government service gaps. The conceptual model was used as a guideline for empirical data collection and analysis and will help to establish a multi-dimensional model for assessing e-government service gaps in the context of a developing country. Before discussing the theories and approaches underpinning the development of the model and the step-by-step processes involved, the chapter presents an overview of theory building since Elangovan and Rajendran (2015) in their study "*Conceptual Model: A Framework for Institutionalising the Vigour in*

Business Research" suggested that model development is part of the theory-building process; hence, it should be guided by the same process that guides theory development.

This chapter is divided into several broad sections as follows: Section 3.2 covers the theoretical foundation and orientations of theories and conceptual models. The purpose of this subsection is to give an appraisal of how theories and conceptual models have become mandatory ingredients in guiding scientific research and creating new knowledge. Furthermore, the section is divided into two subsections: Subsection 3.2.1 which focuses on theory and the differing views. The purpose of this subsection is to foreground the views on the understanding of the role of a theory in information systems research. In addition, the subsection provides the four classifications of the purpose of a theory in advancing knowledge in information systems research. The classification was important to enable the researcher to determine how the study aims to answer a critical realist question:

> *Why do e-government service gaps exist despite intensive efforts in the implementation of e-government projects in developing countries?*

On the other hand, Subsection 3.2.2 presents a conceptual model as a transitional theory. The idea of this subsection is to give a bird's eye view of the theoretical foundations of a conceptual model and how a conceptual model provides a link between theoretical and empirical research. Section 3.3 describes theories and approaches underpinning the development of a conceptual model as well as how they are informed by different paradigms. Furthermore, Section 3.4 gives a detailed description of how the conceptual model was developed and validated. This is a step-by-step process of model development. The chapter ends with a detailed summary of what was discussed in this chapter and a preview of Chapters Four, Five and Six. The figure below shows the research map of the chapter in order to guide the reader in navigating the sections contained in this chapter.

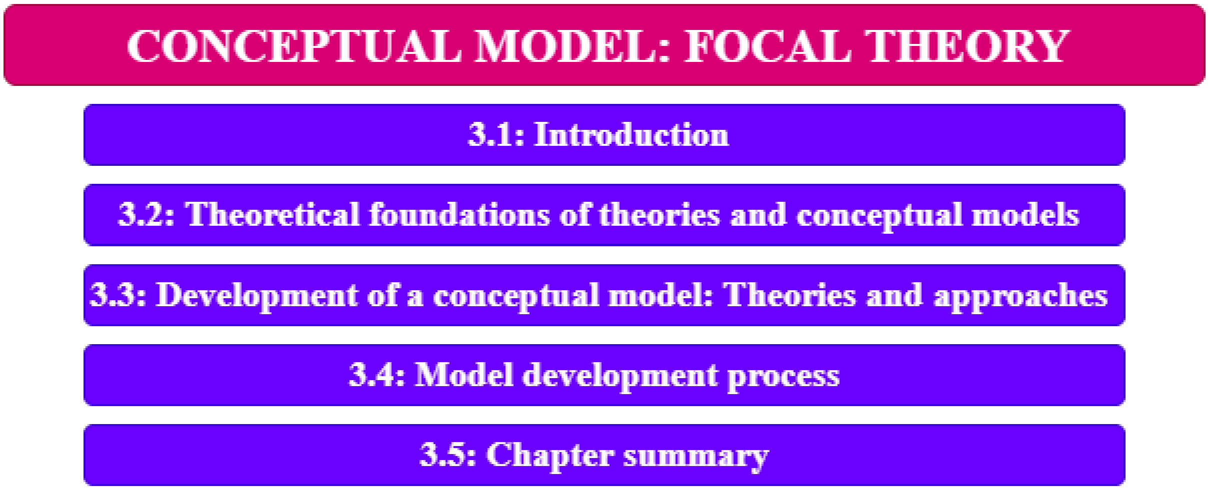


Figure 3.1: Chapter outline

3.2 Theoretical foundation of theories and conceptual models

Theories and conceptual models have become mandatory ingredients in the development of knowledge (Kivunja, 2018). In this section, the researcher takes a deliberate effort to discuss these ingredients because the development of a conceptual model follows the design process of theory building; therefore, it is important to demonstrate how theory-building influences the development of a conceptual model.

The next subsection presents underlying ideas relevant to theory to introduce the subsequent discussion of theory in developing a conceptual model. It is essential to articulate these ideas to demonstrate the underlying theoretical positions in which the model development relies on.

3.2.1 Theory and the differing views

A theory is practical because it allows knowledge to be gathered methodically and this collected knowledge illuminates scientific research. And its development should be guided by the question of interest and the problem to be addressed (Gregor, 2006). The theory has long been valued in information systems research ever since its inception (Colquitt & Zapata-phelan, 2007; Hassan et al., 2019; Kanungo, 1993; Lim et al., 2013) and more recently in critical realist research sphere (Fletcher, 2017; Sorrell, 2018). Likewise, theory enables the discipline of information systems to compete with other disciplines in the contest for trustworthiness in scientific discourse (Hassan et al., 2019; Weber, 2012).

There are multiple views about the understanding of a theory. The term theory could be defined in different ways depending on the following three elements: the field of study; basis of science (Dickson et al., 2018); and even the epoch it was discerned to be an essential tool in the creation of knowledge (Hughes, 2019). These three facets can be expected to shape the nature of theory development.

According to Colquitt and Zapata-phelan (2007), other definitions of theory focus on the relationships between independent and dependent variables. A simple definition provided by Leedy and Ormrod (2005: 4) states that "a theory is an organised body of concepts and principles intended to explain a particular phenomenon". It is a rational idea not held in the form of its illustration, but with essence expressed by its form (Elangovan & Rajendran, 2015). On the other hand, Eastwood (2011) defines a theory as an abstract thought with a particular form, intention, distinguishing attributes and derivative. Furthermore, a theory can be defined as a statement of relationships of units observed or judged in the empirical world (Nilsen, 2015). These various definitions show that a theory is formed around concepts and ideas meant to explain certain events. Thus, a theory is conceived to explain both observable and non-observable worlds. However, Elangovan and Rajendran (2015) argue that a theory is restricted in both temporal and contextual sentiency.

On the other hand, Gregor (2006) mentioned that the definition of a theory is influenced by philosophical and disciplinary orientations. Generally, philosophers of science consider theory as a tool that provides explanations, prescriptions and predictions as well as being testable *(ibid)*. However, from a positivist perspective, the two functions of a theory are prediction and explanation (Buchanan, 2015). In contrast, the interpretivists' view submits that, "a theory does not precede research but follows it so that it is grounded on the data generated by the research act" (Kivunja & Kuyini, 2017: 33). Therefore, according to these views, scientific research should follow a grounded theory to provide valid explanations and claims about the phenomenon.

Nevertheless, a critical realist theory should provide explanations of why a certain phenomenon has happened and its causal powers (Hoddy, 2019; McAvoy & Butler, 2018; Thapa & Omland, 2018). This shows that a critical realist theory has a dual objective: explanatory and prescriptive purpose. Actually, the explanatory power of a critical realist theory lies in the identification of generative mechanisms that explain how and why events occur in a given context (Eastwood et al., 2014; Hodges, Ruecker, Scaletsky, Rivera, Faller, Geppert, et al., 2017; Mingers et al., 2013).

Furthermore, some of the differing views about theory based on discipline orientations are as follows: theory as statements that say how something should be done in practice (Ononiwu, Brown & Carlsson, 2018); theory as statements providing a lens for viewing or explaining the real-world (Gay & Weaver, 2011; Grant, 2014); theory as statements of relationships among constructs that can be tested (Hughes, 2019). According to Hodges, Ruecker, Scaletsky, Rivera, Faller and Geppert (2017: 70), "a theory is a model of current understanding with the potential to inform future understanding". This understanding makes a model to be viewed as a transitional theory. Thus, a theoretical foundation is of the essence for the *description*, *explanation*, and *prediction* of the phenomena it relates to; it presents an understanding of the what, how, and why of the real-world (Crittenden & Peterson, 2011; Whetten, 1989).

According to Gregor (2006: 619), theory in information systems research is classified into four categories as follows:

a) *Analysis and description:* A theory offers a description of the phenomena of interest, analysis of relationships among constructs, the extent of generalisability in constructs and relationships and the boundaries within which relationships and observations hold.
b) *Explanation:* A theory explains how, why, and when things happened, based on variegating perspectives of causality and generative mechanisms.
c) *Prescription:* Statements in the theory specify how people can accomplish something in practice, for example, by developing an artefact, strategy, framework or model.
d) *Prediction:* A theory states what will happen in the future if certain preconditions hold. However, information systems research the degree of certainty in the prediction is expected to be only approximate or probabilistic.

This study will consider all four categorisations of the theory because of the following reasons:

a) The study aims to describe the phenomenon of interest (e-government service gaps).
b) Analyse and describe the relationship among independent, moderating and dependent variables.
c) Explain critical realist questions such as the following:
    - *Why do e-government service gaps exist despite intensive efforts in the implementation of e-government projects in developing countries?; and*
    - *What are the factors enhancing e-government service gaps in developing countries?*
d) At the same time, the study will address the problem of e-government service gaps by prescribing a multi-dimensional model which is a significant intervention in providing comprehensive e-government services in a developing country.
e) Lastly, the study will try to predict what will happen to user satisfaction if e-government service gaps are addressed.

3.2.2 Conceptual model as a transitional theory

This subsection provides a bird's eye view of theoretical foundations of a model. Generally, a model refers to a depictive design and a heuristic tool that describes the concepts and theory visually (Dickson et al., 2018; Hughes, 2019; Soulliere et al., 2001). It is further defined by Kivunja (2018) as a diagram of proposed causal linkages among a set of concepts and variables. The author indicated that a conceptual model offers a pictorial illustration of concepts and/or variables in the form of boxes connected with arrows. Thus, a model depicts the interplay of the real-world phenomenon graphically.

A well-known model in information system research includes TAM which has been widely adopted and used to evaluate the adoption of technology from a user's perspective (Napitupulu, 2017; Sebetci, 2015; Sio et al., 2015; Zabadi, 2016). The purpose of the model is to give a general understanding of the knowledge by showing various components of a system and their interrelationship (Nilsen, 2015). Thus, a model developed using the normal patterns, can undoubtedly represent the causal, a sequential and logical argument that the habit of mind makes a lucid and familiar understanding of the phenomenon.

Research is a scientific inquiry aimed at developing knowledge or contributing to the existing body of knowledge with the help of models and theories (Kivunja, 2018). A good theoretical base is one of the distinguishing characteristics of scientific research (Udo-akang, 2012). Conclusions made from an inquiry that lacks a good theoretical underpinning would be unscientific (Driscoll, 2011). Conceptual models are a kind of transitional theory; they provide a link between theoretical and empirical research. Hence, Hughes (2019) concluded that conceptual models work like maps in scientific research because they ensure that empirical enquiry is done coherently and logically.

According to Imenda (2014), conceptual models in research are treasured for two good reasons. Firstly, models provide guidance and momentum in scientific inquiry. Secondly, models provide a scaffold for extending knowledge. Furthermore, models enable researchers to dissect the phenomenon of interest using a theoretical lens (Zolfagharian et al., 2019). Also, models have been acknowledged for their roles in guiding data collection and analysis. In the context of a case study, Yin (2013) suggested that models should be used in a case study design since they enhance the understanding of complex situations.

In addition, conceptual models are useful in theory building because they form the first part in developing a theoretical framework (Bankole & McDermott, 2017). On the same note, Eastwood, Jalaludin and Kemp (2014) reported that conceptual models can be employed to simplify reality by indicating the interplay between concepts and elements of a phenomenon. It should be noted that the strength of the conceptual models is its ability to depict the logical order of causation and the role of moderating variables in a study. This shows that illustrations provided by conceptual models facilitate the understanding of the cause-effect relationship among study variables. Thus, the development of conceptual models is ordinarily informed by the researcher’s understanding of the relationships among variables.

Likewise, Eriksson, Johannesson and Bergholtz declare that:

> “Conceptual models are intended to capture knowledge about the world. Hence, the design of conceptual models could be informed by theories about

> what entities exist in the world and how they are constituted" (Eriksson, Johannesson & Bergholtz, 2018: 105).

Therefore, in terms of the above declaration, a conceptual model can be regarded as a tool designed to capture knowledge concerning the real-world and the constituted domain.

3.3 Development of a conceptual model: theories and approaches

In a quest of how to develop a conceptual model, the previous section outlined the theoretical orientation and foundations of the conceptual model. This section highlights various approaches that can be used in developing a conceptual model. Specifically, this section aims to present theories that provide support to the development of a conceptual model for assessing e-government service gaps based on a critical realist perspective.

Traditionally, the development of a conceptual model largely depends on the theoretical background and related literature (Fram, 2013; Imenda, 2014; Dickson, Adu-Agyem & Kamil, 2018). This argument shows that previous research is fundamental in developing a conceptual model. Thus, researchers should make a sincere effort to understand what is currently known about a phenomenon.

However, it should be noted that a model developed from theoretical background and literature is used as a tool for data collection and analysis (Imenda, 2014). In fact, Imenda (2014) in his study *"Is there any difference between a theoretical framework and conceptual framework"* suggested that a conceptual model is applied in a study when the research problem cannot meaningfully be researched with a single theory or concepts resident in one theory. Furthermore, according to Miles and Huberman (1994), when the research problem cannot be investigated using one theory, it is prudent to develop a model using concepts from various theories and empirical literature. Such a model (conceptual model) could then be used in place of a theoretical framework (Imenda, 2014; Soulliere et al., 2001). The arguments presented by Imenda as well as Miles and Huberman justify why the development of a conceptual model is a key facet in this study.

Also, it is necessary to develop a conceptual model with the same criteria and process by which theory building is done (Elangovan & Rajendran, 2015). Likewise, Eastwood, Jalaludin and Kemp (2014) argued that the development of a conceptual model is the first phase in theory building; therefore, it should follow the same process of theory development. Too, a conceptual model can be developed in many ways. First, by deductively and conceptually using elements obtained from the literature review. In this case, theory-building begins with mapping relationships among the concepts then afterwards, concrete evidence from empirical data is used to validate the model (Levin-rozalis, 2004; Schadewitz & Jachna, 2007; Levin-Rozalis, 2010). This approach to theory-building which is informed by the paradigm of positivism derives knowledge from rational reasoning and conclusions based on universal laws of cause and effect - deductive reasoning.

Positivism is a philosophy of science that gives importance to the merits of falsification (Uduma & Sylva, 2015). This implies that the knowledge entrenched in theory is factual until proven. The underlying approach in this paradigm is to develop a theoretical framework and test it using empirical data (Gregory & Muntermann, 2011). In fact, the theory developed using deductive reasoning should be testable using a *posteriori* method against set hypotheses to ascertain if the theory is predictive and refutable. Thus, the deductive approach is more suitable in quantitative studies.

Also, a theory can be developed using the Dubin's (1978) Theory-Building Method, hypothetico-deductive reasoning, an approach that has been widely used in theory building (Colquitt & Zapata-phelan, 2007; Musgrave, 2011; Tariq, 2015). This is an eight-step theory building approach based on the two-part of the theory-research cycle. The first part which consists of the following: 1) defining concepts, units and constructs, 2) define the law of interaction, 3) define the boundaries and 4) define the system state is regarded as the theoretical cycle because it aims to develop a conceptual framework of the theory. In contrast, the second part comprises of the following: 5) define the propositions, 6) define empirical indicators of key terms, 7) obtain testable hypotheses and 8) testing represents the operational side and it aims to produce an empirically confirmed theory (Lynham, 2002; Torraco, 2002). Figure 3.2 shows Dubin's theory-building method as an eight-step and two-part theory-research cycle.

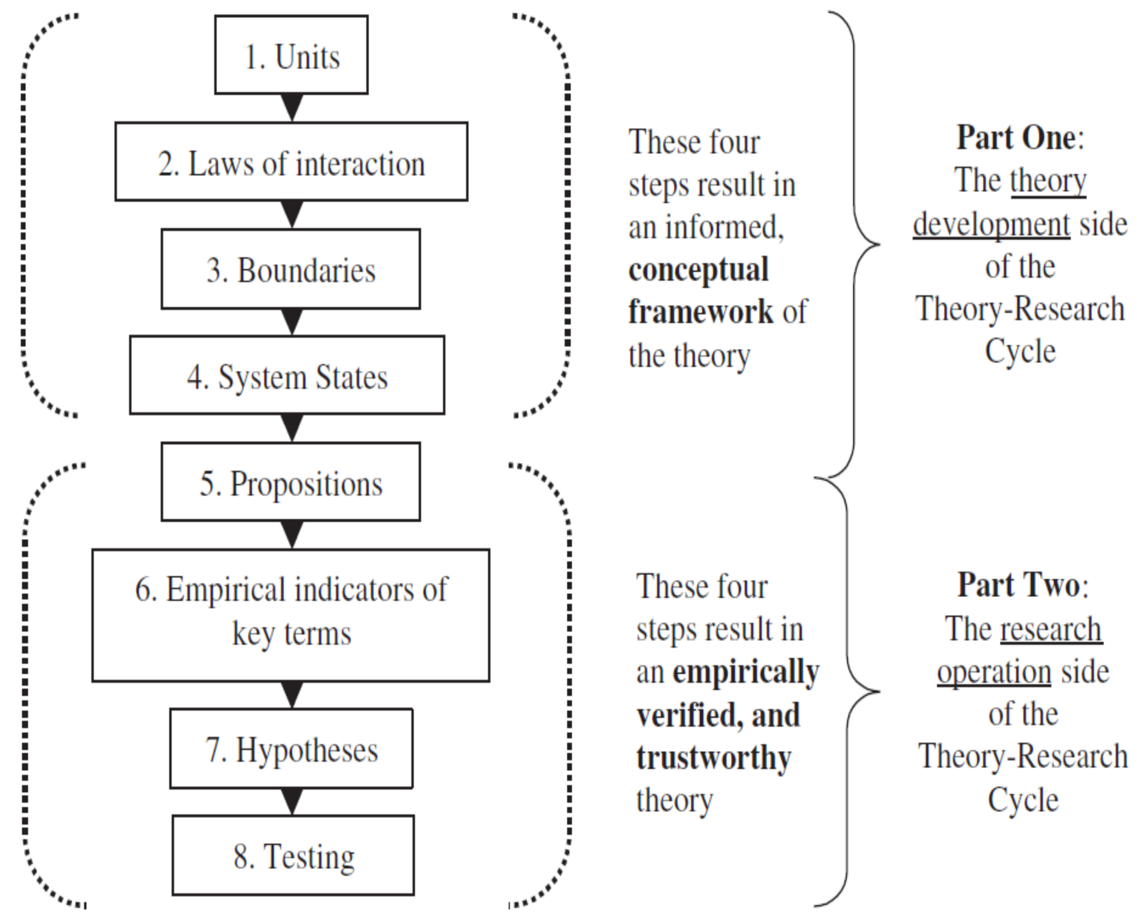


Figure 3.2: Dubin's theory-building method as an eight-step and two-part theory-research cycle (Source: Adapted from Lynham, 2002: 243)

As can be inferred in Figure 3.2, the output of the first part or theoretical side of the development cycle is an informed conceptual framework of the theory, while the second part, or research operation side, results in an empirically verified and trustworthy theory (Holton & Lowe, 2007). Accordingly, the successful completion of the first part (conceptual framework) heavily depends on the comprehensive and scholarly journeying of the related literature. Therefore, once the theoretical framework has been defined in such a way that it can be measured the study can be conducted to test the applicability of the theory in the specified domain. In contrast, the output of the last part of the theory development process depends on the collection and analysis of the empirical data. Thus, this two-part theory-research cycle and eight-step applied to the theory-building method is considered necessary and sufficient to ensure both rigour and relevance in the resulting theory. The eight steps of the model are presented and described in Table 3.1 below.

Table 3.1: Description of Dubin's Theory-Building Method steps

Step	Description
Units identification	The first and foremost undertaking in theory development is the identification of units that should be used to develop the theory. The units represent the concepts of the phenomenon of interest.
Specifying laws of interaction	This step pertains to indicating the relationship and association of the concepts of the conceptual model.
Determining the boundaries	The third step in theory development is determining the boundaries so that the bounded domain in which the theory/model will be applied is known in advance.
Specification of the system states	In the fourth step, the system state of the theory should be specified in terms of inputs, processes and outputs. This step marks the last phase of the theory development side of the cycle.
Specifying propositions	The fifth step of the theory research-cycle which also represents the first step of the theory development part pertains to the specification of the propositions based on the theoretical or conceptual framework developed in the first part. At this stage, the theory is considered ready for empirical investigation and testing.
Identify the empirical indicators	This step is necessary to ensure that the proposition statements identified in step five are testable.
Construct hypotheses	In this step, empirical indicators in the proposition statements are replaced with testable hypotheses for empirical testing in the real world.
Theory testing	The final step in this theory-building process is to perform the actual testing of the theory using statistical methods so that it can be confirmed, refuted, verified or refined.

(**Source: Adapted and modified from Lynham, 2002)**

Building on Dubin's theory-building model, Holton and Lowe (2007) proposed a seven-step general research process for theory building as shown in Figure 3.3.

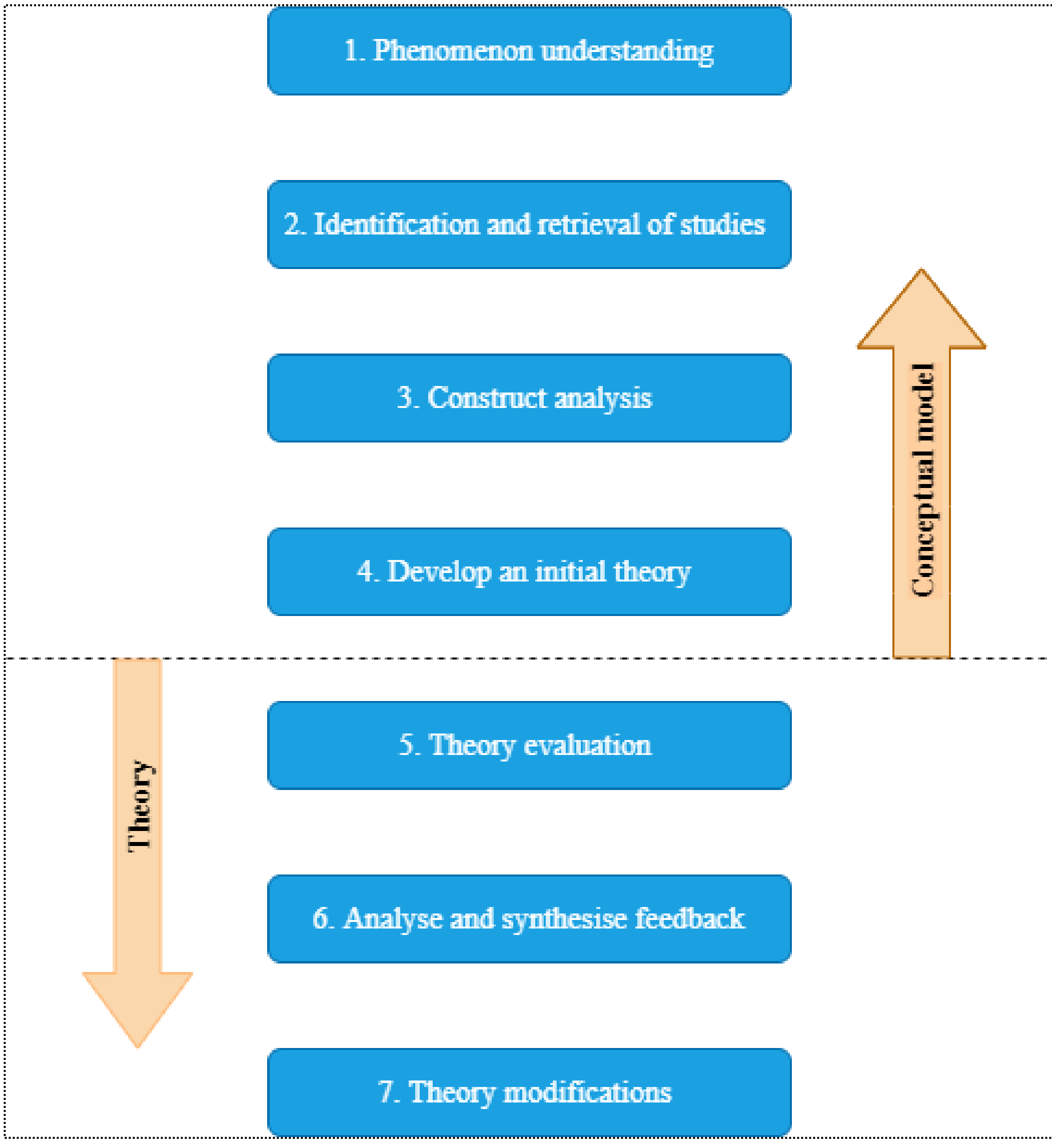


Figure 3.3: Holton and Lowe's (2007) seven-step theory development method

(Source: Adapted and modified from Holton & Lowe, 2007)

The explanation of the steps involved in the theory development method proposed by Holton and Lowe are presented in the table below:

Table 3.2: Holton and Lowe's (2007) seven-step theory development method

Step	Action/ description
Phenomena understanding	• Conduct an initial review of the literature to understand phenomena and refine it to formulate the study. • Conduct a preliminary interview with the user, experts and academicians on multi-perspective.
Identification and retrieval of studies	Find the literature on the refined areas and make a review.
Construct analysis	• Analyse constructs and relationships from existing literature. • Propose a new construct or a new relationship out of experience or thought process.
Develop an initial theory	• Define the units. • Defining the laws of interaction of theory. • Defining the boundaries of theory. • Defining the system states of theory. • Define the propositions of a theory.
Theory evaluation	The theory is evaluated against Patterson's (1986) criteria by a team of scholars.
Analyse and synthesise feedback	Analyse and synthesise feedback from scholars' evaluations.
Theory modifications	Modifies the initial theory based on a synthesis of scholarly evaluation, resulting in a modified theory.

(Source: Adapted and modified from Holton & Lowe, 2007)

While the deductive approach to theory development has found its place in theory building, this approach has been criticised for excluding data that does not fit into the initially defined conceptual model or theory (Gay & Weaver, 2011; Meyer & Lunnay, 2013). Besides, the deductive inference is regarded as being rigid in the development of the conceptual model by posing restrictions on the addition of new concepts (Samparadja et al., 2014). Thus, valuable data that would otherwise enable the emergence of new constructs is lost during data analysis. This is because deductive reasoning put more emphasis on previous research with empirical data used to either support the claim or refute it.

Apart from the deductive approach, a model can be built inductively using empirical data (Malhotra, 2017; Schadewitz & Jachna, 2007; Thomas, 2006). The theory generation method based on the induction approach is normally iterative, recurring, and nonlinear. This reasoning approach is grounded in interpretive paradigm (Jebreen, 2012)- theory building aims to reveal deep meanings of events based on deep perceptions about the phenomenon or based on conclusions drawn from observations of a phenomenon (Gay & Weaver, 2011). According to Thomas (2006: 1), "the purpose of the inductive approach is to develop of model or theory about the underlying structure of experiences or processes which are evident in the raw data". Thus, inductive reasoning is valued by Eisenhardt (1989) for its ability to avoid premature theoretical closure in the scientific inquiry because it provides methodological flexibility - allows new constructs to emerge from empirical data by moving back and forth between research questions and data analysis (Liu, 2016). Figure 3.4 shows the inductive approach in theory building.

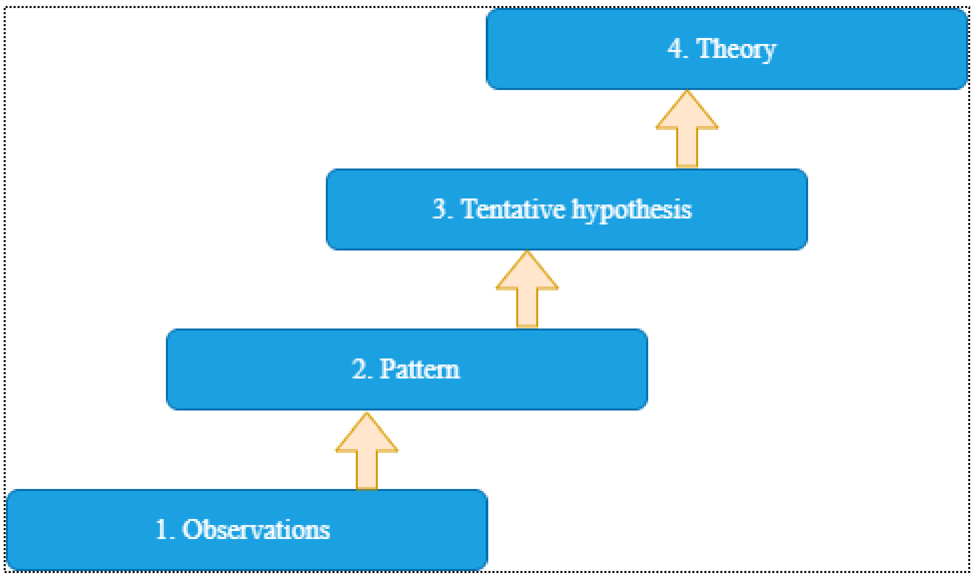


Figure 3.4: Inductive approach to theory development

From the foregoing, it can be concluded that theories and models can be developed by moving from theory to reality and vice-versa. Eriksson, Johannesson and Bergholtz (2018) referred models that move from theory to reality as conceptual models because they enable researchers to advance knowledge; hence, a conceptual model provides scaffolds for theory building and advancement of knowledge.

Since different paradigms are grounded in deeply dissimilar assumptions, obviously they create different means of approach to theory building (Holton & Lowe, 2007). So, contrary to deductive and inductive approaches, critical realists favour abduction and retroduction reasoning (Bergene, 2007; Bygstad, 2010; Fischer, 2001; Heeks & Wall, 2018; McAvoy &

Butler, 2018; Mingers & Standing, 2017; Isaksen, 2016; Saxena, 2019; Smith, 2018; Sorrell, 2018; Wynn & Williams, 2020). Likewise, Wynn and Williams (2020) maintain that abduction and retroduction approaches underpin the development of a conceptual model or theory that is informed by a critical realist perspective. Therefore, the development of the model in this study will be guided by abduction and retroduction inferences since the study is grounded on the philosophy of critical realism.

While other researchers (for example, Pietarinen & Bellucci, 2014) treat abduction and retroduction approaches similarly, this study is in agreement with Danermark (2019) who argued that abduction and retroduction are two different reasoning inferences. Abduction reasoning which is regarded by Eastwood, Kemp and Jalaludin (2016: 3) as the "hallmark of realist reasoning" is the approach employed in critical realism studies to re-interpret and re-contextualise the phenomenon within a conceptual model or situated ideas. This gives insights that are produced by mechanisms that are real but that are not directly accessible to observation and are evident only through their effects (Fischer, 2001; Levin-Rozalis, 2010; Mitchell, 2018). The use of abduction in theory building is done by the construction of models or developing pictures of structures and mechanisms such that, if they exist and act in the way contended, they would account for the phenomenon being investigated. In actual fact, structures and mechanisms are not discovered by accumulating data but by looking for evidence that would confirm their existence (Ononiwu, 2015). Thus, abduction approach answers the '*why'* question by providing a deep explanation and understanding about the phenomenon.

As used in this study, the abduction approach; that is, *"leading away from"* enabled the researcher to develop a new understanding about the object of inquiry by moving forward and backwards between theory and data (Fischer, 2001; Levin-Rozalis, 2010); thereby, moving the analysis beyond the theoretical frame. Thus, the task of a critical realist in theory development is to consistently and conscientiously move back, forward and sideways.

Malhotra (2017) defines retroduction as a knowledge-generating approach employed by critical realists that explain the causation of a phenomenon. According to Eastwood, Kemp and Jalaludin (2016: 3), "retroduction is a process where we move from a description and analysis of concrete phenomena to reconstruct the basic conditions for those phenomena to be what they are". It is a process of shifting from describing and analysing existing developments to reconstructing the fundamental conditions/mechanisms influencing these developments. A retroduction approach emphasises identifying the causes and conditions of findings. Thus, simply put, retroduction which means *"deliberately leading backwards"* enables the researcher to discern the fundamental mechanisms that explain the observed events (Hoddy, 2019; Mingers & Standing, 2017; Modell, 2009; Sousa, 2010; Thapa & Omland, 2018).

Applied in this study, retroduction entailed working back from data to a possible explanation of the reasons why e-government service gaps exist in developing countries despite intensive efforts in the design, development and deployment of e-government projects. Thus, a retroductive inference for the study was attained by going beyond the empirically observable actions - descriptive statistics. Collectively, abduction and retroduction enabled the researcher to overcome the pitfalls of purely inductive or deductive approaches to make valid explanations and representation of the real-world (Gregory & Muntermann, 2011; Nastar et al., 2018; Seymour & Serumola, 2016).

In addition, the use of abduction and retroduction approaches in theory development will enable the researcher to identify data that falls out of the conceptual model for assessing e-government service gaps and give it explanatory power rather than discarding it (Danermark, 2019a). For that reason, abduction and retroduction reasoning will enable the researcher to construct bridges between deep structures (factors enhancing e-government service gaps) and empirical patterns of a phenomenon (system functionality, service delivery, system performance and user satisfaction).

Furthermore, according to Downward and Mearman (2007), researchers employing abduction and retroduction approaches in theory development should institute certain assumptions to the research. The authors propose that these assumptions will enable the researcher to question the circumstances that are critical to the existence of reality. In this study, the researcher presents the following assumptions:

> Our minds have limitations in knowledge acquisition. The solutions and explanations we get depend on the questions we ask. The fact that we do not know that something exists does not mean it is non-existence; hence, we conduct a scientific inquiry to discover what we do not know and gain new knowledge about a phenomenon.

As a result, the assumptions presented above give credence to the fact that a solution for assessing e-government service gaps in the context of a developing country even though it is not known to exist is quite attainable through scientific inquiry; hence, this study through abduction and retroduction will be able to research for the unknown.

3.4 Model development process

Researchers need to identify a suitable theory or approach to developing a model. However, while models and theories have been widely used for developing a theory in IS research, the study argues that these foundations do not provide guidelines and/or road maps for constructing the theory. Instead, they only define the components that must be included in the theory or model. Therefore, even though models and theories are comprehensible and explicit on what should be included in the theory, they do not specify how the theory should be developed. As a result, it can be argued that some theories and models are constructed based on a "*crash landing*" manner rather than scientific and rigorous approach; hence, there is a need for establishing a road map in theory development.

The previous subsection discussed various theories and approaches to developing models and theories. With the theoretical orientation about model development at hand, the researcher presents the scientific journey in the development of the conceptual model for assessing e-government service gaps by drawing upon the Holton and Lowe's (2007) seven-step general research process as well as the Dubin's theory building method. Actually, the process for building a conceptual model for the study is synthesised into a seven-stage approach. Furthermore, the seven stages are modified and horned into the abduction and retroduction approaches. Such a synthesis does not only inform the development of a conceptual model from a critical realist perspective but also demonstrate scientific rigour in theory development.

Each stage of the conceptual model development is explained in detail in the following subsections. Figure 3.5 shows the seven-step process of developing a conceptual model.

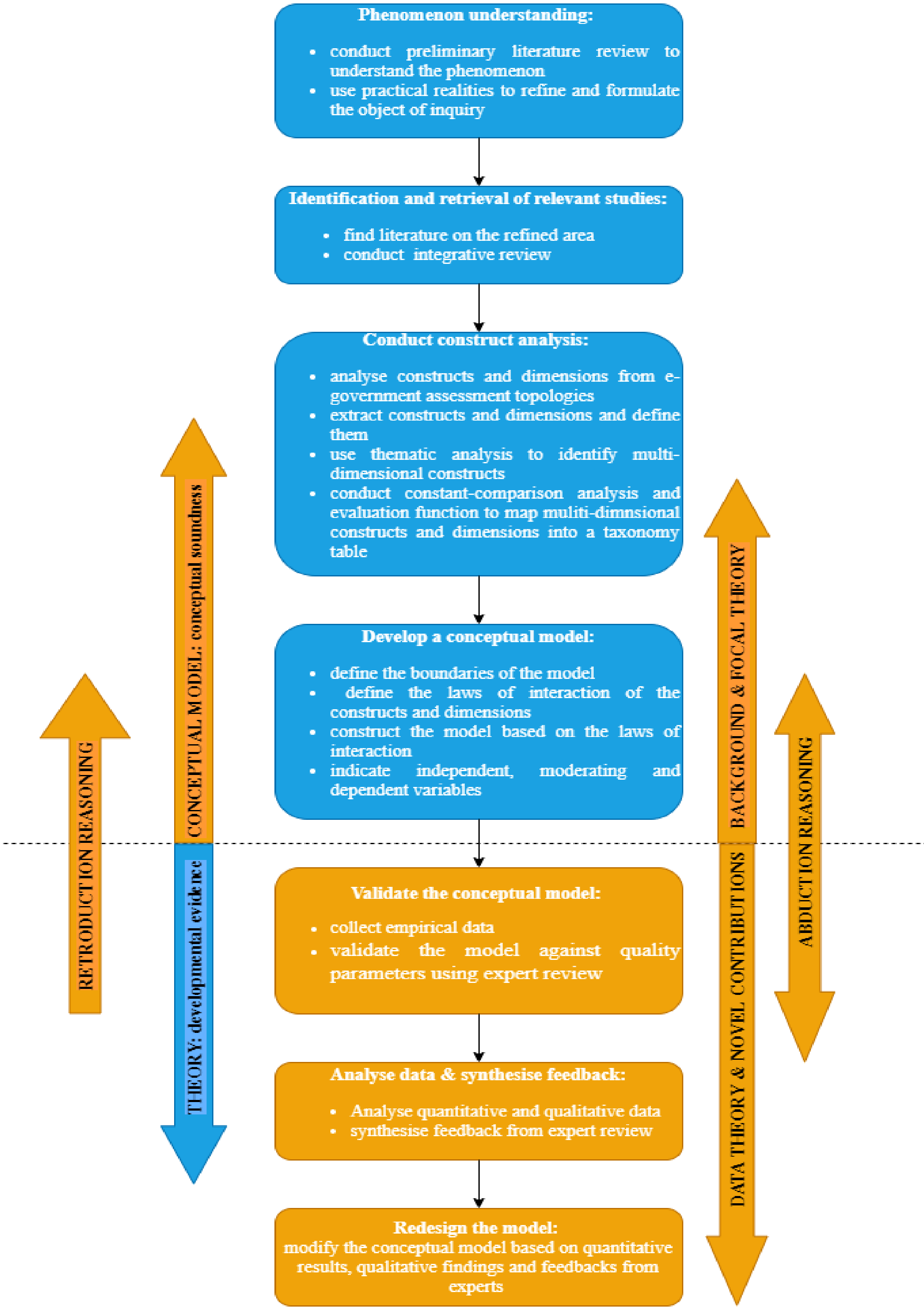


Figure 3.5: Model development using abduction and retroduction reasoning

(Source: Adapted and modified from Holton & Lowe, 2007)

The next section provides detailed descriptions of the abduction and retroduction journey taken by the researcher in the development of the multi-dimensional model for assessing e-government service gaps. The journey consists of seven steps outlined in Figure 3.5 above.

3.4.1 Phenomenon understanding

Understanding a phenomenon is essential in theory-building. “It is difficult to imagine starting a theory-building journey without having attained an initial understanding of the phenomenon sufficient to realise that new theory is needed” (Holton & Lowe, 2007: 305). This makes a phenomenon the foundation of the theory-building process (Tellis, 2017); therefore, it should be understood before theory development. According to Van de Ven (2016: 1), “a research phenomenon can be any problem, issue, or topic that is chosen as the subject of an investigation”. It can be perceived to typify a dissatisfactory situation or condition, a prospect, a collapse or anomaly in an expected system or just an issue of interest. A phenomenon may originate from one of the following sources: “the practical world of affairs, a theoretical discipline, or a personal experience or insight” (*ibid*). However, Tellis (2017) argued that the entry point in developing new knowledge is the literature; hence, it is a rare case to develop a theory independent from literature. This argument suggests that a preliminary review of literature is a prerequisite to understanding the phenomenon. Obviously, this is because literature comprises what is already known about the phenomenon (Shalley, 2012) and constitutes proven models and theories to direct a scientific inquiry. Remarkably, the literature also exposes gaps in knowledge that can become an object for further inquiry. Therefore, Tellis (2017) postulates that gaps in knowledge inspire further research in a given area of study.

In this study, the phenomenon was understood from the practical world of affairs; theoretical discipline; personal experience; and insights, taking preliminary literature review as the entry point. This was important to avoid what is termed “imaginary pseudo-problems that lack empirical grounding” by Van de Ven (2016: 2). Furthermore, grounding a phenomenon on the aforementioned four particulars is premised on the researcher’s following argument:

> We do scientific inquiry because there is a knowledge gap. This gap combined with observations in the practical worlds of affairs, personal experiences and insights about the phenomenon leads to the identification of

a persistent problem. And the scientific inquiry should fill the identified gap to solve the problem in the practical world and contribute to the body of knowledge as well as improve practise or satisfaction.

Furthermore, the above assertion finds support from Hevner et al. (2004) by arguing that information systems researchers should make a sincere effort to contribute to the existing body of knowledge and improve industry practise. This argument dovetails with the purpose of this study — to contribute to the existing e-government assessment typologies and propose a solution that will possibly improve the design, development and deployment of e-government projects in the developing context.

A spider concept mapping (non-hierarchical) (Davies, 2011) was used to organise and represent the phenomenon since the study of e-government does not necessarily follow successive levels. Accordingly, "concept maps are composed of concepts that are written in boxes and connected with arrows that are labelled to indicate the relationship between concepts" (Kinchin, Möllits & Reiska, 2019: 14). Thus, researchers are at liberty to study e-government right from its core, particularly those in the developing context. In fact, while developed countries have gone past the adoption of e-government (Alabdallat, 2020; Le Blanc & Settecasi, 2020; Conceição, Samuel, & Biniecki, 2017), countries in the developing context are still battling with e-government adoption issues (Aneke, 2019; Chhabra et al., 2018); hence, the phenomenon of e-government in the developing context is more likely to begin at the nucleus of e-government concept.

The concept mapping shown in Figure 3.6 gives a pictorial understanding of the wider area of e-government and its domains developed from the preliminary literature review (Conceição et al., 2017; Davies, 2011; Kinchin et al., 2019).

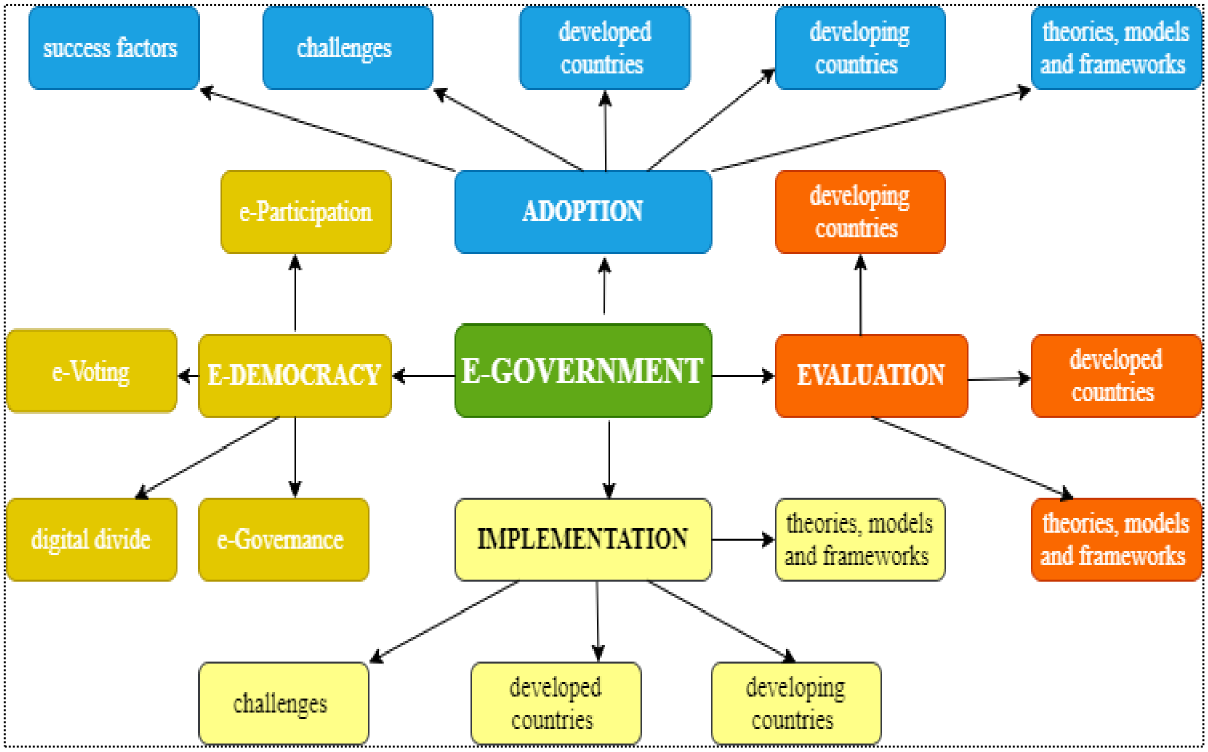


Figure 3.6: A concept map representing a wider area of e-government phenomena

While going through the literature on e-government, the study understood that e-government services have been in use in developing countries for approximately two decades (Enaw et al., 2016; Verkijika, 2018). However, despite the deliberate efforts into the design, development and deployment of e-government services in these countries, e-government service gaps still exist. This understanding led to the following critical realist question:

Why do e-government service gaps exist in developing countries despite intensive efforts into the design, development and deployment of e-government projects?

Based on the practical world of affairs (observing long queues in government offices), personal experience (lack of comprehensive e-government services) and insight (from MICTPCS) into the deployment of e-government projects, the researcher argued that the existence of e-government service gaps could be more of an evaluation problem. This is because issues such as adoption and implementation have received significant attention since the inception of e-government. Hence, the researcher focused on assessing e-government in the context of a developing country rather than investigating its adoption and/or implementation.

3.4.2 Identification and retrieval of relevant studies

The literature exploration is of the essence in the theory building process (Holton & Lowe, 2007). Therefore, reviewing relevant literature to establish the extent, persistence and the context of the phenomenon is also required (Van de Ven, 2016). In the same vein, Wacker (1998) advised that literature review (relevant studies) plays an important role in fulfilling model building conditions. In this study, the literature review provided a theoretical and empirical framework on which the model for assessing e-government service gaps was grounded. The fundamental methodology was integrative literature review supported by constant-comparison method, thematic analysis and evaluation function. The integrative review gave direction to construct the conceptual model based on findings from prior studies and existing e-government assessment typologies. According to Torraco (2016: 404), "an integrative review of literature is a distinctive form of research that uses existing literature to create new frameworks, models, perspectives and knowledge from emerging or mature topics". Here, the integrated review was used to address an emerging topic since the quest for e-government in developing countries is still an on-going process. The procedure for conducting the integrative review in this study involved the following steps: identification and retrieval of relevant studies; and construct analysis.

During data collection, research articles were searched through electronic databases which include Ebscohost, Wiley Online Library, Springer Link, Science Direct, Taylor and Francis journals, Sage Research Methods, JSTOR, Google Scholar and Emerald and the Electronic Journal of Information System in Developing Countries (EJISDC), which is one of the famous ICT4D journals. Keywords and phrases used to collect data included: e-government in developing countries; e-government and developing countries; success factors on e-government implementation; implementation of e-government initiatives; factors for successful e-government adoption; success and failure factors for e-government projects; critical success factors for e-government; e-government evaluation; e-government assessment; digital governance success factors and barriers; e-government evaluation model; and framework for assessing e-government. Boolean logic operators (AND, OR) were used to widen the search (Ecker & Skelly, 2010) while filters and phrase searches were utilised to refine the search to the specific topic. Abstracts, introduction/background, methods and discussions were carefully examined to justify the inclusion of the articles.

Furthermore, the snowballing sampling technique was used to identify relevant articles (Wohlin, 2014). The researcher used the *"E-government citizen satisfaction framework"* by Sigwejo and Pather (2016) as a start case as proposed by Wohlin (2014). Accordingly, Sigwejo and Pather argued that:

> "The [existing] models and frameworks were designed based on evaluation dimensions derived from developed countries, which may differ from those of developing countries; therefore, rather than just adopting these existing measures, it seems far more logical to re-evaluate and customise the [measurement elements], establishing which ones are important and suitable for a typical African e-government service" (Sigwejo & Pather, 2016: 2).

Likewise, snowball sampling enabled the researcher to identify quality studies on e-government evaluation from previous authors by following a reference of references (Wohlin, 2014). Furthermore, by using a snowball sampling, the researcher expected to collect as many articles on e-government evaluation as possible. The process of data collection iterated until the researcher could not find frameworks/models with new constructs/dimensions. Hence, the search process was terminated based on theoretical saturation (Wirtz & Daiser, 2018). This is a point in which further inquiry no longer offers new data about the study.

3.4.3 Construct analysis

Constructs are concepts or ideas regarding a phenomenon that is worthy of measurement through variables (indicators) in a given theory development process (Polites et al., 2012). According to Roy et al. (2012: 35), "constructs represent different variables which are useful in understanding the phenomenon". They are conceptualised as unidimensional or multi-dimensional depending on the degree of their abstraction (Kim, 2017). Conceptually, a construct is construed as unidimensional when it can be measured using a single indicator, item or element (Kim, 2017). On the other hand, a multi-dimensional construct pertains to many different but related dimensions regarded as a single theoretical concept.

The usefulness of multi-dimensional constructs in theory development lies in its ability to provide a holistic representation of a multifaceted phenomenon (Johnson et al., 2012; Polites et al., 2012). Collectively, linked dimensions represent a single theoretical concept. This implies that a multi-dimensional construct is a distinct theoretical concept that is measured by several related dimensions, constructs or concepts (Edwards, 2001; Kim, 2017; Polites et al., 2012; Wong et al., 2008) and apiece, these dimensions represent some segment of the overall underlying construct. Thus, the abovementioned shows that multi-dimensional constructs have a higher degree of abstraction compared to unidimensional constructs. In addition, a multi-dimensional construct is a truly unobservable and abstract construct which coexist with its dimensions. Abstraction integrates many relationships and variables into a larger theory (Wacker, 1998). Thus, a multi-dimensional construct is a higher-level construct underlying its dimensions (Edwards, 2001; Kim, 2017; Polites et al., 2012; Wong et al., 2008).

A constant-comparative method (Eastwood et al., 2014) was used together with the thematic method (Maguire & Delahunt, 2017) to analyse the constructs for developing the conceptual model. In the constant-comparative analysis, each portion of data was compared with all other sections of relevant data. The method was considered appropriate for construct analysis because the researcher needed to identify the constructs and their dimensions that are suitable for developing a multi-dimensional model. Furthermore, since the constant-comparative method is consistent with the abduction reasoning which emphasises the connection between theory and data, the use of abduction inference enabled the researcher to employ constant-comparative analysis to establish well-defined and mutually exclusive dimensions for developing constructs of the conceptual model. Thus, the constant comparative method was used to make certain that there was no substantial overlap of dimensions — dimensions for assessing e-government service gaps did not belong to more than one construct (theme). This was further achieved by creating a table of taxonomy (see Table 3.5) in organising and comparing extracted dimensions with other dimensions in the same group as well as in the other group. Thus, dimensions that were close to each other were grouped together under one theme.

On the other hand, thematic analysis, according to Maguire and Delahunt (2017) is a systematic process of identifying patterns/ themes within qualitative data to group related elements together. Nowell, Norris, White and Moules (2017) define a theme as conceived to be a thread of fundamental meaning totally revealed at the interpretative level to unify ideas regarding the subject of inquiry. Thematic analysis is therefore epistemology-independent because of its flexibility in analysing qualitative data. Qualitative researchers have therefore relied on thematic analysis' theoretical freedom. Hence, it was suitable for this study since it is grounded within a critical realist perspective (Clarke & Braun, 2013) and was required to analyse textual data, too (Al-Debei & Avison, 2010).

During data analysis, thematic analysis was used to cluster dimensions extracted from evaluation metrics according to their themes/constructs. Table 3.3 shows the constant-comparative method used together with the thematic approach as a means of qualitative data analysis.

Table 3.3: Constant-comparative method used together with the thematic approach

Stage	Brief description
Stage 1	Read through the e-government assessment typologies
Stage 2	Identify, define and describe measurement dimensions
Stage 3	Identifying constructs (themes)
Stage 4	Mapping constructs and dimensions

Stage 1: Read through the e-government assessment typologies

After conducting a comprehensive and profound exploration and analysis of contemporary and related literature, the researchers read through the e-government assessment typologies to gain an understanding of constructs and dimensions essential for e-government assessment.

Stage 2: Identify, define and describe measurement dimensions

During the analysis, the researcher identified and extracted the dimensions that were found relevant for developing initial constructs. A total of 22 dimensions (see Table 3.4) were identified from various e-government assessment typologies. Moreover, to aid the process of constant comparative analysis, the definition of each dimension extracted from the e-government assessment typologies were checked from literature to determine their inclination since they could be a thin line between the constructs. Thus, the researcher organised the dimensions in a table and defined them to create textual data that would facilitate thematic analysis. Dimensions and their definition/description are presented in Table 3.4.

Table 3.4: Selected scholarly definitions/descriptions of measurement dimensions of e-government

Dimension	Definition/description
Responsiveness	This encompasses the quickness of an e-government system in responding to services and/or information requested by users (Gebremichael & Singh, 2019).
Sufficiency	This refers to the quality of an e-government system to provide or deliver comprehensive services to the citizens so that their needs are fulfilled electronically (Waller et al., 2014).
Flexibility	This is the ability of the e-government system to adapt to emerging requirements of the citizens (Abu-Shanab & Khasawneh, 2014).
Completeness	This refers to the degree to which services provided by an e-government system are sufficient to meet citizen expectations (Zhou et al., 2019).
Navigation	This is about ensuring that citizens are able to complete their required tasks in a way that is simple and uncomplicated (Roberts & Hernandez, 2019)
Integration	This refers to the extent to which e-government systems can share information to enable citizens to access services from various department and agencies using a single access point (Waller et al., 2014).
Ease of use	This is the degree to which citizens believe that using the e-government to perform transactions with the government would be free of effort (Ahmad et al., 2019).
Interactivity	This is the extent to which citizens can participate in modifying the content of a website in real-time (Ahmad et al., 2019).
Personalisation	This refers to the practice of delivering tailor-made experiences to citizens based on their distinctive preferences and needs, as opposed to offering a uniformed experience to all citizen (Waller et al., 2014).
Intangibility	Generally, intangibility is the degree to which a service cannot be touched or seen, lacks a physical presence, and has attributes with which the *user* is unable to physically interact (Taherdoost et al., 2014).
Efficiency	This refers to how citizens the potential of the e-government system to save money, time, and efforts in the delivery of public service (Patsioura, 2014).
Availability	Availability refers to the types, levels, and a number of services offered via an e-government portal (Roberts & Hernandez, 2019).
Accessibility	This can be defined as the extent to which e-government services are available to citizens with varied restrictions and diverse IT capacities (Roberts & Hernandez, 2019).
Accuracy	This is the degree to which information and services provided by e-government systems are free from error (Khameesy et al., 2017).
Convenience	"Convenience ... involves saving time and increasing service efficiency as compared to branch agencies" (Eze et al., 2011: 519).
Relevance	This is the degree to which an e-government system is consistent with the need of the citizens and is applicable for delivering adequate services (Jaeger & Matteson, 2009).
Timeliness	This is the degree to which citizens are able to get e-government services without any delay (Palvia & Sharma, 2007).
Reliability	This represents the extent to which public services are delivered to the citizens normally and consistently, with problems that take

	place being solved timeliness (Albar et al., 2017).
Transparency	Transparency is defined as the degree to which services provided by an e-government system are timeliness and unequivocal.
Actual performance	The Actual performance of the e-government system pertains to the real and tangible services offered to users by a particular e-government system (Gupta & Jana, 2003).
Expected performance	The expected performance of the e-government system is a metric of how the system should perform from the perspective of the users (Rana et al., 2017).
Satisfaction	Satisfaction refers to the degree to which users believe that the e-government system meets their service requirement (Ives, Olson & Baroudi, 1983); that is, there is no gap between users' expectation and the services provided.

Stage 3: Identifying constructs (themes)

Having the content identified for the 22 dimensions, the researcher started to analyse them thematically (Al-Debei & Avison, 2010). The researcher looked for pertinent narratives in each definition/description to identify key concepts or phrases. It is important to note that only a single concept or phrase was identified from each definition/description. This was also important to ensure that dimensions did not belong to more than one construct or theme. In addition, dimensions which had similar definitions were merged in the taxonomy table. The use of thematic analysis over the extracted definitions and descriptions of the dimensions facilitated the building of a taxonomy that categorises the different dimensions into four exclusive constructs/themes that are presented in Table 3.5.

Thus, thematic analysis led to the identification of the following multi-dimensional constructs/themes: *system functionality; service delivery; service gaps;* and *user satisfaction*. Dimensions whose definitions or descriptions were related to the technical attributes of the system were grouped under the *system functionality* construct while those that related to the delivery capabilities of the system were grouped under the *service delivery* construct. In contrast, narratives that highlighted on system performance were grouped under the *service gaps* theme since the performance of a system determines whether there is a gap or not. On the other hand, descriptions that were related to satisfaction were grouped under the *user satisfaction* theme. The four constructs/themes developed through a thematic analysis were perceived by the researcher fitting to encapsulate the 22 dimensions extracted from the e-government assessment typologies. Despite being used to encapsulate the measurement dimensions, the constructs were also regarded as suitable for representing the theoretical abstraction of the phenomenon.

Apart from the definitions and descriptions of the dimensions, the constructs were also determined by taking into account that an e-government system needs to perform certain functions, deliver comprehensive e-services and satisfy users. Furthermore, to assist the constant-comparative analysis, the researcher gave a brief description of the identified four constructs as follows:

System functionality

The functionality of the e-government system is defined by Sigwejo and Pather (2016) as the extent to which government systems are expected, by the users, to perform. This construct defines how the e-government system functions; the technically correct functioning of the e-government system. The elements of functionality include, but not limited to responsiveness, navigation, reliability, interactivity, completeness. According to Albar et al. (2017), the successful development and implementation of e-government should consider the component of functionality. The functionality of the e-government system can exert an indirect impact on the quality of the system. However, in most developing countries many researchers have indicated that a majority of e-government systems have limited functionality (Abdelkader, 2015; Albar et al., 2017; Barbosa et al., 2013; Elkadi, 2013). A five-point Likert scale was used to measure the functionality constructs in view of the dimensions indicated in Table 3.5.

Service delivery

Delivery of e-government services is the electronic distribution of public services to offer a dependable service experience to a specific user-group using appropriate delivering channels. It is defined by Yang (2017) as a continuous, cyclic process for developing and delivering user-focused public services by means of technology. An effective e-government service delivery depends on accessibility, efficiency, accuracy, relevance, timeliness, completeness and transparency (Abbassy, 2016; Maphephe, 2013; Muhammad, 2013). Nevertheless, many authors contend that developing countries are saturated with failure reports on the delivery of e-government services (Al-Nidawi et al., 2018; Elkadi, 2013; Ofoeda et al., 2018; Wamoto, 2015). Likewise, the delivery construct was measured using the dimensions presented in Table 3.5 based on a five-point Likert scale.

Service gaps

Pena, Maria, Maria, Tronchin and Melleiro (2013) defined service gaps as the gap between the expectations of customers and the services provided to them. Specifically to this study, e-government service gaps is the extent to which e-government services are not fulfilled to the intended beneficiary (businesses and citizens) of the e-government system (Herdiyanti et al., 2018) either because the system is constrained to deliver the required services or some of the expected services are not being provided. This results in gaps between the actual performance and the expected performance of the e-government system.

User satisfaction

Existing research has long considered *user satisfaction* as a primary determinant of successful e-services (Ali, 2017; Ives, Olson & Baroudi, 1983; Patsioura, 2014). According to Ives, Olson and Baroudi (1983: 785), “user satisfaction is the extent to which users believe that the information system available to them meets their information [and service] requirements”. The factor of the user satisfaction is used in many studies to ascertain how the degree of satisfaction to e-services will impact citizens’ adoption rates (Ali, 2017; Mohamed et al., 2009; Patsioura, 2014; Ramdan et al., 2014). Improved quality of e-government will increase citizens’ satisfaction, which, in turn, increases the utilisation of e-government services.

Stage 4: Mapping constructs and dimensions

Dimensions extracted from e-government assessment typologies were mapped into four constructs using a table of taxonomy for organising constructs and dimensions. In essence, “taxonomy is a systemising mechanism utilised to map any domain, system, or concept, as well as a conceptualising tool relating its different constructs and elements” (Al-Debei & Avison, 2010: 361). The mapping process in this study was refined using constant-comparative analysis and abduction and retroduction inferences to ensure that dimensions aligned with the appropriate constructs. The outcome of this mapping strategy is a taxonomy which comprehends four unique constructs/themes and respective dimensions.

Furthermore, using the evaluation function, dimensions were mapped into the same construct/theme based on the following specifies:

a) Apiece, they are thematically analogous; that is, dimensions converse matching or much-related semantics and ideas about the construct/theme.
b) They have contextual relationships that complement each other; thus, they become more useful in assessing e-government service gaps if clustered.
c) The clustered dimensions as a whole articulate a distinctive compositional facet of the e-government assessment construct.

Out of 22 dimensions presented in Table 3.4, 17 were mapped into four constructs and further used in the next subsections to develop the conceptual model for assessing e-government service gaps. However, to avoid the inclusion of redundant dimensions in the development of the conceptual model, five dimensions were dropped because of the following reasons:

a) Convenience was defined by the extant literature similarly with efficiency.
b) Completeness referred to the degree to which services provided by an e-government system are sufficient to meet citizen expectations.
c) Availability of e-government services also entailed the accessibility of e-government services to the citizens.
d) Navigation since it is regarded as the indicator of ease of use.
e) Personalisation was perceived by the researcher as unsuitable for assessing e-government in the developing context since it is normally achieved by highly matured (seamless) e-government systems.

The final constructs and dimensions are presented in Table 3.5 prior to the development of the conceptual model.

Table 3.5: The taxonomy for organising constructs and dimensions

CONSTRUCT	DIMENSION
SYSTEM FUNCTIONALITY	Responsiveness
	Flexibility
	Integration
	Ease of use
	Interactivity
	Reliability
	Intangibility
SERVICE DELIVERY	Efficiency
	Sufficiency
	Accessibility
	Accuracy
	Relevance
	Timeliness
	Transparency

SERVICE GAPS	Actual performance
	Expected performance
USER SATISFACTION	Satisfaction

3.4.4 Developing a conceptual model

The conceptual model was developed based on the constructs and dimensions extracted from e-government assessment typologies. Furthermore, the researcher emphasises the inclusion of factors enhancing e-government service gaps since they are perceived to work as generative mechanisms in the performance of an e-government system. The constructs and dimensions are translated into the model based on the constant comparative method, thus an initial model is developed. In developing the model, the following principles suggested by Lynham (2002) were taken into consideration:

- The boundaries of the model; and
- The laws of interaction.

No model can represent and explain the entire real-world (Lynham, 2002). This is because, by their very nature of design and construction, models have limited explanatory sphere. Therefore, since models have limited scope, their boundary conditions need to be defined to adjudicate the effects within the model (Lincoln & Lynham, 2011). Boundaries delineate the realm over which the conceptual model is implemented. Conceptual models are symbolic of the real-world and the boundaries define the facets of the real-world that is represented by the model. However, since models have limited realm in explaining the real-world, determining the boundaries of the model enabled the researcher to situate and elucidate the facets of the real-world that the model is seeking to represent; hence, providing a focus on the explanation of the phenomenon. Therefore, every researcher should be mindful that the boundary of the conceptual model sets the real-world limits of the model; thus, showing what the model is capable of explaining (Lynham, 2002). This enabled the researcher to avoid dogmatic application of the model.

Conventionally, boundaries in a conceptual model are categorised as internal and external (Al-Debei & Avison, 2010). The internal criterion is grounded on dimensions and the law of interactions within the model. In comparison, the external criterion is imposed by dimensions or interactions not initially included in the conceptual model but emerge from the empirical study. The researcher acknowledges that e-government has many interactions and boundaries. These include government employees, businesses, citizens, political process, civil society and non-government organisations (Rowley, 2011). However, since every phenomenon of interest should be governed (Lincoln & Lynham, 2011), the proposed model only interacts with government employees, businesses and citizens.

Also, the researcher arrives at the conceptual model with the assumption that any digital-enabled service shares boundaries with information systems and e-services domains; hence, the researcher got a broader picture of the phenomenon. This assumption is also based on the view that historically, information systems and e-services developed earlier than e-government and e-Taxation (which is the case system in this study) follows the order stated below:

- Information systems;
- E-services;
- E-government; and
- E-Taxation.

Furthermore, since the purpose of the boundary is to show the utmost realm of the operation of the model, the boundaries presented in Figure 3.7 indicate that the proposed model can possibly contribute to the evaluation of the entire e-government as well as e-services and information systems in general. However, it should be noted that the further the point of interaction, the lesser the explanatory power of the model. Thus, it can be concluded that models have great explanatory power within their immediate interactions or boundaries but they lose that power as the boundaries elongate. The figure below depicts the boundary of the conceptual model for assessing e-government service gaps.

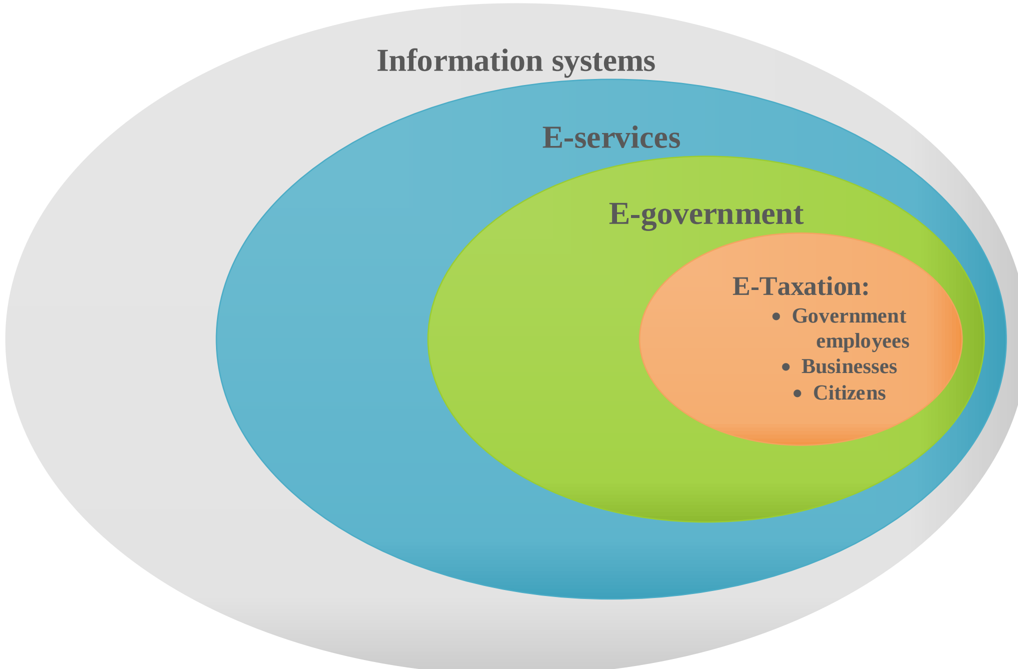


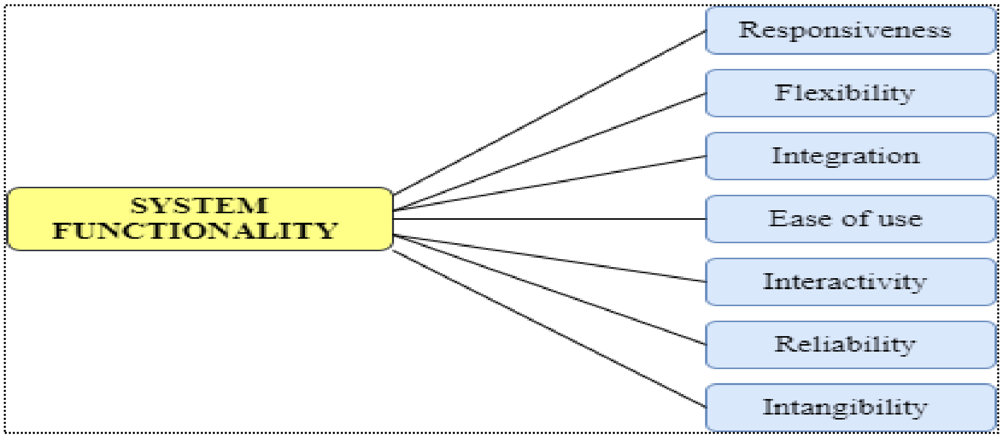
Figure 3.7: Boundary of the conceptual model for assessing e-government service gaps

The boundaries shown in Figure 3.7 above make clear and explicit the real-world domain over which the conceptual model is expected to apply and hold up. The boundary of the model also shows the realm in which e-government and e-taxation systems exist. Furthermore, the boundary of the model enabled the researcher to determine the generalisability of the model.

On the other hand, the laws of interaction are the statements of the relationship between the constructs and dimensions of the model (Lynham, 2002; Holton & Lowe, 2007). Thus, "the laws of interaction are those [statements] that describe the existing relationship between the theory's concepts (units) and that show the cause-effect relations between the concepts …" (Campos, Atondo & Quintero, 2014: 81). The statements of the interaction clearly state how constructs and dimensions should interact with each other in the model. Constructs and dimensions can be adequately mapped in the model if the nature of the interaction is established accurately. Also, it can be noted that defining laws of interaction has a major impact on the contribution of knowledge by the model (*ibid*). The following seven laws of interaction which enhance e-government service gaps and user satisfaction were identified as follows:

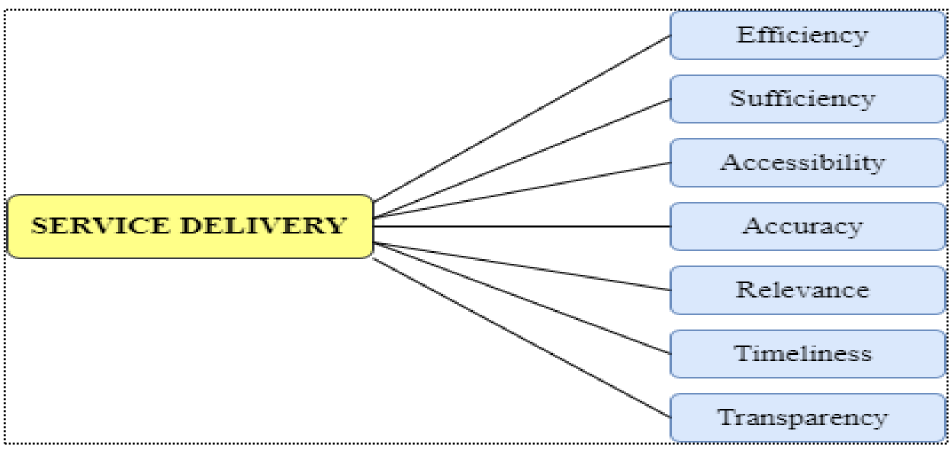
Law of interaction 1:

System functionality of e-Taxation is enhanced by responsiveness, flexibility, integration, ease of use, interactivity, reliability and intangibility.



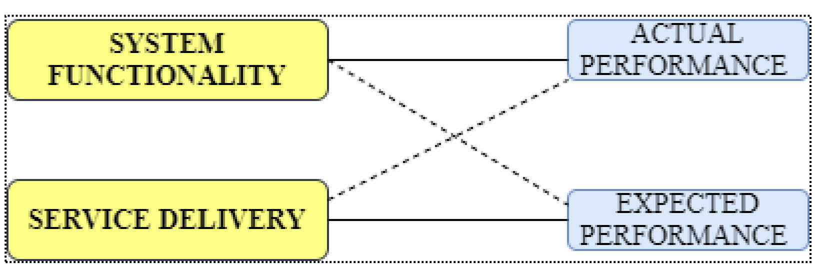
Law of interaction 2:

Service delivery of e-Taxation is enhanced by efficiency, sufficiency, accessibility, accuracy, relevance, timeliness and transparency.



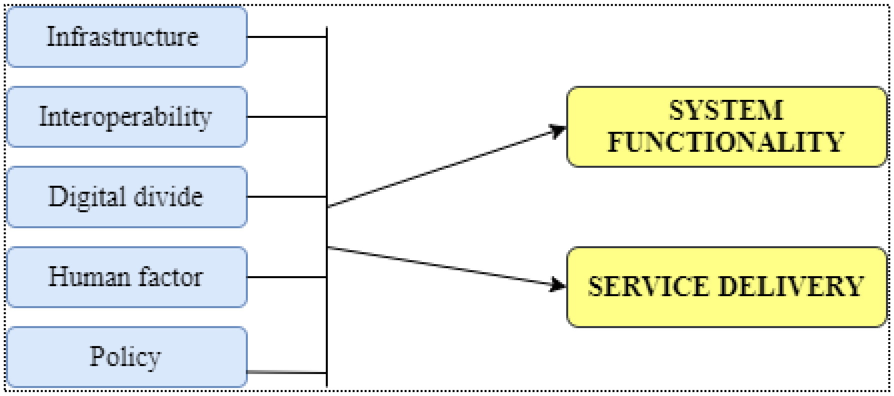
Law of interaction 3:

System functionality and service delivery capabilities of e-Taxation influence the actual performance and expected performance of the system.



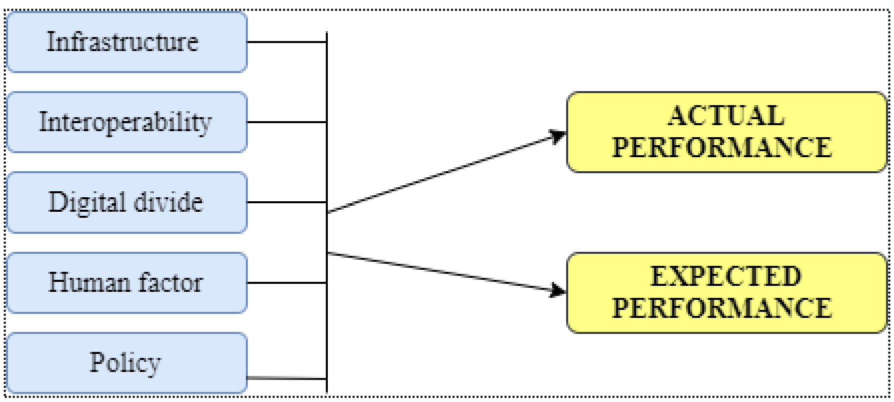
Law of interaction 4:

Factors enhancing e-government service gaps influence the system functionality of the e-government and its service delivery capabilities.



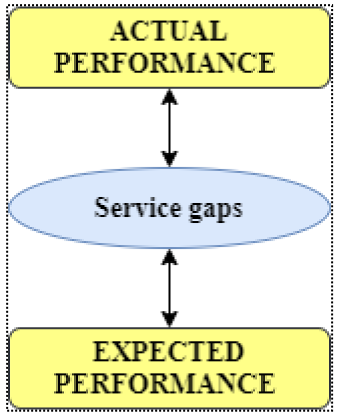
Law of interaction 5:

Infrastructure, interoperability, digital divide, human capacity and policy alter the performance of the e-Taxation system.



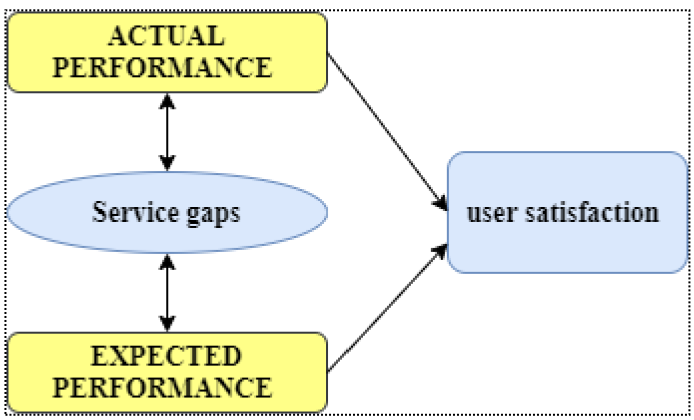
Law of interaction 6:

Actual performance and the expected performance of e-Taxation determine the e-government service gaps.



Law of interaction 7:

User satisfaction depends on the gap between actual performance and the expected performance of the e-Taxation system.



Based on the laws of interaction presented above, a conceptual model for assessing e-government service gaps is presented in Figure 3.9 below. In the conceptual model, system functionality and service delivery constructs represent the independent variables of the study. Singularly or jointly, system functionality and service delivery constructs influence the expected performance, the actual performance of the e-government system and user satisfaction. Furthermore, by using the laws of interaction it can be concluded that the level of user satisfaction depends on the gap between expected performance and actual performance of the e-government system.

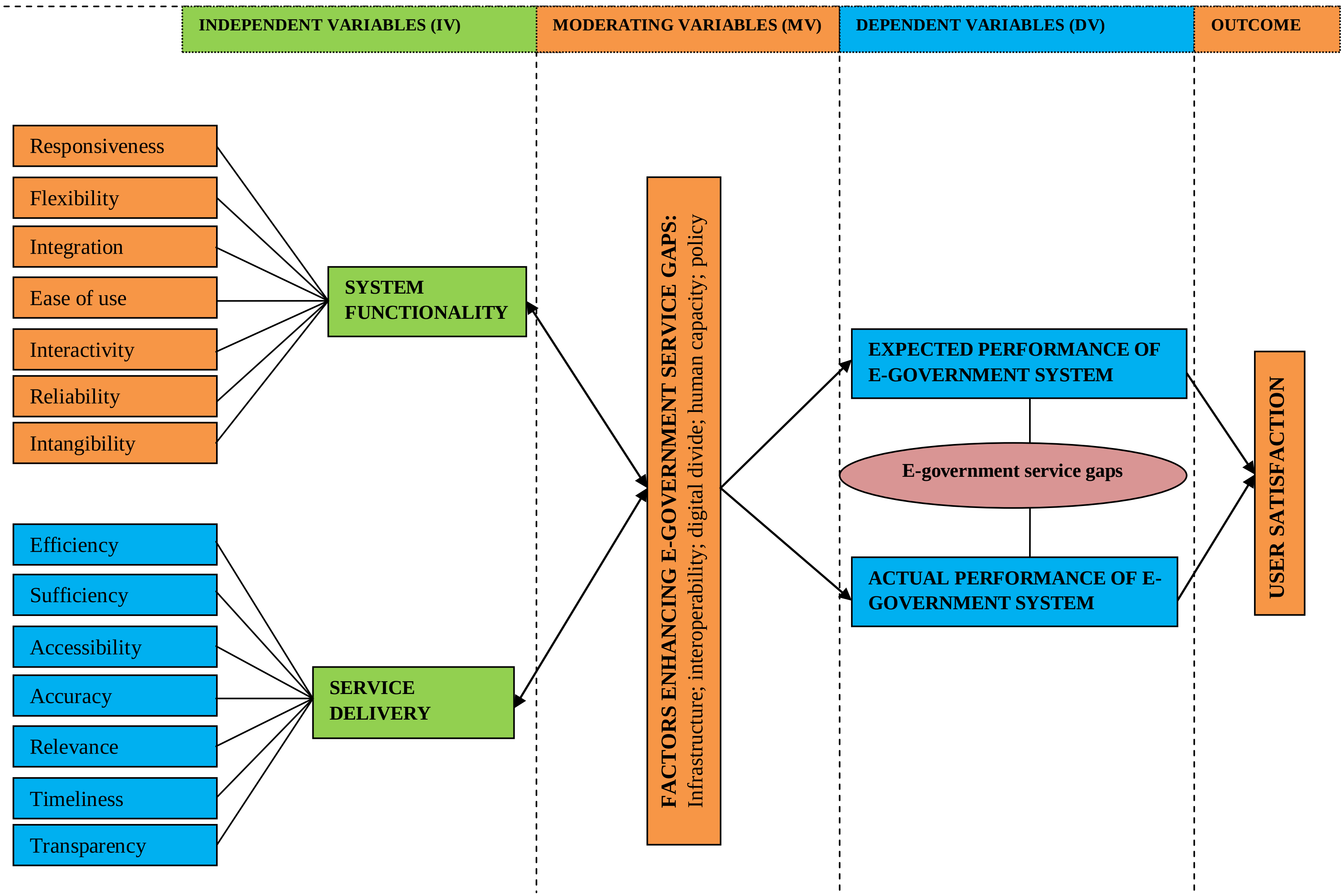


Figure 3.8: Conceptual model for assessing e-government service gaps

3.4.5 Model validation

Model validation is defined as the practice of ascertaining the degree to which a model is a true representation of the real-world from the viewpoint of the intended use of the model (Ling & Mahadevan, 2013). It denotes the procedure of confirming that the model really accomplishes its intended use. Mostly, validation entails confirming that the model is extrapolative under the conditions of its intended use. Similarly, according to Hill and Westbrook (1997), a good model must have a good fit in the realm of application. Hence, validation is of significant value to ensure that the model serves the purpose of its design. Thus, a design researcher not only develops a model but has the obligation to present evidence that the model can solve a real-world phenomenon.

Therefore, model validation ensures that the aspect of developmental evidence in theory building which was highlighted in Figure 3.5 is achieved. In this study, the model should present evidence that it is a suitable and comprehensive instrument for assessing e-government service gaps in the context of a developing country. This will be viewed in the perception of the experts, and those who implement and the users of e-government projects, too.

3.4.5.1 Model validation technique used in this study

The strength of the model depends on the validation process. One way of validating the conceptual model is to ask experts and/or scholars to validate the model quantitatively or qualitatively based on various information needs or quality parameters. The method is commonly referred to as expert review. This is a process of validating a conceptual model by employing individuals who have expertise in the area in which the model is supposed to be adopted (Giannarou & Zervas, 2014). This validation technique is a potent and efficient method of pulling together the dispersed expertise. In this study, experts and scholars were presented with the conceptual model for validation and their feedback was used to improve the quality of the model. The protocol for selecting the case and experts to validate the conceptual model is presented and described in Chapter Four.

Expert review is useful where the opinions and judgments of experts and practitioners are necessary to improve the validity of the conceptual model or address the incomplete state of knowledge. Mergel, Edelmann and Haug (2019) suggest that it is appropriate to use expert review when convening experts in one meeting is impractical. However, it is important to note that in some cases, experts may delay responding or may choose not to respond at all without giving any reason. As a result, this may affect the deadline of the research or the validity of responses. Nevertheless, the researcher made a sincere effort to persuade the experts to review and give feedback by sending reminders through emails and WhatsApp. Hence, the researcher argues that expert review is more appropriate in longitudinal studies; studies that are carried out over a long period of time.

3.4.5.2 Quality criteria for validating conceptual models

Traditionally, the quality criteria for validating conceptual models have been widely informed by positivist, interpretive and design science perspectives (Calder & Tybout, 2016; Cramer, 2013; Hevner et al., 2004; Hodges, Ruecker, Scaletsky, Rivera, Faller, Geppert, et al., 2017; Ling & Mahadevan, 2013; Wacker, 1998). For instance, Wacker (1998: 361) proposed that a model should be validated using the following virtues: uniqueness, parsimony, conservation, generalisability, fecundity, internal consistency, empirical riskiness, and abstraction.

Similarly, Calder and Tybout (2016) in their study *"What makes a good theory practical?"* suggested that attributes such as isomorphic, generalisability, complexity, value and consistent should be considered for validating a conceptual model. Likewise, a study by Shalley (2012) on *"writing good theory"* advised that conceptual models should have the quality of being novel and useful, whereas, Lincoln and Lynham (2011) maintain that a model should be validated based on the following criteria: consistency, accuracy and parsimony. On the other hand, De Jongh et al. (2017) proposed that the best model validation criteria should comprise of two distinct elements: conceptual soundness and developmental evidence.

Equally, a conceptual model requires to be validated by those who have interests (stakeholders) or expertise based on two fundamental standards: the "theoretical soundness and the modelling taxonomy" (Elangovan & Rajendran, 2015: 15). Also, Hevner, March and

Park (2004) suggested that model validation is crucial in design research. According to them, validation is significant to appraising the completeness and effectiveness of the model in its particular context. Therefore, the authors recommended that once the model has been developed, it becomes essential to validate its usability, relevance and applicability in addressing the phenomenon that called for the development of the model. In the same vein, Colquitt and Zapata-phelan (2007) reported that the applicability and usability of a model should be judged by its relevance. Thus, relevance is fundamental in determining the fit of the model.

Nevertheless, Lincoln and Lynham (2011) contested that the criteria for validating good model should be built from multiple inquiry paradigms. Lynham (*ibid*) further argues that validation criteria informed by positivism and interpretive perspectives are not adequate for validating a model developed from a critical realist perspective. However, Calder and Tybout (2016) pointed out that regardless of the perspective informing the development of the model, the model must meet certain quality criteria. Although there is no consensus on the number of quality parameters for model validation, Ling and Mahadevan (2013) advised that too many quality criteria may bring complexity in model validation. Therefore, to validate the conceptual model developed of study, the validation only focused on five (5) quality parameters (see Table 3.6).

The quality parameters are drawn from the validation criteria discussed in this subsection and are perceived to be relevant and adequate for validating the conceptual model for assessing e-government service gaps. In arriving at the selected quality parameters, the research referred to the literature to check if the definitions of parameters proposed in the literature could have similar meanings. Hence, only one parameter from those with comparable meanings was selected. The approach was needed to avoid redundancy in constructing the model validation instrument or rather including parameters which could not provide significant value.

Table 3.6: A synthesis of quality parameters for validating a conceptual model

Parameter	Description	References
Relevance	Relevance refers to the extent to which the measurement dimensions/concepts included are appropriate for the model to achieve specific goals.	(Hevner et al., 2004)
Usefulness	Usefulness refers to the extent to which a model is suitable for accomplishing a specified purpose.	(Davis, 1989)
Usability	Usability refers to the extent to which a model is perceived as usable by particular users to achieve specific goals.	(Adebesin, 2011; Shawgi & Noureldien, 2015; Wang & Senecal, 2008)
Completeness	Completeness is concerned with ensuring that all the measurement dimensions/concepts which make a model comprehensive for accomplishing a specific purpose are all specified.	(Arora et al., 2019; Liu et al., 2011)
Systematic construction	Systematic construction refers to the manner in which the model is perceived as constructed logically; that is, the concepts of the model are arranged sequentially starting from independent variables, followed by moderating variables, then, lastly dependent variables.	(Mendling et al., 2019)

Table 3.6 is a depiction of the set criteria that the researcher believes a good conceptual model should have. Thus, a good quality model should relevant, useful, usable, complete and systematically constructed. The quality parameters presented in Table 3.6 above were used for constructing the model validation instrument. The validation instrument was designed openly and flexibly to allow experts to suggest other quality attributes that were not included in the conceptual model. This possibly strengthened the applicability of the model. The details for designing and administering the validation instrument is presented and described in Chapter Four.

3.4.6 Analyse and synthesise feedback

Validation should provide feedback on the quality of the conceptual model (Lincoln & Lynham, 2011). After the model is validated against the quality parameters, feedback was received from the expert reviewers. Each opinion from the experts was validated for strength and justification to ascertain its worthiness for modifying the conceptual model. The following justified the inclusion of the suggested dimension and/or construct: it should be supported by a detailed explanation from the expert; the suggested dimension/construct should find support from the literature on evaluating e-government. Thus, using abduction and retroduction reasoning techniques, feedback from experts were compared with relevant literature to determine the critical relevance of modifying constructs of the conceptual model. This reasoning enabled the researcher to manage the abstraction of the model by moving backwards, sideways and forward to compare evidence from different sources of data.

3.4.7 Redesign the model: developing the final version

Generally, a conceptual model cannot be expected to be comprehensive and suitable from the researcher's standpoint; moreover, a model constructed from the literature review which may lack contextual application. Therefore, to ensure that the model is suitable for assessing e-government service gaps in the context of a developing country, the researcher redesigned it based on the evidence gathered from the survey, case study and the feedback received from the experts. Findings from the case study and feedback from the experts enabled the researcher to incorporate constructs and/or dimensions not included in the conceptual model but which were rather relevant for assessing e-government service gaps in a comprehensive manner. This was important to avoid what is referred by Ononiwu, Brown and Carlsson (2018) as "premature theoretical closure" in theory development. However, before the model was redesigned, feedback from the experts was checked for critical relevance to justify the inclusion of proposed constructs and modification of the model. Once redesigned, it was believed that the model was ready for implementation or use in testing/measuring e-government service gaps. The final model (theoretical model) is presented in Chapter Seven.

3.5 Chapter summary

This chapter commenced by discussing the theory and the differing views of theory development. This was necessary because the development of a conceptual model follows the design process of theory-building. Therefore, it is important to demonstrate how theory-building influences the development of a conceptual model. The chapter revealed that there are multiple views of understanding a theory. These include the field of study, basis of science, the epoch it was discerned to be an essential tool in the development of knowledge, degree on philosophical and disciplinary orientations. These facets can be expected to shape the nature of theory development. Furthermore, the chapter exposed that conceptual models are a kind of transitional theory - they provide a link between theoretical and empirical research.

Accordingly, a conceptual model is developed and applied in a study when the research problem cannot meaningfully be researched with a single theory or concepts resident in one theory. Even though there are many approaches and theories in developing a conceptual model, critical realists tend to favour the abduction and retroduction approach. Hence, in developing the conceptual model this study was guided by the abduction and retroduction reasoning.

Ideally, this chapter shows that the development of a conceptual model should follow a seven-step process: (a) phenomenon understanding, 2) identification and retrieval of relevant studies, 3) construct analysis, 4) develop the model, 5) model validation, 6) analyse and synthesise feedback and 7) redesign the model. Furthermore, the development of the conceptual model was guided by the following principles: the boundaries of the model and the laws of interaction. The boundaries are important since no model can represent and explain the entire real-world.

On the other hand, the laws of interaction were needed to show the relationship between the constructs and dimensions of the model. The conceptual model identified four (4) multi-dimensional constructs as follows: 1) system functionality, 2) service delivery, 3) service gaps and 4) user satisfaction. These constructs together with their dimensions were mapped into a multi-dimensional model; hence, the outcome of this chapter was the development of the conceptual model for assessing e-government service gaps.

However, it should be noted that the conceptual model is not exhaustive since it only focused on the findings of the literature review and not the contextual issues of a developing country. Nevertheless, the conceptual model was used as a road map for empirical data collection and analysis and to establish a comprehensive model for assessing e-government service gaps in the context of a developing country. Thus, the conceptual model denotes the initial phase towards the contribution of this study to the body of knowledge on e-government evaluation, not a refined artefact.

Furthermore, the conceptual model was validated using empirical data. In addition, the model was redesigned in Chapter Seven based on the evidence gathered from the survey, case study and the feedback received from the experts. The next chapter presented and discussed the research philosophy and methodology that was followed to investigate and validate the conceptual model of the study.

CHAPTER FOUR

RESEARCH PHILOSOPHY AND METHODOLOGY

> "The world is too rich and multi-layered to be captured adequately by any single person. It requires a researcher to be reflexive and recognise his/her perspective and to understand and bring together views of other [primal] stakeholders to identify rich features of the phenomenon being studied" (Van de Ven, 2016: 3).

4.1Introduction

The previous chapter focused on the development of a conceptual model for assessing e-government service gaps comprising of independent variables (systems functionality and service delivery), moderating variables (factors enhancing e-government service gaps) and dependent variables (system performance and user satisfaction). The conceptual model serves as a road map for empirical data collection and analysis and to establish a comprehensive model for assessing e-government service gaps in the context of a developing country. Thus, it provided the initial stage towards the contribution of this study to the body of knowledge on e-government evaluation, not a refined artefact.

The conceptual model for assessing e-government service gaps presented in Chapter Three required validation by empirical data to become a valid novel model or theory. To achieve this purpose, the empirical data needed to be collected in a legitimate and procedural manner. This chapter aims to present and discuss the philosophy (legitimacy) and methodology (procedure) for conducting the study. Thus, the chapter focuses on the data theory of the study.

Research is an action that cannot be conducted messily and chaotically but is bound to the actions of world-views, designs, strategies, methods and techniques (Al-Amoudi & Willmott, 2011; Danermark, 2019b; Ononiwu et al., 2018). Therefore, researchers are compelled to reflect on the world-views to delimitate the setting of the study. To ignite the methodological journey of the study, the chapter begins with the presentation and appraisal of the Three Worlds Framework which connects the philosophy of science, science and everyday life. Furthermore, the chapter presents philosophical research paradigms and their underlying assumptions. Besides, the chapter presents the justification of critical realism as the research stance for this study. The research methodology along with the research process, strategy, sampling techniques, research methods, data analysis techniques deem suitable for the study are also comprised in this chapter. The quality checks, triangulation, research framework, ethical consideration and chapter summary are presented to mark the end of the methodological journey. The entire chapter is organised in the manner presented below:

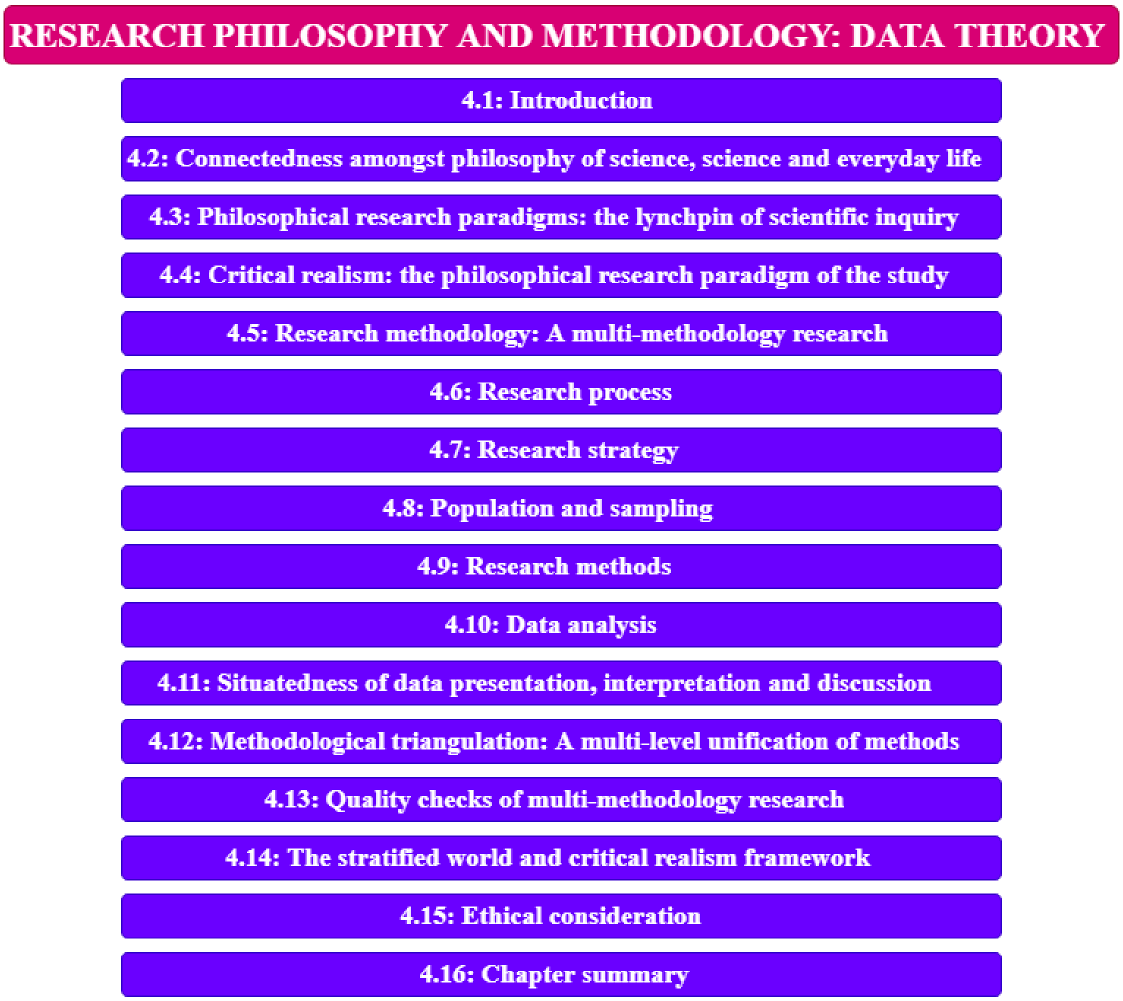


Figure 4.1: Chapter outline

4.2 Connectedness amongst Philosophy of Science, Science & Everyday Life

Undoubtedly, there is a strong connectedness between the philosophy of science, scientific research and everyday life (Parusnikova, 1990). Therefore, to turn real-life (social and/or practical) problems facing organisations, businesses and people into a research problem that warrants a scientific inquiry there is a need to make use of the Three Worlds Framework.

Accordingly, the Three Worlds Framework constitutes the conception that various strata of thoughts are required when investigating a phenomenon. The framework is useful in situating the problem statement of an empirical study. Most importantly, the framework can be used to explain the constructs of both non-scientific and scientific knowledge in addition to theory and investigation. The Three Worlds Framework together with its underlying elements is presented in Figure 4.2.

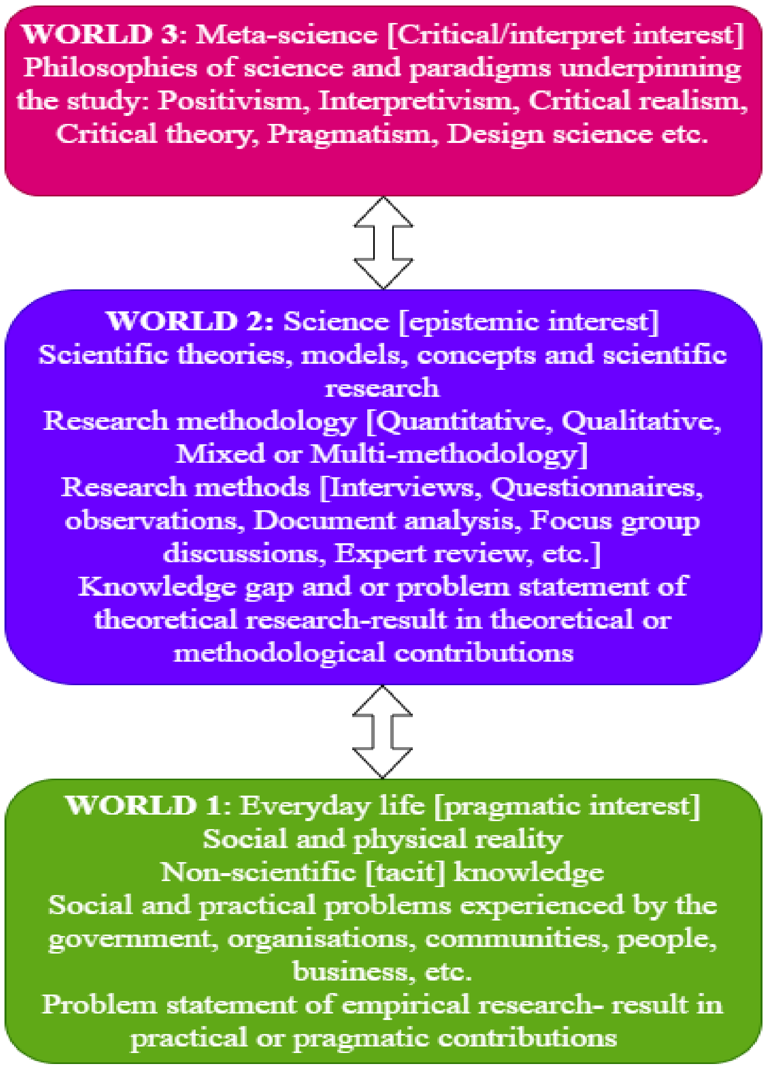


Figure 4.2: Connectedness between Meta-Science, Science and Everyday Life

(Source: Modified from Remenyi, Pather & Klopper, 2011)

The Three Worlds Framework is regarded as a general rule in translating real-life problems into research problems and designing solutions for such problems. World 1 is conceived as the world of pragmatics because it is concerned with everyday life (Parusnikova, 1990);

people in this world are occupied with daily actions and practice — they use wisdom, rationale thinking and skills to create non-scientific knowledge for solving daily problems. This practice is referred to as pragmatic coping because people need to embrace a pragmatic interest that underlies the development of everyday solutions. However, problems that possibly will not be solved through the pragmatic coping strategy will certainly drive the interests of those who operate in World 2 (scientific researchers) to use scientific methods and procedures to find solutions for everyday life. A phenomenon in World 1 is carefully chosen and transformed into an object of inquiry for consideration in World 2. Thus, actions in World 2 are only possible if either a pragmatic (real-life) problem is identified from everyday life or a knowledge gap is discovered in World 2.

In contrast, World 2 is mainly concerned with epistemic actions — generating valid, trustworthy and dependable theories, models and explanations about the world through rigorous and systematic inquiry. Thus, the purpose of World 2 is to increase knowledge (what is known) and provide solutions to World 1. This suggests that broadly any scientific research should serve two purposes: contributing scientific knowledge and solving everyday problems. Most importantly, World 2 can be regarded as a convergence zone for Worlds 1 and 3 since these two worlds cannot interact directly.

In developing scientific knowledge the researcher needs to employ the philosophy of science located in World 3. This world is assumed to provide a reflective activity about pragmatic and epistemic nature of the phenomenon. In conclusion, it can be stated that the observable research problem in World 1 can be intellectually conveyed and reflected on in World 2 and 3 and reverted to World 1.

This study is informed by the pragmatic interest (World 1) where everyday problems are positioned. Essentially, the pragmatic question derived from World 1 is:

> *Why do e-government service gaps exist in developing countries despite intensive efforts in the design, development and implementation of e-government projects?*

If this phenomenon could be explained, more comprehensive e-government systems can be developed. Therefore, the fact that e-government service gaps still exist in the developing context despite such intensive efforts and the availability of numerous e-government assessment typologies makes this study relevant to investigate factors enhancing service gaps and re-evaluate and reconstruct theories for assessing e-government. Thus, the study concludes that non-scientific knowledge is not sufficient to understand the phenomenon of e-government service gaps in the context of a developing country; hence, scientific inquiry is inevitable.

Therefore, based on the pragmatic question raised in World 1, the following questions form the basis of actions to be performed in World 2:

a. What are the factors enhancing e-government service gaps in a developing country context (Zimbabwe)?
b. Which measurement dimensions from various e-government assessment typologies are applicable in the assessment of e-government service gaps?
c. How can measurement dimensions from e-government assessment typologies be synthesised into a multi-dimensional conceptual model?
d. How can the conceptual model be validated to become a theoretical model in assessing e-government service gaps in a developing country?

However, to ensure that the study obliges to theoretical soundness and actions in World 2 it should be situated within the philosophy of science (World 3). Thus, in World 3, the pertinent question is as follows:

> *Which philosophical research paradigm is suitable for guiding actions to be performed in World 2?*

The next section provides an overview of the philosophical research paradigms as the study embarks on a journey to select a research paradigm suitable for guiding actions to be performed in World 2.

4.3 Philosophical research paradigms: the lynchpin of scientific inquiry

Broadly, the creation of knowledge is an active mechanism that is primarily guided by world views, precepts and set of beliefs, which any researcher should take into cognisant and reflect on (Brierley, 2017; Guba & Lincoln, 1994; Mkansi & Acheampong, 2012; Scotland, 2012; Sefotho, 2017; Shannon-Baker, 2016; Wikgren, 2005). Guba and Lincoln (1994) refer to these world views, precepts and set of beliefs to philosophical research paradigms because they guide the process of knowledge creation. In the same vein, Park, Konge and Artino aver that: "Research paradigms guide scientific discoveries through their assumptions and principles. Understanding paradigm specific assumptions help illuminate the quality of findings that support scientific studies and identify gaps in generating sound evidence" (Park, Konge & Artino, 2020: 690). Thus, any scientific knowledge generated in various scientific fields is informed by philosophical research paradigms.

Park, Konge and Artino (2020) maintain that research paradigms strongly influence the selection of the research methods, design and strategies for a particular inquiry. So, this implies that there is a logical chain of interconnectedness in a scientific inquiry which starts at an abstract-level (research paradigm) to a more concrete-level (research techniques). Grounded on their unique characteristics and assumptions, each of the research paradigms has its area of appropriateness and suitability which is influenced by what a researcher seeks to understand (Haigh et al., 2019; Ryan, 2018).

In essence, world views, precepts and beliefs are useful in dealing with theoretical epistemic questions like the nature of knowledge, its justification and sources where knowledge can be obtained (Moon & Blackman, 2014; Morgan, 2014). Such a philosophical research paradigm makes up a mental model that shapes and structures how researchers perceive their field of study. Thus, every research paradigm determines how knowledge in a particular field of study should be gained, processed and developed at the essence of its dogma.

Based on the foregoing, this study defines a philosophical research paradigm as a belief system that compels the researcher to follow a meticulous path in creating knowledge. Thus, a research paradigm is the 'lynchpin' of a scientific inquiry because it enables the researcher to make informed decisions about the research methodology.

Table 4.1: Various statements showing paradigms as the lynchpin of scientific inquiry

Statement	Reference (s)
"A paradigm is the basic belief system or worldview that guides the investigator, not only in choices of the method but in an ontologically and epistemologically fundamental way".	(Guba & Lincoln, 1994: 105)
"Philosophical ... paradigm about the nature of reality is crucial to understanding the overall perspective from which the study is designed and carried out. A ... paradigm is thus the identification of the underlying basis that is used to construct a scientific investigation".	(Krauss & Putra, 2005: 759)
"Paradigms [are] shared beliefs within a community of researchers who share a consensus about which questions are most meaningful and which procedures are most appropriate for answering those questions".	(Morgan, 2007: 53)
"The research [paradigm] refers to epistemological, ontological and axiological assumptions and undertakings that guide an inquiry in a research study, implicitly or explicitly".	(Pathirage, Amaratunga & Haigh, 2008: 514)
"Research paradigms [are] fundamental beliefs that affect the ways to conduct ... research, including the choice of a particular research methodology".	(Wahyuni, 2012: 69)
Research paradigms consist of four (4) fundamental elements: ontology, epistemology, axiology and methodology, which guide researchers in their endeavour to contribute to the existing knowledge.	(Nguyen et al., 2019)
"A research paradigm, or set of common beliefs about research, should be a key facet of any research project".	(Brown & Dueñas, 2020: 545)
"A philosophical worldview influences the practice of research; therefore, it needs to be identified for the present study".	(Creswell, 2009: 5)

4.3.1 Underlying assumptions of philosophical research paradigms

Research paradigms are regarded as the philosophies of science which are governed by the following core underlying assumptions: ontological, epistemological, axiological and methodological assumptions (Aliyu & Adamu, 2015; Guba & Lincoln, 1994; Kivunja & Kuyini, 2017; Moon & Blackman, 2014; Park, Konge, & Artino, 2020). The understanding of these assumptions is a must for all researchers (Moon & Blackman, 2014; Smith, 2018); failure of which will compromise the validity of the research design of the study as well as limit the interpretation of the findings.

Ontological assumptions reveal the fundamental nature of the object of inquiry or why the object exists. The nature of research questions generated to guide a scientific inquiry develop out of ontological assumptions (Berryman, 2019; Brown & Dueñas, 2020). On the whole, ontology is a belief that resides in individuals about nature of reality (Hodges, Ruecker, Scaletsky, Rivera, Faller, Geppert, et al., 2017; Kant, 2014; Mingers, 2004; Walsh & Evans, 2014); that is, it is concerned about what exists in the world which can provide knowledge or can be known. Ontology is further defined by Aliyu and Adamu (2015) as the premise that involves certainty about reality. This implies that ontology depicts the researcher's view of the nature of reality or being on the phenomenon studied. Thus, philosophically, ontology is a belief system about the nature of reality. The conscious and unconscious questions, suppositions, and notions that the researcher brings to the research undertaking provide an opening for a methodical procedure in creating knowledge.

Furthermore, ontological assumptions are deeply embedded in human beliefs because they attempt to figure out whether knowledge exists in the human mind or it is independent of the mind waiting to be discovered (Aliyu et al., 2014; Berryman, 2019; Frauley, 2017; Hodges, Ruecker, Scaletsky, Rivera, Faller, Geppert, et al., 2017; Irene, 2014). Thus, ontology affects the epistemological inclination of researchers which in turn shapes the selection of research methods and design.

On the other hand, epistemology denotes the theory of obtaining knowledge (Irene, 2014; Kant, 2014; Kivunja & Kuyini, 2017; Walsh & Evans, 2014). All claims to knowledge are grounded on epistemological assumptions concerning the nature of knowledge and how valid knowledge can be created; otherwise stated; all claims to knowledge are backed by a theory of knowledge.

Epistemology has substantial deportment on how researchers undertake their research endeavours by ensuring that knowledge is created through adequate and legitimate means. An in-depth scoping of epistemology by Moon and Blackman reveals that:

> "Epistemology is concerned with all aspects of the validity, scope, and methods of acquiring knowledge, such as, with what constitutes a knowledge claim; how knowledge can be produced or acquired; and how the extent of its applicability can be determined" (Moon & Blackman, 2014: 5).

In addition, the main question raised by epistemological assumptions is how reality can be known. Thus, epistemology is significant to scientific inquiry because it shapes how researchers structure their research in their endeavour to discover knowledge (Brown & Dueñas, 2020; Moon & Blackman, 2014). Subsequently, both epistemological and ontological assumptions are translated into distinctive methodological schemes and designs. Ontology and epistemology reach intensely into the research process, shaping not only the research questions to be asked but also how the researcher will find answers to the questions asked (Berryman, 2019). In consequence, ontological and epistemological assumptions determine the choice of the research paradigms and methodology; thus, making researchers be more clearly positioned in studying a particular phenomenon.

Epistemologically, scientific knowledge can be obtained based on any of the four dimensions: objectively, subjectively (Onwuegbuzie & Turner, 2007; Willig, 2019); constructional (Levers, 2013; Moon & Blackman, 2014; Smith, 2006); and relativism (Aghapour, 2012; Danermark, 2019a; Mingers & Standing, 2017; Ononiwu et al., 2018; Isaksen, 2016). Table 4.2 presents brief descriptions of the four epistemological dimensions.

Table 4.2: A description of the epistemological dimensions

Dimension	Description of the dimension	Sources
Objectivism	The epistemology of objectivism contends that there is an objective 'truth' that can be verified and validated through empirical means. Objectivists attempt to test reality by collecting and analysing evidence to discern averments, substantiate claims, and provide a connection with the real-world. Ultimately, objectivists posit that knowledge can be gained by using methods that are suitable for studying facts. Thus, truth is objectified in objects of inquiry; hence, the dictum of objectivism postulates that: "*seeing is believing*"	(Gunbayi, 2020; Kant, 2014; Levers, 2013; Moon & Blackman, 2014)
Subjectivism	The epistemology of subjectivism declares that knowledge depends on how reality is perceived and understood by the researcher and the target population. Thus, truth is subject to the meaning attached to the phenomenon and the interpretation about it; hence, the aphorism of subjectivism states that: "*believing determine what is seen*"	(Berryman, 2019; Byerly, 2019; Gunbayi, 2020; Moon & Blackman, 2014; Maroun, 2012)
Constructionism	The epistemology of Constructionism rejects the idea that objective 'truth' awaits to be discovered. This epistemological stance assumes that knowledge is constructed through interaction and engagement with the phenomenon or objects of inquiry.	(Al-Amoudi & Willmott, 2011; Elder-vass, 2015; Moon & Blackman, 2014; Pedler, 2012)

Relativism	The notion of relativism is that there is no absolute truth — the truth is regarded as the belief held by individuals or societies. This epistemological dimension acknowledges the view that different people have different perspectives about a phenomenon. Thus, relativism generally entails that truth is relative to context. Therefore, it is possible that opposing and paradoxical theories regarding a certain phenomenon may both be true, depending on the model used to judge them.	(Kalderon, 2009; Kusch, 2017; Yucel, 2018)

Alternatively, axiology which represents the theory of value is concerned with the individual values or ethics of the researcher (Brown & Dueñas, 2020; Heeks & Wall, 2018). Distinctively, axiology is occupied with the judgment of the role of the researcher's value in the study of a phenomenon. Jointly, the researcher’s beliefs about reality (ontology), knowledge (epistemology), and values (axiology) form the research paradigm or methodological trinity, which guides the selection of research design and methods (Aliyu et al., 2014; Brown & Dueñas, 2020; Carter & Little, 2007; Kaushik & Walsh, 2019; Mingers & Standing, 2020; Morgan, 2007; Musa, 2013).

In contrast, methodological assumptions are concerned with the approach, strategies, methods and techniques used to uncover knowledge (Berryman, 2019; Mingers, 2004). Thus, the methodology represents the procedural rules which guide researchers in the investigation of a phenomenon. Figure 4.3 shows the co-dependent nature of the philosophical assumptions of research paradigms.

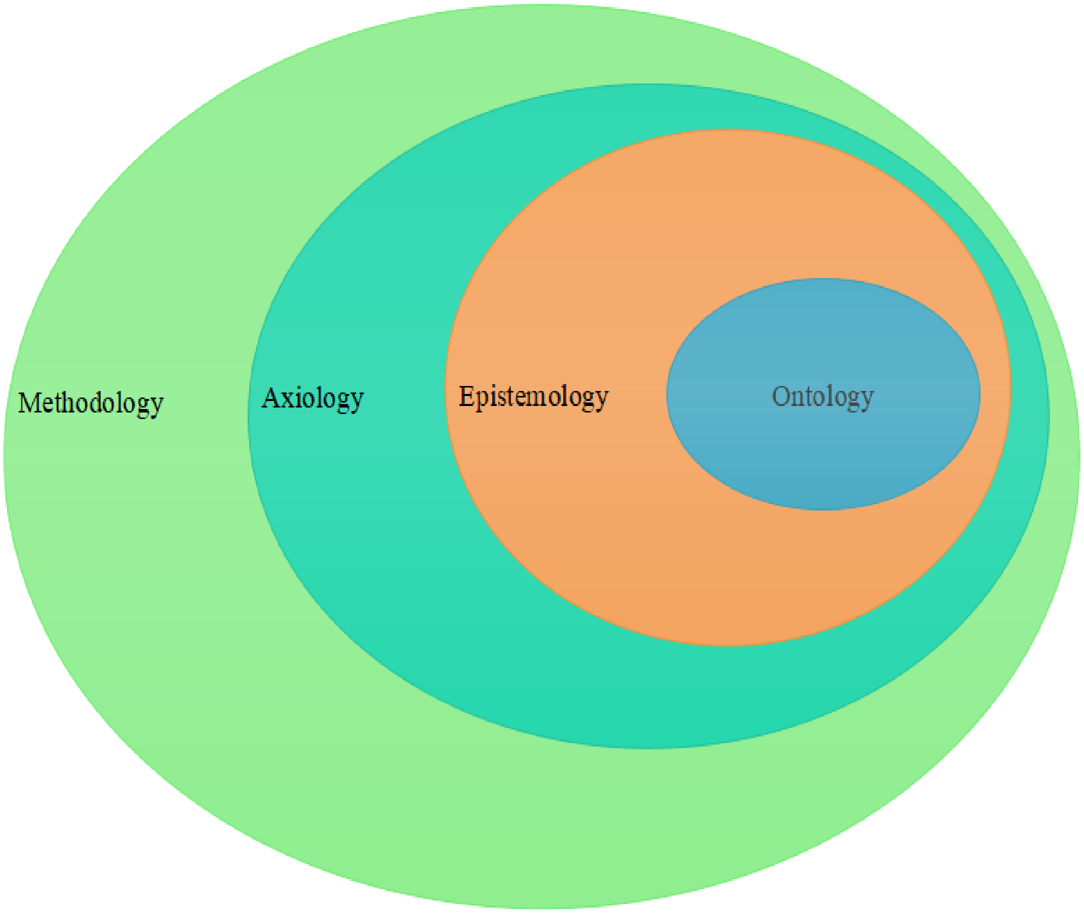


Figure 4.3: Co-dependent nature of philosophical assumptions of research paradigms

Several research paradigms have evolved. However, to guide the selection of the appropriate philosophical stance and the discussion of the research philosophy underpinning this study, Table 4.3 presents the taxonomy of research paradigms applicable in information systems research; the prominent philosophers; and their underlying assumptions. Thus, by presenting the paradigms and their underlying assumptions, the researcher creates taxonomy useful for guiding the selection of a philosophical stance of the study and its methodology.

Table 4.3: Taxonomy of research paradigms applicable in information systems research

	Philosophical Research paradigms				
Element	**Positivism**	**Interpretivism**	**Critical realism**	**Pragmatism**	**Critical theory**
Alternatives	Naïve realism	Constructivism	Post-positivism		Historical realism
Prominent Philosophers	Auguste Comte, E. Littré and Herbert Spencer	Max Webber, Alfred Schutz and Franz Boas	Roy Bhaskar, Margaret Archer and Andrew Sayer	Sanders Peirce, William James, John Dewey, Jane Addams and Herbert Mead	Herbert Marcuse, Theodor Adorno and Max Horkheimer
Ontology: The nature of being	Reality is single, apprehensible and independent of human beings.	Realities are multiple, subjective & socially constructed.	Reality is mind-independent, transcendental and stratified.	Reality is external and multiple.	Reality is virtually and historically situated.
Epistemology: The theory of knowledge	Scientific knowledge is generated through testing of hypothesis and theory.	The meaning is created from the interplay between the subject and object of inquiry.	The creation of any kind of knowledge is a social practice. Focuses on theory building rather than theory testing.	Knowledge is always based on experience and the "what works".	Knowledge is created through cultural, historical, and social perspectives.
Axiology: The theory of value	The inquiry is value-free, that is, the researcher and data are independent.	Situated understanding and value-bond; researcher and the researched cannot be separated.	Our knowledge of the world is fallible and theory-laden.	Scientific practices are always value-laden and theory-laden.	The researcher and the object of inquiry are interlinked; making knowledge to be value-loaded.
Methodology: The procedure to conduct scientific research	Quantitative	Qualitative	Quantitative, Qualitative or Multiple methods	Mixed methods	Mixed methods

(Sources: Developed from Guba & Lincoln, 1994; Sobh & Perry, 2006; Kant, 2014; Moon & Blackman, 2014; Brierley, 2017; Ryan, 2018; Heeks & Wall, 2018; Park, Konge & Artino, 2020; Aliyu et al., 2014; Yucel, 2018)

4.3.2 Appraisal of philosophical research paradigms

Information systems research like many other scientific types of research should be grounded in a philosophical research paradigm (Carlsson, 2005; Ononiwu et al., 2018; Smith, 2018; Wynn & Williams, 2020). However, to justify the adoption of a particular philosophical stance, researchers need to have a broader understanding of various philosophical research paradigms used in scientific investigations (Wynn & Williams, 2012; Ryan, 2018); hence, the researcher embarked on a journey to gain knowledge about philosophical research paradigms employed in information systems. For that reason, it should be noted that in appraising various research paradigms, the study is not necessarily endorsing them; but at the very least, attempts to demonstrate their awareness and appreciation to recognise their strengths and weaknesses prudent to inform the choice of the philosophical stance for this study. Accordingly, the positivism, interpretivism, pragmatism and critical theory paradigms are presented before providing an in-depth discussion of critical realism, which is the chosen philosophical stance of the study.

As can be seen in Table 4.3, contemporary research paradigms applicable in information systems research are positivism, interpretivism, critical realism, pragmatism and critical theory. Positivism is a research paradigm that is ingrained on the ontological belief and dogma that truth and reality are apprehensible and independent of the researcher (Aliyu et al., 2014; Park, Konge, & Artino, 2020). Traditionally, the philosophical research paradigm of positivism emphasises that empirically gained data through the means of rigorous scientific methods are justifiable scientific knowledge (Heeks & Bailur, 2007; Heeks & Wall, 2018; Tanlaka et al., 2019). The stressing point is quantifiable reflections that lend themselves to statistical analyses (Berryman, 2019; Levers, 2013). Thus, when using a positivism stance, more emphasis is put on experimental and quantifiable reflections that contribute to statistical analyses of data (Aliyu et al., 2014; Kaboub, 2008; Riley, 2007). This is because positivists believe that scientific knowledge comprises of facts.

Positivism as a philosophical stance has a long and rich historical tradition in scientific research (Carlsson, 2005; Mingers, 2004; Rehman & Alharthi, 2016; Ryan, 2018). This philosophy dominated the early scientific research, particularly in the 1970s (Johnson &

Onwuegbuzie, 2004; Krauss & Putra, 2005; Ryan, 2018; Yavuz, 2012). By then, according to Bhattacherjee (2012), any knowledge claims that were not grounded in the philosophy of positivism were regarded as invalid and not scientific.

Positivists, by their very nature, submit that reality exists independent of the human mind (Smith, 2006; Porta & Keating, 2008; Rehman & Alharthi, 2016). Also, Porta and Keating proclaim that:

> "The world exists as an objective entity, outside of the mind of the observer, and in principle, it is knowable in its entirety. The task of the researcher is to describe and analyse this reality. Positivist approaches share the assumption that in nature as in social sciences, the researcher can be separated from the object of his/her research and therefore observe it in a neutral way and without affecting the observed object" (Porta & Keating, 2008: 23).

The assertion by Porta and Keating and many other similar views of positivists, therefore, imply that the researcher should adopt an objective stance and remain independent of the phenomenon being studied. Besides, positivism explains the findings from rational conclusions that are controlled by general laws (Goldkuhl, 2012; Sousa, 2010). Also, the research conducted from a positivist perspective adopts extremely structured and objective methods, large surveys and quantitative methods so as to facilitate replication and generalisability of research findings. The findings can be confirmed or refuted based on prior research (Aliyu et al., 2014).

Actually, the main aspiration of positivist inquiry is to generate explanatory associations or causal relationships that eventually result in prediction and control of the phenomena under investigation (Park, Konge, & Artino, 2020). The research objectives of positivism are accomplished by testing theory so as to enhance the extrapolative understanding of particular phenomena (Guba & Lincoln, 1994). Thus, positivism is employed when the researcher aims to develop and test a hypothesis. This is because positivists consider reality as constant, observable and can be described from an objective viewpoint (Scotland, 2012). According to them, knowledge is gained through measurement. As a consequence, the positivist perspective suggests that science is deductive and credible findings are generated through hypothesis and theory testing; hence, positivism is aligned with the hypothetico-deductive model of science (Gay & Weaver, 2011; Park, Konge, & Artino, 2020).

Nevertheless, despite its popularity in scientific research, positivism has weaknesses that ostensibly undermine its applicability in complex studies such as e-government assessment (Major, 2017; Ryan, 2018), for instance, rating scales that are common in positivism limit e-government findings to technological determinism; thus, denying the possibility of a socially-determinist stance. Therefore, the assessment of e-government cannot be fully realised solely by adopting an objective stance. Even though the positivist paradigm has relative strengths such as generalisability, quantifiable reflections and replication of findings, this paradigm is regarded to be weak in addressing emerging topics such as e-government in which its pursuit in developing countries is still an ongoing process.

Also, due to its deterministic nature, the philosophy of positivism is less useful in continuously changing phenomena such as e-government. Besides, while positivism in this study might be required to explain the extent of e-government service gaps and the gap facilitating factors, however, due to its methodological “individualism”, the paradigm lacks the potential for an in-depth understanding of mechanisms that enhance e-government service gaps. Thus, it lacks a detailed explanation of the causes and actions of a research phenomenon.

Furthermore, positivism does not consider the human mind as a legitimate source of knowledge because of its ontology. Therefore, by working with observable reality positivism tends to ignore the human potential in knowledge creation. This has resulted in the ‘ossification’ and asepsis of the research. Another criticism levelled against positivism by Major (2017) is that the paradigm oversimplifies the real-world into experimental situations that are difficult to apply in realities such as e-government research. Also, the paradigm fails to acknowledge that not all solutions can be created through experiments. Likewise, it is also impracticable to capture complex phenomena of e-government in a single controlled quantifiable variable(s). Also, positivism fails to acknowledge that e-government is stratified and multilayered-construct with unobservable units which cannot be understood by mere observations. In fact, according to Yucel (2018), positivism does not provide explanations to deeper 'why' questions beyond the usual occurrence of a phenomenon. As a result, this paradigm could not offer an in-depth explanation of why e-government service gaps exist in the developing context like Zimbabwe despite the intensive effort in the implementation of e-government projects.

In consequence, the weaknesses of positivism paved the way for an interpretivism research paradigm which views knowledge as a product of social construction (Dobson, 2003; Gregor, 2006; Rehman & Alharthi, 2016; Walsham, 2014). Interpretivism stance maintains that the world consists of multiple realities that are socially constructed (Berryman, 2019; Dobson, 2003; Rehman & Alharthi, 2016; Ryan, 2018; Smith, 2006). This philosophical paradigm nullifies the proposition of apprehensible and single reality. Rather, interpretivism contends that neither quantification nor statistical correlations can fully and exhaustively understand a phenomenon. In fact, the interpretivism paradigm conceives that reality is multi-layered and multifaceted (Brand, 2009; Dieronitou, 2014; Norwich, 2020; Santiago-Delefosse et al., 2015); therefore, a single phenomenon can be interpreted differently.

According to Ryan (2018), a research that is grounded on the interpretive philosophical paradigm could be identified by a Constructionism epistemology. Epistemologically, the paradigm of interpretivism believes that meaning is created from the interplay between the subject and object of inquiry. In addition, the interpretation of reality is guided by trends rather than laws (*ibid)*. The focus on interpretivism is the examination of the text to find meanings that are deep-rooted from people. This implies that truth and reality is a product of the social actors — the researcher and the researched. Thus, information systems research is regarded as interpretive if knowledge is acquired through social construction — knowledge is created through shared meaning.

Concurring to the above axiom, McChesney and Aldridge state that:

> "The knowledge arising from interpretivism research is integrally linked to the participants and the context of the research, meaning that the products of interpretivism research are not universally applicable theories or laws but, rather, rich and contextually situated understandings" (McChesney & Aldridge, 2019: 3).

Therefore, it can be concluded that meaning about reality in the point-of-view of interpretivists is derived from human engagement with the practicalities of the world.

Besides, interpretivism stance holds that social situations are not only complex, but they are also unique (Al-Amoudi & Willmott, 2011; Dobson, 2003; Pathirage et al., 2008). The implication is that research that aims to obtain rich convolution of social situations are not likely to produce findings which are generalisable to the larger population (Carr, 2006; Kivunja & Kuyini, 2017; Shannon-Baker, 2016). This is because the social world is increasingly changing; circumstances of today may not replicate in future (Scotland, 2012) and each social context is dissimilar. Hence, interpretivism leads to adopting a pliable research procedure and methods which flow from the perspectives gathered from the participants of the research.

Although this paradigm has a relative strength in data and method triangulation, interpretivism has been criticised for lack of generalisability of research findings since research is conducted for a wider community. Opponents of interpretivism have noted that the findings from a Constructionism stance could be biased as all the meaning and interpretations rest entirely with the researcher (Linsley et al., 2015; Shannon-Baker, 2016). Moreover, the interpretivism is a truth-seeking paradigm —making it less important to developing an explanation on why things happen.

Likewise, Avgerou argued that:

> "The development of explanation in interpretive IS research faces the difficulty of searching for causal processes of meaning-making and action in the context-dependent unfolding of dynamic interactions of people with

> technology. Causal processes cut across levels of analyses between the individual and the collective, connecting the interpretations and actions of individuals with the norms of the collectives by which they are influenced" (Avgerou, 2013: 403).

However, the paradigm of interpretivism is only able to provide a single level of analysis. As a consequence, the adoption of interpretivism paradigm alone could not holistically provide a solution to the research problem.

A wide-ranging viewpoint of critical theory ontology calls for an understanding that reality is created through social and historical processes (Mack, 2010; Scotland, 2012). The paradigm of critical theory introduced the idea of emancipation as the underlying principle for developing knowledge as well as providing an awareness of material conditions as the foundation of understanding (Asghar, 2013; Dieronitou, 2014; Rehman & Alharthi, 2016; Ryan, 2018). The critical paradigm assumes that any reality is shaped by people - predominantly, those who have the power to persuade others to see things the manner they would like.

The epistemological stance of the critical theory paradigm believes that knowledge and abstract views are developed because the researcher and researched are connected through historical values, which through subjectivity shape the research. Certainly, as a way of discovering what knowledge comprised of, critical theory reckons that knowledge resides within the structure and dynamics of social being (Asghar, 2013; Fenwick, 2015). It does not amass in a complete sense; its growth is determined by a dialectical procedure of historical reconsideration that endlessly erodes unawareness and misapprehensions and exposits more clued-up insights. The appropriate criteria in critical theory are historical situatedness of the inquiry. For that reason, the main thrust of the critical paradigm is the reconstruction of the formerly apprehended constructions.

In contrast, Pragmatism, as a philosophy, is unique in its emphasis even in theoretical issues on practice (Brierley, 2017; Cameron, 2011; Johnson & Onwuegbuzie, 2004; Morgan, 2007;

Williams, 2017). It is a philosophical research paradigm that includes those who claim that an idea or proposition is true if it works satisfactorily (Cameron, 2011; Gunbayi, 2020; Maarouf, 2019; Mitchell, 2018; Morgan, 2007); that is, pragmatism accepts ideas that have practical consequences, while on the other hand rejecting unpractical ideas. Thus, according to pragmatists, truth is what constitutes practical efficiency.

The next section discusses critical realism as a chosen philosophical research paradigm underpinning this study. The subsection also justifies the selection of critical realism as a suitable underpinning philosophy for this study.

4.4 Critical realism: The philosophical research paradigm of the study

The study adopted critical realism as a philosophical research paradigm (Bygstad et al., 2016; Fletcher, 2017; Heeks & Wall, 2018; Hodges, et al., 2017; Mungai, 2018). However, before making a well-grounded justification about the choice of adopting critical realism, the researcher begins by discussing its key tenets and philosophical foundations as posited by Roy Bhaskar and other critical realists.

4.4.1 Critical realists' assumptions about reality

Critical realism is a philosophy of science developed Roy Bhaskar in 1995 in reaction to the tendency of reducing ontology to epistemology by traditional philosophers, a practice he referred to "epistemic fallacy" (Bhaskar, 1998). Critical realism embraces a realist ontology and relativist epistemological stance, both aimed at unveiling structures, entities and mechanisms that constitute the social world (Bygstad et al., 2016; Fletcher, 2017; Mungai, 2018; Sayer, 2002; Whitbeck & Bhaskar, 1977). Most importantly, "critical realism offers a simple and coherent framework for [information systems] researchers that avoid many of the problems of positivism and [interpretivism] by finding a middle ground between [these two philosophies]" (Yucel, 2018: 407). For this reason, many researchers have argued that critical realism is located within the continuum of positivism and interpretivism philosophies (Bygstad et al., 2016; Heeks & Wall, 2018; Khazem, 2018; Mingers, 2001; Pedler, 2012; Rehman & Alharthi, 2016; Smith, 2006; Sorrell, 2018).

Increasingly, critical realism is becoming significant and a justifiable philosophy in the information systems research because it enables researchers to provide profound and reflective causal explanations about the occurrence of particular events in a socio-technical phenomenon (Bygstad et al., 2016; Cruickshank, 2002; Dobson, 2003; Fox, 2009; Mingers, 2001; Mingers et al., 2013; Mingers & Standing, 2017, 2020; Ononiwu et al., 2018; Shi, 2019; Smith, 2006). Traditionally, the philosophy of critical realism upholds a sacrosanct emphasis on ontological assumptions. The primary tenet of critical realism is that the existence of reality is independent of the human mind (Levers, 2013; Mingers et al., 2013; Smith, 2006; Whitbeck & Bhaskar, 1977). This implies that reality exists regardless of one's knowledge about it (Heeks & Wall, 2018; Mingers, 2004; Mingers & Standing, 2017); thus, reality can either be known or unknown. Essentially, this tenet makes researchers acknowledge that their knowledge is fallible (imperfect) and limited due to subjective interpretation of reality.

Nevertheless, while critical realists contend that reality exists independent of the mind, they also acknowledge a transcendental reality (Bhaskar, 1998; Isaksen, 2016; Duindam, 2018; Richards, 2018). Likewise, Isaksen (2016: 246) affirms that "critical realism supports a transcendental conception of reality. This means that reality is absolutely or relatively independent of our inquiries, and we, therefore, do not get direct or immediate access to the reality we study". Besides, critical realists dispel the principle of positivism which claims that reality can be knowable in its entirety. Otherwise, if that was the case, critical realists argue that there was no need in whatsoever to conduct scientific research (Nastar et al., 2018). In fact, according to Fletcher (2017: 182), "human knowledge captures only a small part of a deeper and vaster reality". Therefore, the world will never experience absolutist truth but only a glance or part of the world can be known.

Ontologically, while philosophies of positivism and interpretivism together assume a flat ontology, in contrast, critical realism acknowledges a three-level stratified ontology ordered hierarchically: the empirical; the actual; and the real worlds (Adler et al., 2015; Bergene, 2007; Easton, 2010; Heeks & Wall, 2018; Hodges, Ruecker, Scaletsky, Rivera, Faller, Geppert, et al., 2017; Mingers, 2004; Mingers et al., 2013b; Mungai, 2018; Sayer, 2002;

Smith, 2006; Sorrell, 2018). By providing a stratified ontology, critical realism obviates flattening ontology to a single level. This enables researchers “to make sense of how socially constructed scientific knowledge can be anchored in an independent reality” (Yucel, 2018: 407).

The following three worlds presented in Figure 4.4 below constitute the stratified reality of critical realism:

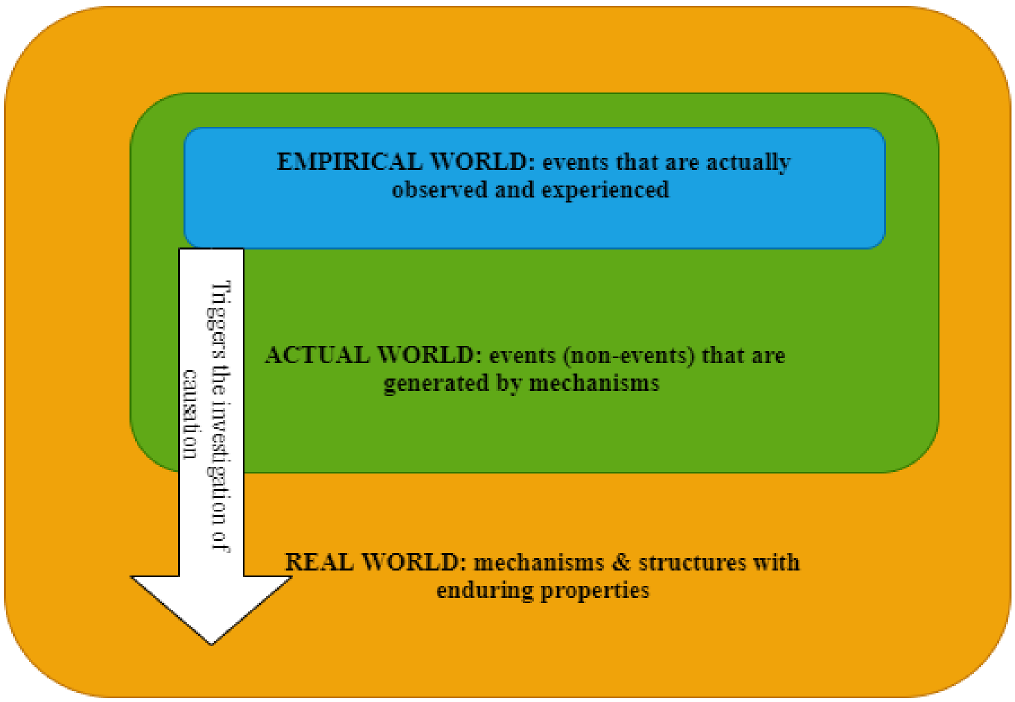


Figure 4.4: Three-level stratified ontology of critical realism
(Source: Adapted and modified from Mingers, 2004)

The top layer represents the empirical world which is related to the ontological phenomena of experiences (Heeks & Wall, 2018; Hu, 2018; Mungai, 2018). This world comprises of the subjective understanding of reality through experiences of observable events; directly or indirectly. It is the world where constructs and their interpretations are established to capture the empirical world as a possible reality (Buch-Hansen, 2014; Mingers et al., 2013; Richards, 2018). Thus, the empirical world is regarded as a subset of the actual world because it is the world in which events generated from the actual world can be observed either through perception or measurement. It should be noted that the researcher modified the stratified ontology to show that the events in the empirical world trigger the investigation of the causation of what is observed and experienced.

In contrast, the actual world represented by the second layer and is related to the ontological phenomena of events (Heeks & Wall, 2018; Hodges, Ruecker, Scaletsky, Rivera, Faller, Geppert, et al., 2017; Mingers et al., 2013). The actual world pertains to events that occur in the social world when the causal powers of the structures, mechanisms and their relations are exercised regardless of whether or not they are observed in the empirical world. Lastly, the real-world which forms the deepest end of reality comprises of objects (both physical and social) with generative mechanisms and structures with enduring properties capable of producing events in the actual world (Hoddy, 2019; Hodges, Ruecker, Scaletsky, Rivera, Faller, Geppert, et al., 2017; Mungai, 2018; Sayer, 2002). Nevertheless, these objects tend to be unobservable (Heeks & Wall, 2018).

In essence, generative mechanisms operating in the real-world triggers events in the actual world to occur and to some extent, these events can be observed and experienced in the empirical world (Heeks & Wall, 2018; Mingers, 2004; Smith, 2006). Therefore, the real-world is concerned with generating events so that they can be observed in the actual domain; thereby, making certain outcomes to be seen - whatever is experienced in the empirical world is the outcome of events generated by mechanisms in the actual world. However, it should be noted that not all events are observable because their occurrence are dependent on the availability of generative mechanisms, which in turn depend on the context of manifestation. Thus, mechanisms do not always trigger events to occur in the actual world; though, the potential to trigger events still exist even if it remains unexercised.

Critical realists also give a strong emphasis on the need for researchers to be aware of the difference between the transitive and intransitive worlds; disregarding this difference will lead to conflating of the reality and collapsing ontology into epistemology (Dobson, 2003) or committing epistemic fallacy. According to Whitbeck and Bhaskar (1977), the transitive world is the reality constructed by our knowledge of the world whereas the intransitive world is the reality that is independent of our knowledge of the world. In the transitive world, objects of knowledge are within the scope of the human mind, construction, and linguistic explanation (Alderson, 2016; Richards, 2018). In contrast, the objects of knowledge in the intransitive world are real while structures, mechanisms and processes, events and would continue to exist regardless of the human perceptual experiences (Alderson, 2016; Cruickshank, 2002; Richards, 2018). This means that meaning about the reality is beyond our knowledge. Thus, in simple terms, in the intransitive world, “what is discovered exists independently of its discovery” (Richards, 2018: 5). Hence, Yucel (2018: 414) concludes that “the distinction between the transitive and intransitive dimensions allow critical realism to sustain a fundamental separation between ontology and epistemology”.

From the abovementioned, it can be concluded that the critical realist ontology is premised on real, the actual and the empirical, the transitive and intransitive worlds of science (Sayer, 2002).

4.4.2 Epistemological stance of critical realism

In terms of epistemology, critical realism does not put much focus on the epistemological stance of the research because researchers have no immediate influence on reality (Wynn & Williams, 2012). The crux of the epistemological stance of critical realism is the rejection of absolute truth. Nevertheless, even if there is no much emphasis on epistemology, the epistemological stance of critical realism:

a) endorses a dual epistemology: relativism and moderate subjectivism epistemology;
b) affirms that knowledge about reality is transient and historically situated;
c) assumes that knowledge about reality is socially constructed;
d) enables researchers to provide causal explanations about a single reality from multiple perspectives; and
e) acknowledges that reality and knowledge are not one and the same thing.

The previous two sections have discussed the ontological and epistemological assumptions of critical realism. It is now necessary to present a summary of these assumptions and other tenets of critical realism (Figure 4.5).

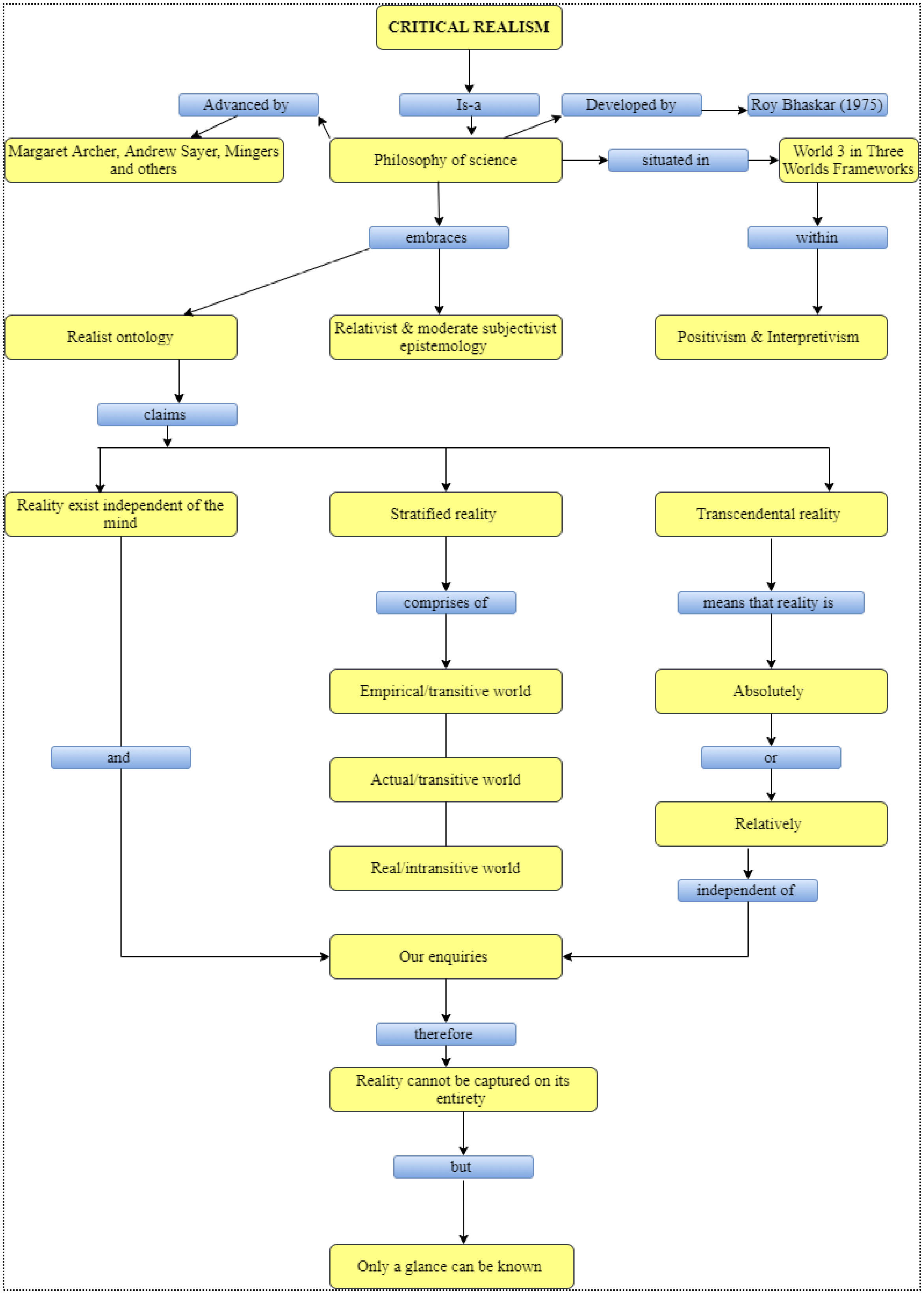


Figure 4.5: Summary of critical realism and its fundamental tenets

The next subsection provides the connectedness of the conceptual model of the study and the philosophy of critical realism.

4.4.3 Situating the conceptual model of the study within critical realism

In order to provide a clear guideline for the scientific inquiry, it is important to merge the *priori* framework (conceptual model) with the chosen philosophy of the study. Hence, the conceptual model for assessing e-government service gaps aligns to critical realism in the manner presented below:

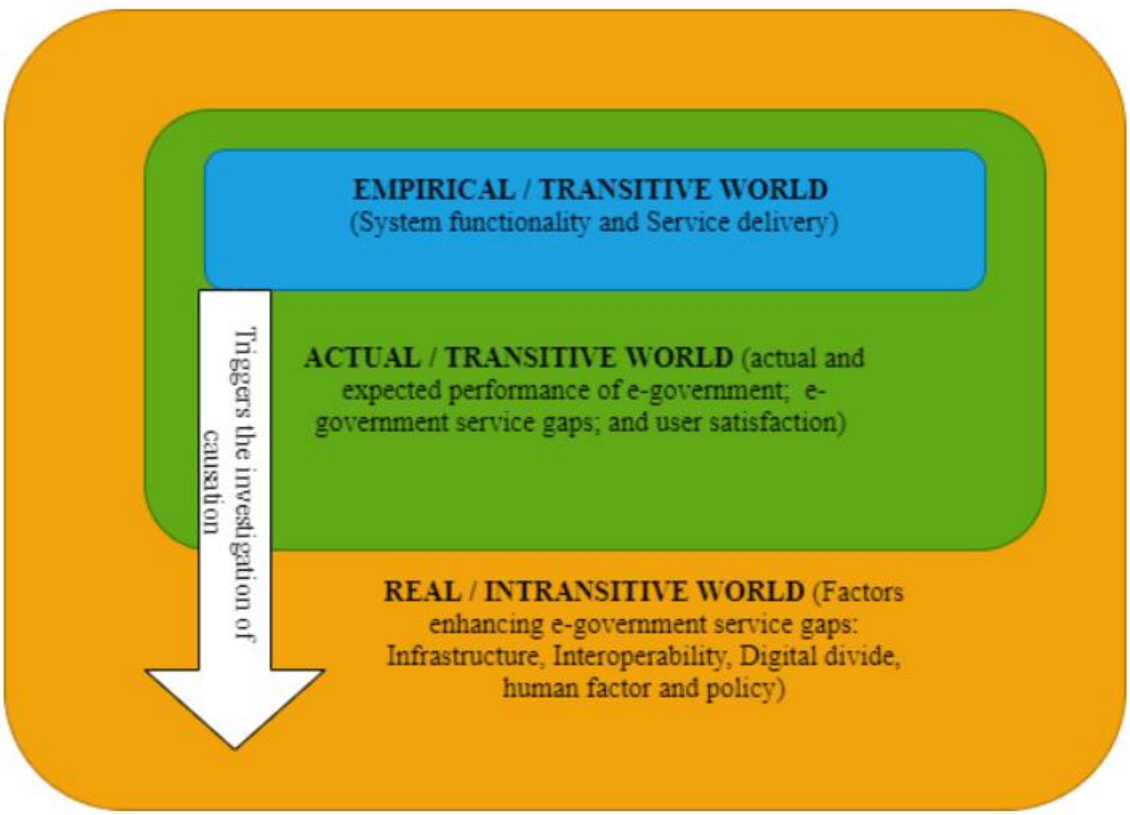


Figure 4.6: Situating the conceptual model within the stratified ontology of critical realism

The figure above shows that the real or intransitive world comprises of factors that enhance e-government service gaps. The factors include infrastructure, interoperability, digital divide, human capacity and policy. These factors are regarded as generative mechanisms because they have the potential to trigger events to occur in the actual world. The actual or transitive world comprises of events such as expected performance of e-government system, actual performance, e-government service gaps and user satisfaction level. All these events are triggered to occur by the generative mechanisms. In simple terms, the performance of the e-government system, the service gaps and user satisfaction will depend partly or entirely on infrastructure, interoperability, digital divide, human capacity and policy. Ultimately, this will result in the observation of the actual performance of the e-government system, system functionality and service delivery. Thus, these three events can be observed and experienced by the users of the e-government system.

With the understanding of the reviewed philosophical research paradigms, the next section presents the key critical realism assumptions for this study which justifies its adoption as the philosophical stance.

4.4.4 Justification of critical realism as a research stance for this study

The following are key critical realism justifications for this study:

Justification One: Bhaskar (1998) concludes that for science to occur there should be a reality independent of our mind. In this study, it can be argued that e-government comprises of a surfeit of services even if the implementers and users are not aware of them. While knowledge about e-government assessment can be constructed, it is worth mentioning that the constructed knowledge can be imperfect; hence, this study acknowledges that the existing models and framework for assessing e-government services are not perfect. In addition, critical realism is interested in multiple interpretations about a single, mind-independent reality (Mingers & Standing, 2017; Wikgren, 2005). Thus, by adopting critical realism as a research stance, the researcher was able to obtain rich and multiple views from government employees, business and citizens about factors enhancing e-government service gaps in the context of a developing country.

Justification Two: While philosophies of positivism and interpretivism together assume a flat ontology, however, critical realism recognises a stratified ontology (Heeks & Wall, 2018; Mungai, 2018; Sayer, 2002; Smith, 2018). This is because a single ontological paradigm may not show the perspectives of people and their social structures. Thus, adopting a flat ontology would produce possibly constricted perspectives of the object of inquiry; hence, the need for taking a critical realist stance. Also, the question “why e-government service gaps exist despite the intensive effort in the implementation of e-government projects in developing countries cannot be answered by determining the level of exactness that natural scientists enjoy in using positivists philosophy. Instead, answers drawn from a stratified ontology can help to provide in-depth and rich explanations about the phenomenon. For instance, the actual performance of an e-government system may be observable at the empirical world by seeking users’ perceptions towards service delivery and system functionality. The actual world constitutes what happens when e-government services are not provided comprehensively. This includes e-government service gaps and lack of user satisfaction. However, the explanation of these events-effects emanating from empirical and actual worlds can only be provided with reference to the real world (Eastwood et al., 2016), where generative mechanisms such as infrastructure, interoperability, digital divide, human capacity and policy trigger the causation of such events.

Justification Three: The real-world comprises of objects with generative mechanisms and structures with enduring properties capable of producing events in the actual world (Ononiwu, 2015; Sorrell, 2018; Williams et al., 2017). The purpose of critical realism is neither to reveal general laws nor to understand irregularities, but to discover, comprehends and explicates mechanisms that cause an event to happen (Danermark, 2019a; Shi, 2019). Thus, the fundamental characteristics of a study grounded on critical realism paradigm include the following: its pursuit for cause and effects; inquiry of the mechanism underlying an event or action; causative explanation; and employing multiple research methods. Since the focus of the study is on assessing e-government service gaps in the context of a developing country, the fact that e-government service gaps are a reality in a developing context shows that there exist underlying mechanisms for this phenomenon to occur and be experienced by the government employees, businesses and citizens in the empirical world. Undoubtedly, the mechanisms cause dissatisfaction in the use of e-government in this context. And these mechanisms need to be revealed and explained. Thus, the suitable philosophical research paradigm for this kind of inquiry is the one that is designed to addresses the causation conception and provide an explanation about the occurrence of the phenomenon (Heeks & Wall, 2018; Mungai, 2018); that is the critical realism philosophy. Hence, the study was also planned as explanatory research because it sought to answer the why question.

Justification Four: Also, the relativist epistemology embraced in the philosophy of critical realism submits that reality is socially constructed (Eastwood et al., 2014; Pathirage et al., 2008; Smith, 2006) and different individuals construct the meaning of the same object or phenomenon in different ways. Therefore, researchers need to engage with different social actors of the phenomenon under investigation. This epistemology thus promotes dialogical interaction between the researcher and the participants during data gathering. Similarly, Barbosa et al. (2013: 745) claim that "e-government is socially constructed by the social actors that use it". These include the following: government employees, businesses and citizens. Therefore, there was a need to engage with various actors of e-government. Thus, by adopting critical realism, this meant that the researcher was not merely an observer in the study but an active entity. As a consequence, the researcher could gain an in-depth understanding of the problem under investigation through active participation.

Justification Five: The adoption of a specific philosophical stance is influenced by the research questions that dominate the mind of the researcher as well as the research interests and the nature of the research. The researcher considers that he is a critical realist because in his everyday life he is always preoccupied with the why and what questions of a phenomenon. This preoccupation gives the researcher a sustained interest in conducting a scientific inquiry that is guided the philosophy of critical realism. Also, Orlikowski and Baroudi (1991) advised that researchers should adopt a philosophical stance that is attuned with their personal research interests and nature. In this study, the interest was not to observe whether or not e-government service gaps existed but to explain why these gaps existed in a developing context. Thus, the existence of an entity cannot be determined by observation alone. Therefore, critical realism was deemed compatible with the interest of the researcher and the nature of research (explanatory) because this philosophy enabled the researcher to provide a comprehensive causal explanation of the phenomena under investigation since it encompassed both the subjective interpretation of actors' as well as the structures and mechanisms that prohibit the effective implementation and utilisation of e-government services (Heeks & Wall, 2018; Mingers & Standing, 2017). Moreover, for critical realism, relativist epistemology implies that the aspiration of a theory is to generate as truthful as possible explanations concerning the intransitive world rather than putting forward predictions regarding its existence (Eastwood et al., 2014; Fletcher, 2017; Richards, 2018).

Justification Six: E-government research conducted within the philosophical stances of positivism, interpretivism and critical theory suffers from persistent theory-practice and inconsistencies (Smith, 2006). Thus, critical realism helps in transcending many inconsistencies between stated philosophical assumptions and the actual practice of research under both positivism and interpretivism. Most importantly, since it is believed that no single method can adequately explain information systems phenomena (Heeks & Wall, 2018; John Mingers, 2001), the critical realist epistemology makes possible the adoption of multiple-methods, which possibly will otherwise not be realistic should a researcher employs a complete positivism or interpretivism philosophy (Mingers, 2001). Therefore, rejecting methodological individualism as naïve and reductionist allows critical realists to use a research methodology that encompasses multi-methods to achieve research rigour and triangulation (Frauley, 2017; McKeown, 2017). Also, within the philosophy of critical realism, strategies such as case studies and in-depth interviews enabled the researcher to understand social and practical problems experienced by government employees, businesses and citizens in the implementation and utilisation of e-government services.

Justification Seven: Knowledge is transitive - how a phenomenon is understood is subject to change (Alderson, 2016; Haigh et al., 2019). This is because the human mind has the potential to construct fallible knowledge; leading to the creation of misconceptions or development of misguided theories and models, which may require refutation, extension and modification. Therefore, as a consequence, this study claims that e-government assessment typologies may be modified to enhance practical relevance.

The aforementioned list contains the justifications for the selection of critical realism as an appropriate research philosophy of the study. As mentioned in the earlier discussions, the research philosophy informs the selection of the research methodology of the study. Therefore, having chosen a critical realist stance, the following section and subsequent subsections present the key components of the research methodology and their justification for adoption.

4.5 Research methodology: Multi-methodology research

This section presents the key elements of the research methodology used in this study and the justification of their adoption. The term methodology, in the context of research, refers to the research process, research designs/strategies, methods and techniques adopted by a researcher to carry out a study in accordance with the philosophical stance and research purpose and objectives. In essence, a research methodology informs the research process, strategy, methods and techniques of a particular study. Thus, a methodology can be defined as a plan that informs the decision to follow a particular research process as well as employ a specific research strategy, set of methods and techniques in pursuit of scientific knowledge (Guba & Lincoln, 1994; Slevitch, 2011).

There are three (3) common methodologies used for conducting a scientific inquiry: qualitative, quantitative and mixed methodology. Research may use a single or multi-methodology. While positivists and interpretivists employ single methodology apiece, critical realism supports methodological pluralism which in turn encourages the possibility of multiple interpretations of the same reality (Pathirage et al., 2008; Saxena, 2019). As indicated in Table 4.2, *"Taxonomy of research paradigms applicable in information systems research",* positivists are required to employ a quantitative methodology while interpretivists use qualitative methodology. However, critical realism is regarded as a 'conciliatory' philosophy in which the researcher may choose to employ qualitative, quantitative or mixed methodology (Bergene, 2007; Mingers, 2001).

But, this study refers to the combination of two methodologies to multi-methodology which like mixed methodology is the adoption of plural research methods to collect and analyse data in a single research study (Mingers, 2001; Ormerod, 2002; Creswell, 2009; Hodges, Ruecker, Scaletsky, Rivera, Faller, Geppert, et al., 2017) when a single method is not adequate to address the research problem (Rocco & Plakhotnik, 2009; Mckendrick, 2020). However, apart from combining methods from qualitative and quantitative methodologies, multi-methodology requires the use of at least two (2) methods from either quantitative or qualitative methodology to achieve the purpose of the study. Likewise, measurements and quantification severely limit the ability of the study to address complexity brought about by multiple perspectives in evaluating e-government. The use of multi-methodology provided a rational balance between generalisability of the outcome and the lived experiences of the participants; thereby, overcoming the biases inherent in quantitative and qualitative methodologies (Collins et al., 2007; Davis et al., 2011; Yin, 2009).

In addition, multi-methodology provides more evidence for studying research problem than either quantitative or qualitative research methodology alone (Bentahar & Cameron, 2015; Caruth, 2013; Terrell, 2012). Multi-methodology also provides precision and depth of the research findings since it enables the researcher to study the "inner-world" of the phenomenon, which in this study is represented by the factors enhancing e-government service gaps. Furthermore, the methodology aims to combine the insights from both qualitative and quantitative research so that the study results present a realistic solution and strength theory building. Besides, multi-methodology enabled the researcher to achieve two (2) purposes of critical realist research: explaining relationships and identification of the causes that influence outcomes (Jolly & Jolly, 2014; Linsley et al., 2015).

Moreover, critical realists postulate that multi-methodology provides three (3) key features as follows (Mingers, 2001; Ormerod, 2002; Saxena, 2019):

a) First and foremost, the findings should comprise of the quantitative facet to enhance the generalisability of the findings. In this study, multi-methodology will make the model applicable in assessing other e-government systems in Zimbabwe and similar context, too.
b) Secondly, qualitative methods are open-ended; allowing unanticipated themes to emerge from the primary data. Hence, enabling the study to reveal context-based mechanisms that enhances e-government service gaps.

c) Lastly, together with critical realism, multi-methodology provide a considerable link between the world of science and the pragmatic world; thus, ensuring that scientific knowledge provides practical solutions to everyday life (e-government service gaps in the developing context) in a meaningful way.

4.6 Research process

Research process presents a schema of the research that provides coherent sequences of activities to be performed to complete the research study (Dang, 2015). It involves a lot of phases that include formulating the research questions/objectives, gathering information, analysing and reporting the data among other activities of research needed to accomplish the study. Thus, a research process can be regarded as a systematic procedure that guides the researcher in conducting a scientific investigation to achieve the research aim. Figure 4.5 shows the research process followed in this study.

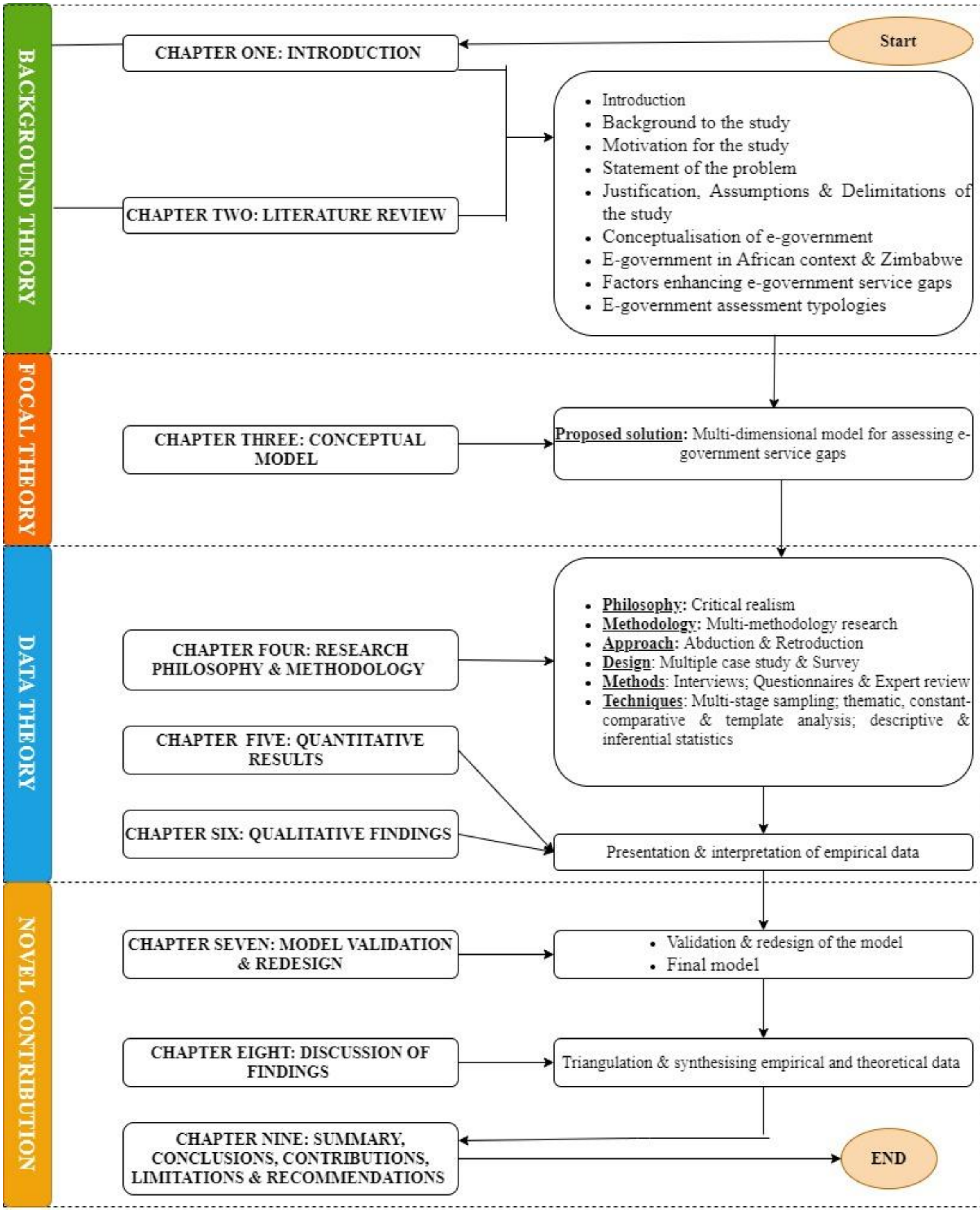


Figure 4.7: Research process

The study consists of the following four (4) major stages:

a) *Background theory:* This stage enabled the researcher to define the problem and review literature so that the problem in the world of pragmatics (World 1 of the Three

Worlds Framework) is translated into an object of inquiry, which is a phenomenon of investigation. At this stage, the researcher was able to critically review literature in the problem area to establish the research need of the study - lack of studies that explicitly focus on investigating e-government service gaps and the lack of e-government assessment metric that focuses on assessing e-government service gaps. Thus, the background theory focused on the 'what' of the study; that is, *what* is the problem and *what* is known about the problem.

b) *Focal theory:* The second stage aimed at developing and presenting the conceptual model based on the findings of the literature. A multi-dimensional model for assessing e-government service gaps was proposed at this stage. The focal theory is the first phase of developing a solution for the world of pragmatics and the action takes place in World 2 of the Three Worlds Frameworks.

c) *Data theory:* Research methodology, methods and techniques for validation of the conceptual model are selected and justified in this phase. A multi-methodology has been adopted based on the research philosophy and the purpose of the study. Both quantitative and qualitative units of measure were employed to validate the conceptual model and synthesise the findings. The focus of this stage was to generate valid, trustworthy and dependable model and explanations about the phenomenon of the study through rigorous and systematic inquiry.

d) *Novel contributions:* As for this stage, the purpose is to reflect on the findings of the study obtained in the previous stage and consider suggested revisions to the conceptual model. Also, at this stage, summaries of the findings, conclusions and critical contributions are provided together with recommendations for further research. The solution to the world of pragmatics is provided. Thus, the purpose of novel contributions is to increase knowledge (what is known) and provide solutions to the world of pragmatics; hence, contributing to theory and practice.

4.7 Research strategy

Research strategy is another important element in research as it provides the overall direction to conduct a scientific inquiry (Aghapour, 2012; Jick, 1979; Pathirage et al., 2008). Also known as a research design, Yin explains that:

> "A research strategy is an organised structure that serves as a master plan for defining the ways of collecting and analysing data. It acts as a functional scheme in which certain research methods, techniques and procedures are linked together to obtain reliable and valid data for empirical analysis, conclusions and theory formulation" (Yin, 1979: 23).

Various research strategies with distinct characteristics are available for selection by researchers. These include case study, experimental, action research, ethnography, grounded theory, phenomenology, narrative and survey research. Nevertheless, Orlikowski and Baroudi (1991) implore that a research conducted in information systems should be grounded in any of the following five (5) research strategies: survey, case study, laboratory experiment, action research and Histories/archival analysis. Research questions and action mechanisms associated with these strategies are presented in Table 4.4.

Table 4.4: Types of the questions under different research strategies in information systems research

Research strategy	Research questions	Action mechanism
Survey	Who, why, where, what, how many	Researcher generalises notion or views of a segment of population obtained from a sample size.
Case study	why, what and how	Researcher study a phenomenon in a particular research context.
Experimental	How and what	Researcher conducts an experiment about a phenomenon practically to draw conclusions.
Action research	What, why, and how	Researcher directly participates in the research process to experience and observe how the research unfolds.
Histories/archival analysis	Who, why, where, what, how many, when	Researcher analyses and investigates a phenomenon using the historical data.

(Source: edited from Joshi, 2018)

The appropriateness of a research strategy in a scientific inquiry depends on the research purpose, objectives and the chosen philosophy (Zaidah & Zainal, 2007). In contrast, Benbasat (1987) claims that the criteria for choosing a research strategy is influenced by the research questions, availability of knowledge in the research area, researcher's philosophy and the study horizon. However, Yin (2013) recommends that the selection of a research strategy must be determined by the extent of the researcher's control over behavioural events, nature of the research question as well as whether the study focuses on contemporary or historical events. Since the purpose of the research involves the development and validation of the multi-dimensional model, the case study and survey strategies were employed. The survey was used to validate the technical attributes (system functionality) of the model, service delivery capabilities, and factors enhancing e-government service gaps and user satisfaction while the case study was used to investigate the factors enhancing e-government service gaps.

The following subsections provide a brief description of these two (2) research strategies and their justification for adoption in this study.

4.7.1 Case study and unit of analysis

A multiple-case study was adopted as the research strategy of the study. Case study is a research strategy that is used to investigate a contemporary phenomenon in its natural setting using multiple methods to collect empirical data from single or few entities such as people, groups or organisations (Yin, 1979, 2003, 2012). In the same note, Benbasat (1987) described a case study as a holistic investigation which employs multiple research methods to study a phenomenon from its natural setting based on single or multiple perspectives. While Bhaskar made no effort to suggest an explicit research strategy for critical realism research, a case study is much viewed as the most appropriate strategy to use when conducting a critical realist study (Bygstad, 2010; Dobson, 2001; Easton, 2010; Henfridsson & Bygstad, 2013; Hu, 2018). In the same vein, a case study research strategy has been widely used within the philosophy of critical realism in information systems research most importantly to develop a new theory (Wynn & Williams, 2012; Papachristos & Adamides, 2016; Mukumbang et al., 2018; Flynn et al., 2019), a purpose that is similar to this study. This is because the case study research strategy enables researchers to gain an in-depth understanding of the complex phenomenon by employing multiple methods such as interviews, observations and questionnaires, documents and focus groups in a given context (Anisimova & Thomson, 2012; Astalin, 2013).

By its design, a multiple-case study strategy allows for the corroboration of research findings across case studies by the use of a cross-case analysis (Bergene, 2007; Van Wynsberghe &

Khan, 2007; Yin, 2013) to understand the complex reality of e-government among different groups of users, though the effects of causal mechanism are perpetually dependent on contingent conditions. Moreover, the evidence from multiple cases is more persuasive and credible, because it enhances an in-depth study of the phenomenon (Yin, 2013) from multiple perspectives. Besides, the selection of multiple cases in this study will obviate a direct replication of the study and demonstrate distinct and divergent experiences of e-government among different user-groups (Yin, 2012). The next two (2) paragraphs present the justification of the use of a case study research strategy.

With regards to research questions as indicated in Table 4.4 above, the case study strategy is suitable for a study that intends to answer the 'why', 'what' and 'how' questions. Similarly, research questions in this study are dominated by the primary research questions of a case study which according to Yin (2013) compels the researcher to adopt a case study research. Thus, Yin's recommendations in the adoption of a case study fit well in this study.

Likewise, the study intends to answer the following research questions:

a) Why do e-government service gaps exist despite the intensive efforts in the design, development and implementation of e-government projects in developing countries?
b) What are the factors enhancing e-government service gaps in a developing country context (Zimbabwe)?
c) Which measurement dimensions from various e-government assessment typologies are applicable in the assessment of e-government service gaps?
d) How can measurement dimensions from e-government assessment typologies be synthesised into a multi-dimensional conceptual model?
e) How can the conceptual model be validated to become a theoretical model in assessing e-government service gaps in a developing country?

Furthermore, the choice of the case study research strategy was determined by the criteria provided by Benbasat (1987); Miles and Huberman (1994); and Yin (2013) as follows:

a) *Limited control:* The researcher does not have control over the design, development and deployment of e-government systems/projects in Zimbabwe.

b) *Contemporary issues:* The quest for e-government in developing countries has made the investigation of e-government related issues to be regarded as contemporary in the domain of information systems.
c) *Natural settings:* By means of the case study strategy, the researcher will be able to study the phenomenon of e-government in its natural settings (developing country), learn about e-government service gaps and its causation in order to generate an appropriate theory for assessing e-government in a developing context.
d) *Complex phenomenon:* Respectively, a case study research strategy is considered appropriate when studying a complex phenomenon like e-government since it allows the researcher to retain holistic and significant features of real-life events and deliberately comprehend contextual factors that may be otherwise unseen to a research strategy such as a survey.
e) *Context-dependent:* A case study is employed when a phenomenon like e-government cannot be studied outside the context in which it occurs. Accordingly, e-government is deployed in a particular context so that it can serve a specific purpose.
f) *Multi-methodology:* Data was collected and analysed using multiple methods and techniques.
g) *Multiple perspectives:* The researcher used different groups of e-government users to gain an in-depth understanding from multiple perspectives. This is because each group of users might have unique experience about e-government. As well, multiple perspectives were required in this study to validate the conceptual model because the philosophy of critical realism contends that a single reality has multiple interpretations; hence, the need to adopt a multiple case study.
h) *In-depth understanding:* The case study research design fits well within this study, because the researcher needed to delve deeper on the phenomenon to gain an understanding of the generating mechanisms. Likewise, a critical realist case study seeks to identify causal mechanisms that do not operate at the observable world but rather in the deep end of reality.

Case selection

The selection of cases began by recognising the key elements or units that could benefit directly or indirectly from the deployment of e-government projects in Zimbabwe. As mentioned in Zimbabwe's e-government implementation framework, the major beneficiaries of e-government projects are e-government users - government employees, businesses and citizens. Although government employees and businesses can be broadly classified as citizens, Rowley (2011) advised that these two categories should be classified separately because they are most likely to have different expectations from the e-government system compared to general citizens. Furthermore, theoretical replication logic was taken into consideration in selecting the case studies (Yin, 2003) since the researcher predicted that the cases selected will provide contrasting result.

Unit of analysis

The level of data collection in any case study is linked to the unit of analysis of the study context (Anisimova & Thomson, 2012; Benbasat, 1987; Van Wynsberghe & Khan, 2007; Yin, 2013). Also, the significance of the findings for the theory rests on the study of the appropriate unit of analysis. For the most part, the nature of the study and the research objectives controls the selection of the unit of analysis. Furthermore, in the study of diffusion of innovations, Van Wynsberghe and Khan (2007) noted that systems, individuals and organisations are the major elements used to define the unit of analysis. Following this notion, the primary unit of analysis in this study is the e-Taxation system and embedded or multiple units of analysis are three (3) different groups of users of the system as follows: government employees, businesses and citizens. These three (3) cases were used as the primary sources of empirical data because it was assumed that the cases were adequate to provide sufficient data about the study and each group has its own perspectives, expectations, concerns and values about e-government services. Moreover, the three units of analysis are within the limits of conducting a case study research (Yin, 2009).

By means of a case study, the case is an object of interest in its own right, and the researcher intends to give an in-depth exposition of it. Miles and Huberman (1994) claim that the case is the unit of analysis but they also acknowledge that the case might not be monolithic and might comprise sub cases embedded within it; thereby, making them multiple cases.

Concurring with claim put across by Miles and Huberman, Yin (2003) maintains that a single case may involve more than one unit of analysis; thereof, it becomes a multiple case study. This situation occurs when within a single case, consideration is also given to sub units (Paré & Montréal, 2004; Yin, 2003). The figure below depicts the case study with embedded units of analysis:

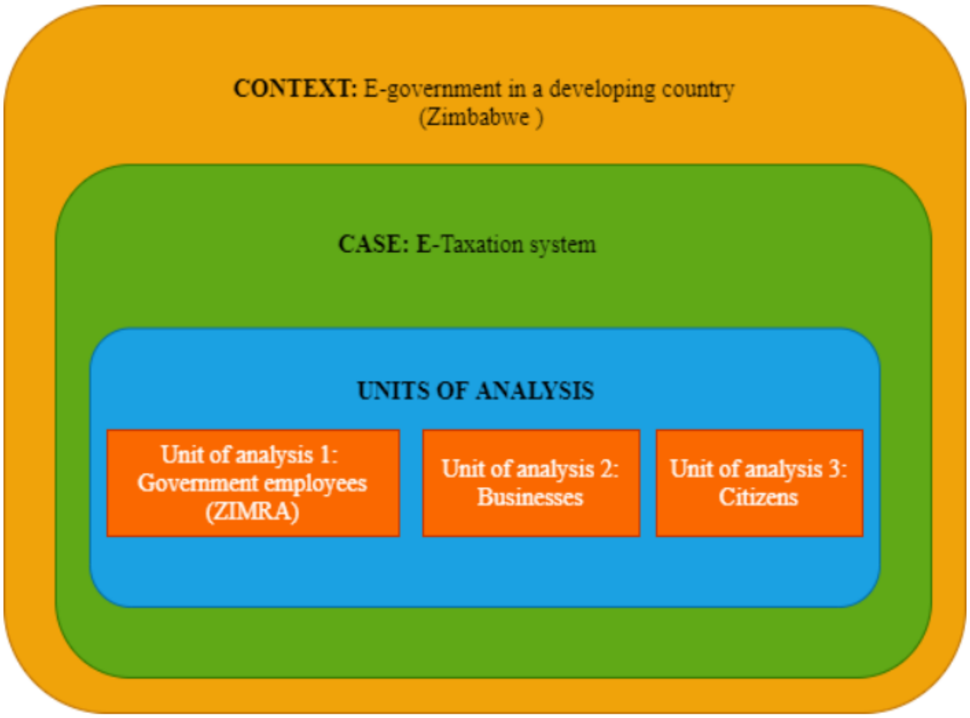


Figure 4.8: A case study with embedded units of analysis

Case description

As a developing country, Zimbabwe was selected as the empirical case for this study. By 2018, the country was ranked 146 out of 193 EGDI and last in SADC while the OSI stood at 0.3246 (Munyoka, 2019). These attributes place Zimbabwe within a developing country context. Furthermore, the current e-government services in Zimbabwe are between phases 1 (Emerging stage) and 2 (Interaction stage) where information is provided online or some downloadable forms are available on the Internet. Thus, all these characteristics make Zimbabwe an ideal context and case for a developing country. More details about e-government services in Zimbabwe were given in Chapter Two.

E-Taxation in Zimbabwe: The case rationale

The government of Zimbabwe identified e-Taxation as one of the important e-government projects for implementation. Accordingly, the designers and developers of e-government need to know how to meet the service and information needs of the users. The e-Taxation is an online system that enables the government agency; that is, the Zimbabwe Revenue Authority (ZIMRA) to engage businesses and citizens on tax issues through online services; thereby, handling tax obligations electronically through e-filling. The platform presents part of the ZIMRA's contributions to the national e-government drive policy. The system is accessible through the website: www.efiling.zimra.co.zw and it is mandatory for use by the business, citizens and government to promote transparency in the administration of tax by the revenue authority.

Also, the e-Taxation seeks to make it convenient, simple and quick for Zimbabwean citizens and businesses to process their tax returns and keep track of their tax transactions online. This e-service platform enables the public to carry out self-service in terms of filling tax returns as well as viewing their tax status online. Accessing the system on the specified website gives options for setting up a ZIMRA e-services account that holds all relevant fiscal details of an individual or business organisation; thus, the online account will have relevant historical data related to payments made and fiscal obligations.

The e-filing process covers Value Added Tax (VAT), Pay as You Earn (PAYE) and Income tax but other obligations like presumptive taxes, tax clearances and capital gains taxes are yet to be included. The other aspect that has not been introduced to the system is the online payment function. The option is only visible but not functioning. The payments are done through the traditional banking channels like the Commercial Bank of Zimbabwe (CBZ) and the Zimbabwe Bank (ZB). Additionally, the mobile application that caters for every aspect of the e-service platform is yet to be availed in the system. Hence, the e-filling currently iterates among VAT, PAYE and Income tax on the website. Thus, it is yet to address all the fiscal issues in Zimbabwe.

The case study (e-Taxation system) is selected based on two reasons. First, tax compliance issues for government departments, business and individuals is an area of keen interest to the revenue authority in Zimbabwe (Onias et al., 2016). E-filling has the potential to increase compliance with tax as well as improves the ease of doing business with the government. As pointed out by Sifile et al. (2018: 4), that "Tax is the most reliable and significant source of revenue in the government of Zimbabwe, contributing more than 60% to the national budget". Therefore, tax compliance is critical to the economy of the country (Sifile et al., 2018); hence, the collection process should be efficient and effective.

Second, the system has been selected because, among the many e-government projects in Zimbabwe that have been implemented to date, e-Taxation is the only system that is being used by government agencies, the business, and citizens to fill their taxes. The other e-government systems either focus only on citizens, government agencies or businesses. Hence, the e-Taxation system presents a relevant case for understanding the phenomenon from multiple perspectives, a facet that is consistent with critical realism and case study research strategy.

4.7.2 Survey strategy

A survey is regarded as one of the most important research strategies in many different scientific investigations (Bradburn et al., 1990; Khaldi, 2017; Wong et al., 2012). It is a research strategy used to collect data from a large cohort through their response to the questionnaire (Jones et al., 2013; Ponto, 2015; Williams & Williams, 2019). The survey is considered a significant research strategy for generalising findings from a section of population under investigation even though the information is not collected from the entire population. Furthermore, the use of survey research strategy within the study context enables a large sample size to support generalisation of the research findings in addition to determining the divergence and convergence of views from different cases. The strategy employs structured questionnaires or interviews to gather data about people and their preferences, values perceptions and opinions (Fricker, 2008; Kelley et al., 2003). Above all, the strategy is capable of collecting both qualitative and quantitative data.

In this study, a quantitative survey strategy has been adopted because of its strength to measure a wide variety of unobservable data, such as system functionality and service delivery (Ahmad et al., 2019). Specifically, the survey strategy was used to address the following questions:

a) What are the factors enhancing e-government service gaps in a developing country context (Zimbabwe)?; and
b) Which measurement dimensions from various e-government assessment typologies are applicable in the assessment of e-government service gaps?

In addition, the survey was used to validate the constructs of the model for assessing e-government service gaps and support the generalisation of the model within the context of a developing country. This is because the use of a case study alone could not suffice the development of a model that can be used beyond the e-Taxation system; that is, assessing other e-government systems in the developing context. Also, since the cases of analysis for this study included the citizens and businesses, the survey strategy was the most appropriate selection for collecting data from these units since they are too large to be investigated through direct observation. Hence, the survey strategy enabled data to be collected from a large number of citizens and business organisations, which would otherwise unattainable with the other research strategies. Thus, the survey strategy is not only suitable in this study for measuring unobserved data but appropriate in model validation and generalisation due to its greater statistical power (Jones et al., 2013).

4.8 Population and sampling

This research is classified as an empirical study and does not take place in an empty setting; it involves “engaging people who experience and know the phenomenon [under investigation]” (Van de Ven, 2016: 2). It is conducted within elements that are defined by certain features. These characteristics provide a structure on which elements are to be considered for the population and sample of the study (Creswell, 2009). A population is a group of elements that possess varying characteristics that make them suitable for selection in the study area from which the sample of the study is to be selected (Delİce, 2001; Fetters et al., 2013). In the same vein, Palinkas et al. (2015: 6) define a population “as the collection of elements from which the sample of the study is to be selected. These elements must conform to specific criteria so that the results of the study can be generalised".

Collecting data from the entire population is impracticable due to cost and time (Fetters et al., 2013); therefore, a sample was required to generalise the findings of the study. "Sampling is the … process of selecting a subset … of a population of interest for purposes of making observations and … inferences about that population" (Bhattacherjee, 2012: 65). It can be summed up as the process of determining how participants for a specific study should be selected. In this study, each research strategy had its own sampling technique; hence, the study adopted a multi-stage sampling procedure.

4.8.1 Case study sampling

To take part in the interviews and model validation, the majority of participants (government employees, businesses and citizens) were supposed to meet any of the following criteria: users of the e-Taxation system; involved in the design and development of e-government systems; responsible for the deployment or implementation of e-government projects, evaluation or monitoring the implementation of e-government projects. Selecting these three samples ensured that all the current user groups of the e-Taxation system are represented in the study as well as those with varying roles in the entire e-government value chain, from design to monitoring and evaluation. Accordingly, since the study of e-government is regarded as a complex phenomenon (Ahmad et al., 2019) and multi-stage in nature (involves different groups of people), the researcher employed a complex/multi-stage sampling in which participants were selected using stratified (Onwuegbuzie & Collins, 2007), purposive (Miles & Huberman, 1994; Tongco, 2007) and snowball sampling techniques (Awa et al., 2016; Grobler & de Villiers, 2017). Multi-stage sampling is a procedure that uses a several sampling techniques to achieve a representative sample of the study (Bhattacherjee, 2012; Fetters et al., 2013). In contrast, stratified sampling is a procedure used to divide the sample frame into homogeneous and non-overlapping subgroups; strata, to ensure that sub units of the population are represented in the sample (Pathak et al., 2012).

Also, purposive sampling is a technique used to select a small number of samples that will yield the most useful information about a particular phenomenon being investigated (Palinkas et al., 2015; Tongco, 2007); whereas, in snowball sampling, the procedure begins by identifying a few participants who qualify for inclusion in the study followed by requesting them to identify other participants who are not known by the researcher but meet the criteria for inclusion (Bhattacherjee, 2012; Kirchherr & Charles, 2018).

Multi-stage sampling was employed for the following reasons:

a) Stratified sampling was conducted to ensure that the sample was divided into relatively homogenous sub groups and each sub unit of analysis were represented in the sample.
b) Stratified sampling was also necessary since the users of e-government could not be treated as a homogenous group.
c) Purposive sampling was used since not everyone in the strata is a user of the e-Taxation system. Therefore, purposive sampling enabled the researcher to deliberately and strategically choose prospective participants or information-rich cases.
d) Purposive sampling also enabled the researcher to select participants that show the best ability to address the research questions and to meet the research objectives of the study.
e) Snowball sampling was used because the citizens who are users of the e-Taxation system were very difficult to find. In fact, it was all but impossible to find the citizens who are users of the e-Taxation system using a random sampling technique. Thus, snowball sampling was conducted to have citizens refer to others who were users of the e-Taxation system.

In addition, the sampling decision was based on the choice of the unit of analysis and the overall purpose of the case study. At each sub unit, the sampling decision was also informed by the precepts of theoretical saturation. Data was collected until each concept had been perceived to be fully explored and no new insights were being generated. Table 4.5 shows the sample distribution for interview participants for the case study research.

Table 4.5: Sample distribution for interview participants for the case study research

Category	Sampling technique	Number of participants
Government employees	Purposive and snowball sampling	13
Businesses	Purposive sampling	7
Citizens	Purposive and snowball sampling	10
Total		**30**

4.8.2 Survey sampling

Participants for the survey were sampled using stratified-random sampling technique (Nguyen et al., 2019) for the following reasons:

a) Stratified sampling was conducted to ensure that each sub unit of analysis was represented in the sample.

b) Random sampling was conducted to ensure that each member within the sub unit had an equal chance of being selected.

4.8.3 Sample size for the survey

A sample size for a survey should be appropriate and adequate to exhaust statistical analysis and enhance the generalisability of findings (Hu & Bentler, 1999). Whereas some criteria have been proposed to guide the determination of the sample size for survey research (Pearson & Mundfrom, 2010), this study followed Cochrun's (1977) criteria for determining the sample size of the infinite population. The formula for determining the sample size for an infinite population is presented below:

*S = Z2 * P* (1−P) /M2; where:*

S = Sample size for the infinite population

Z = Z score

P = Population proportion (presumed to be 50%/ 0.5)

M = Margin of error (5%/ 0.05)

NOTE: *Z* score is determined based on confidence level of 95%; thus, *Z* = 1.96

The above formula implies that the level of precision should be kept at -+5%, while maintaining the confidence level at 95%. Correspondingly, the extent of variability should be maintained at .5, which is considered as a reasonable variation. Therefore, putting the above-proposed figures into an equation, the sample size of the survey is as follows:

$$\textit{Sample size} = ((1.96)^2\ (.5)\ (.5))/\ (.05)^2 = \mathbf{385.}$$

Thus, a random sample of 385 participants in the infinite population like of this study should be enough to give the required confidence levels and statistical power to validate the model for assessing e-government service gaps. However, the research has selected the sample size of 550 which is above the ideal size and adequate to cover up for non-responses. The sample size distribution for the survey is given in Table 4.6.

Table 4.6: Sample size distribution for the survey

Category	Sampling technique	Sample size
Government employees	Random sampling	120
Businesses	Random sampling	130
Citizens	Random sampling	300
Total		**550**

4.8.4 Experts selection

As indicated in Chapter Three, experts were required to validate the conceptual model to strengthen the quality of the model. The selection of experts was conducted using expert sampling technique (Bhattacherjee, 2012). Expert sampling is a technique in which participants were chosen using a non-random procedure based on their expertise on the phenomenon being investigated (*ibid*). Thus, the researcher selected only participants who were known to be involved in the design, development, implementation, monitoring and/or evaluation of e-government projects. The sample distribution for experts is presented in Table 4.7.

Table 4.7: Selection of experts

Category	Inclusion criteria	Number
Ministry of ICT, Postal and Courier Services	Providing the technical back stoppage for e-government projects in the form of systems installations and administration, hardware and networks.	1
OPC	Implementation and evaluation of e-government projects in Zimbabwe.	1
Twenty Third Century Systems (TTCS)	Designers and developers of e-government projects in Zimbabwe.	1
ZIMRA ICT personnel	Implementation of e-government projects in the Zimbabwe Revenue	1

	Authority.	
Total		**4**

All the four (4) experts were assumed to be well suitable for validating the conceptual model. Their different roles and varied experiences in the implementation of e-government projects could further augment the modification of the conceptual model. While expert reviewers may differ in number (Dumas & Sorce, 1995; Olson, 2010; Presser & Blair, 1994), Emmanuel (2019) proposed that at least three (3) experts are adequate to provide valuable information. Therefore, the number of experts selected to participate in this study is above the minimum size.

4.9 Research methods

Research methods are tools, set of instructions or instruments used in scientific inquiry to collect data about a phenomenon under investigation (Aspers & Corte, 2019; Houston, 2011; Van de Ven, 2016; Williams, 2007). This study acknowledges that various research methods are suitable for data collection. These include interviews, questionnaires, document analysis, observations, expert review and Focus Group Discussions (FGDs). In this study, the selection of the research methods is grounded on the type of data to be collected (quantitative and qualitative) and the sources of data.

4.9.1 Interviews

Interviews are the most commonly used research methods within a case study research to gather qualitative data (Benbasat, 1987; Yin, 2009). An interview is a conversation between the interviewee and interviewer which is accompanied by note-taking or voice recordings to avoid any data collection errors (Jacob & Furgerson, 2012). There are various reasons for choosing interviews as part of a research method in a study that is grounded in the philosophy of critical realism. One of the purposes is to gain the ‘inner-world’ about the phenomenon being studied which cannot be directly observed or measured using quantitative data (Eastwood et al., 2014). Furthermore, according Driscoll (2011), interviews provide detailed and rich insights whose in-depth level cannot be achieved by research methods such as questionnaires and observations. Loukis and Charalabidis (2011), in addition, submit that interview as a qualitative research method is valuable and efficient in gathering and exploring rich human insights and perceptions on complex phenomena such as e-government.

Thus, using interviews in investigating the factors enhancing e-government service gaps became significant in answering the main research question of the study - *why do e-government service gaps exist in developing countries despite intensive efforts in the design, development and deployment of e-government systems?* Therefore, to gain such information, interviews appeared to be very useful since the researcher could interact with the interview sample and provide an insight about the interviewees' experiences.

Interviews are categorised as unstructured, structured and semi-structured (Fetters, Curry & Creswell, 2013). In this study, the data was collected using semi-structured interviews. A semi-structured interview is an interviewing technique that allows the interviewer to follow a set of questions during the interview session (Muhammad, 2013). This type of interview is the most preferred interviewing technique when collecting qualitative data in a multi-methodology research (Al-shboul et al., 2014; Harris & Brown, 2010; Muhammad, 2013). A semi-structured interview was important to this study because it enabled the interviewer to encourage the interviewee to give more details on previous responses that were partially answered by using probing questions to gain meaningful clarification as well as to deepen areas of interest that emerged; thereby, going beyond the observable phenomenon. Furthermore, semi-structured interviews enabled the researcher to provide a deeper analysis about the phenomenon from government and user population. Thus, semi-structured interviews guaranteed flexibility and depth in collecting sufficient information.

In addition, semi-structured interview also guided the interviewer on what to ask since it did not allow the interviewee to talk freely and give anything that he/she knew about the theme under the study. This was critical in ensuring that concepts were adequately covered and time was not wasted by deviating from the scope of the research; thereby, ensuring that the conversation of the interview evolved around the central theme of the research. These characteristics of the semi-structured interview were considered to be not just useful but highly valuable for generating a rich set of findings on e-government service gaps while keeping the conversation on track.

Interviews can also be classified as focus and in-depth. In this study, the selection of the in-depth interview was influenced mostly by the research questions and objectives set to be achieved by the use of the case study. Semi-structured in-depth interviews guided the researcher into new and unforeseen areas of assessing e-government service gaps elicited from the participants. A total of 30 semi-structured interviews were conducted with government employees, managers of various business organisations and citizens who have direct contact with the e-Taxation system. The selected size was informed by Weller et al. (2018) who reported that 20 to 30 in-depth interviews are adequate to determine the saturation point of qualitative data. In this regard, the saturation point was reached when the researcher started to get the same narrations repeatedly. In this study, the saturation point was reached at 25 interviews since the 5 interviews conducted afterwards produced narrations that had already been captured; hence, the interview process was terminated at participant number 30. Weller et al. (2018) further argue that less than 20 interviews lack generalisation of the findings to the study population since they are highly contextualised while on the other hand beyond 30 interviews, the researcher is less likely to get new insights about the phenomenon of the study.

An interview guide was developed to direct the interviewer in the course of the interview so that both the interviewer and the interviewee do not deviate from the theme under discussion (Jacob & Furgerson, 2012). The themes focused on exploring the factors enhancing e-government service gaps in Zimbabwe. Thus, this enabled the researcher to remain focused on the main research question and obtain information responding to the objectives of the study despite various interesting but irrelevant topics that participants shared.

4.9.1.2 Data collection procedure using interviews

All interviews had a common opening in which the researcher highlighted the purpose of the study as well as the ethical consideration. In addition, the researcher explained the concept of e-government service gaps to the interviewee to enhance a shared understanding. Most of the interviews were conducted outside the offices (using zoom or Google meet) since many of the participants were working from home due to COVID-19 restrictions. The researcher made use of the natural language to present questions to the interviewees rather than forcing them to understand and fit into the concepts of the study. Also, participants were encouraged to express views and opinions in their own terminology and experiences to avoid mumbling. Each interview session took approximately 30 to 45 minutes and some were recorded with the permission from the participants to avoid errors in data collection.

4.9.2 Questionnaires

A questionnaire is used to collect quantitative data from a large population and obtain results that have a statistical significance (Wong et al., 2012). The questionnaire was chosen for this study because the researcher was not able to interview all the participants of the study; hence, it was administered in a very large population like this. Questionnaire surveys are also regarded as the most appropriate method for accessing a large heterogeneous (government employees, businesses and citizens) number of respondents at a reasonably low cost. According to Fellows and Liu (2008), other advantages derived from the use of a questionnaire which also apply in this study include the following:

- Normally inexpensive to carry out;
- Generally easy to interpret quantitatively;
- Can be distributed broadly;
- Can reach a huge research population in an efficient and practical manner;
- Easy for respondents to answer;
- Easy to code and analyse; and
- Provides a wide breath of the study.

4.9.2.1. Questionnaire development

When constructing a questionnaire survey, Bolarinwa (2015) encourages researchers to use previously tested measurement scales because of their validity and reliability. However, Bhattacherjee (2012) argued that previously tested questionnaires do not guarantee that the data being collected are well-suited for the phenomena under investigation and conform to the statistical techniques being used in the study. Also, Tsang et al. (2017: 85) admit that “a questionnaire with excellent reliability on one sample may not necessarily have the same reliability in another". Therefore, based on the argument presented by Bhattacherjee and Tsang et al., the researcher did not use any previously tested questionnaire but developed a new questionnaire from the constructs of the conceptual model presented in Chapter Three for the following reasons:

a) the questionnaire derived from the conceptual model enabled the researcher to inscribe questions that expressed the meaning of the inquiry precisely as intended by the study;
b) ensured that the measurement scales fitted into the multi-dimensional constructs of the conceptual model;
c) the researcher could design questions that generate the most accurate responses possible from respondents;
d) the researcher avoided using previously tested questionnaires in an attempt to maintain the originality of empirical data;
e) previously tested questionnaires have less exploratory power in gathering new evidence; thus, their use may lessen the purpose of conducting empirical research, since they tend to produce evidence that is almost similar to previous studies; and
f) to the best of the researcher's knowledge, no previous study had so far developed a valid and reliable scale on which to measure e-government service gaps

In developing the questionnaire, the researcher combined the guidelines proposed by Churchill (1979) and Tsang et al. (2017). The combined stages are shown in the table below:

Table 4.8: Stages for developing the survey questionnaire of the study

Stage	Action mechanism
Identify the dimensionality of the constructs	The study constructs are multi-dimensional, to fully measure the constructs, subscales were developed for each constructs.
Determine on the type of the questionnaire and method of administration.	Survey method: Closed-ended, self-complete using electronic means.
Deciding on the rating scale	Scale: Five-point Likert scale
Determine questions wording	Positive and repetitive questions
Purifying the measure	Pre-testing
Modification of the questionnaire	Modifying the items

(Source: Adapted and modified from Churchill (1979) and Tsang et al. (2017) to fit the study)

The questionnaire comprised of three parts in the following order:

- Section A: Demographic information
- Section B: Factors enhancing e-government service gaps
- Section C: Validation of measurement dimensions

Section A comprised of seven (7) multiple-choice questions with single answers that were related to demographic variables and one nominal question to determine the method used by the respondent to access e-government services. Section B comprised of 25 Likert-scale type (closed-ended) questions with a fixed set of choices so that respondents provided standard responses. Standard responses made it easier for the researcher to perform quantitative analysis of data. In addition, the closed-format questions enabled the researcher to provide probable responses using a 5-point Likert-type scale ranging from 1 (Strongly disagree) to 5 (Strongly agree) from which the participants had to choose one.

Similarly, Section C comprised of 17 Likert-scale type (closed-ended) questions ranging from 1 (not at all) to 5 (very great extent) from which the participants had to choose one. Likert-type is a measurement scale that represents ranking order ranging from 3 to 11 points (Wu & Leung, 2017). The use of the Likert scale in this study is also supported by Filzmoser and Treiblmaier (2009: 1) who indicated that "the usage of Likert-type scales has become widespread practice in current information systems research". The researcher used this measurement scale because it is suggested that 5-point rating scales yield higher quality data than those with 3, 7, 10 or 11 points (DeCastellarnau, 2018; Revilla et al., 2014).

To ensure that the respondent was following the survey, five (5) questions were repeated but worded in a different way bearing similar meaning to the main questions. Even though they result in redundant writing, it is advisable that the questions should be included in the survey to ascertain if a thought process was maintained in answering the survey. Responses from the questionnaire survey were filtered during data cleaning to remove repetitive questions so that each factor remained with 5 items for analysis.

Furthermore, the researcher provided a four-page cover sheet on the questionnaire outlining the purpose of the study, the reasons for choosing the participants and ethical issues to be observed during data collection, analysis and presentation. Instructions on how to respond to the questions were also given in every section of the questionnaire. More details of the content of the questionnaire are found in Appendix B.

4.9.2.2 Questionnaire validation: pre-testing and modifying the questionnaire

Validation of quantitative research instruments (questionnaire) has become significant for collecting data that represent the real-world (Bolarinwa, 2015; Gerbing & Anderson, 1988). The validation procedure can be done through the following ways: content validity and reliability (Aghapour, 2012; Bolarinwa, 2015). Content validity should be conducted before data collection using pre-test or a pilot study (Collins, 2009; Ismail et al., 2017; Williams & Williams, 2019) while the reliability test should be performed based on empirical data (Dikko, 2016). A research instrument is assumed to be reliable if the results of the measured phenomenon are consistent and dependable (Bannigan & Watson, 2009; Feng & Yamat, 2019; Mohajan, 2017; Sullivan, 2011; Taherdoost, 2018); that is, a reliable research instrument should produce similar results when employed in the same context and same category of research participants.

This subsection presents the content validity procedure grounded on pre-test while reliability tests are performed in Chapter Five. A pre-test was conducted once with six (6) participants before the questionnaire was finalised for the main survey. The pre-test was conducted among the experts and academia who are all holders of Doctorates. A pre-test is a procedure conducted to ascertain if the survey instrument accurately reflects the information that the researcher intends to collect and the ability of the respondents to answer the questions (Babonea & Voicu, 2011; Collins, 2009; Ngulube, 2005; Williams & Williams, 2019). Based on the feedback from pre-testing, the following key modifications were made:

a) clarity was made between e-government system and e-government service by defining the two concepts;
b) the sentence about backbone infrastructure was re-worded since it could not be understood by non-ICT people; and

c) a definition of the term interoperability was provided

Thus, by making the above revisions, the study assumed that the final questionnaire was valid.

4.9.2.3 Questionnaire administration

According to Harris and Brown (2010), a questionnaire can be self-administered or interviewer-administered. This study used self-administered internet-mediated questionnaires, also known as web-based or online questionnaires. After drafting the question in a word document, Google forms were used to create an online questionnaire for ease of access by the respondents and quick distribution. This enabled the researcher to send the questionnaires to the respondents through online means.

The benefits of using a web-based questionnaire survey were to do away with data entry during analysis as well as administration challenges and costs associated with a postal questionnaire. Also, the researcher could reach large numbers of potential respondents and those who were difficult to reach. The Web-based survey also facilitated real-time analysis since the response data was automatically added to the excel worksheet and imported directly to the Statistical Package for the Social Sciences (SPSS). In addition, the use of Web-based survey saved a significant amount of time and effort in data collection and analysis as well as avoided common errors made with using a manual procedure.

To reach the sample of the study, the hyperlinks to the web-questionnaires were distributed via emails and WhatsApp. To increase the number of participants in this study, respondents were asked to share the online questionnaire with their contacts. In addition, WhatsApp was used to dispense the online questionnaires as it is a widely preferred means of communication by citizens due to its cost-effectiveness compared to other means. The use of social media platform to distribute online surveys also finds support from Kayam and Hirsch (2012) who asserted that the platform is the best possible means of reaching relevant participants of the study.

Furthermore, the reason for the use of an online questionnaire was based on the fact that the target population of the study forms part of the 92 per cent literacy rate of the country; therefore, participants were perceived to be able to read and understand the information presented in English. In addition, the citizens are regular users of the internet; hence, they could access online surveys which have been made possible by the internet access. The other reasons for selecting a web-based questionnaire survey were related to limited time and budget for the study as well as the COVID-19 restrictions. Therefore, using this survey ensured that data was collected within time and budget constraints while the researcher stayed safe from COVID-19 by avoiding handling paper-based responses.

4.9.3 Expert review

As indicated in Chapter Three (see Subsection 3.4.5) experts were required to validate the conceptual model for assessing e-government service gaps by providing comments related to each quality parameter prescribed on the validation template. Their feedback was useful to develop better measures for the constructs/dimension and improve the quality of the model as well as generalise its applicability in different developing country contexts. The experts were presented with the conceptual model and a review template comprising of information requirements for model validation so that they focused on validating the model rather than raising unrelated debates (Holton & Lowe, 2007). The model was sent together with the definitions of constructs and dimensions used to develop the model to enhance the analogous interpretation of the dimensions. The template was divided into three sections: A, B and C. Section A was designed to obtain general demographic information of the experts. Section B provided definitions of quality parameters for validating the model to ensure that experts had a shared understanding of the quality requirements of the model. Lastly, Section C presented the qualitative information needs of the model respectively. Table 4.9 presents an example of the expert review template and a full version is available in Appendix C.

Table 4.9: Sample expert review template

Quality parameter	Comments
Relevance	
Usefulness	
Usability	
Completeness	

Systematic construction	
Strength of the model	
Weaknesses of the model	
Is there anything that you expected from the conceptual model but was not included? If yes, indicate and justify the suggested addition.	
Is there anything that is supposed to be removed from the model? If yes, justify your suggestion.	

Table 4.10: Linking research questions, research objectives and methodology

Main research question: *Why do e-government service gaps exist in developing countries despite intensive efforts in the design, development and implementation of e-government projects?*			
Research sub-questions	**Strategies/Methods**	**Participants**	**Research objectives**
Research sub-questions are narrower questions meant to provide the 'frame' around which data to answer the main research question can be discovered.	This presents an outline of how the study was conducted.	These are human beings who take part in the study and should be able to enlighten significant facets to the phenomenon being studied.	These are the essence of a research because they provide focus and the pathway for attaining the purpose of the study.
What are the factors enhancing e-government service gaps in a developing country context (Zimbabwe)?	Case study, survey, in-depth interviews and questionnaires	Government employees, business and citizens	investigate factors enhancing e-government service gaps in a developing country context (Zimbabwe)
Which measurement dimensions from various e-government assessment typologies are applicable in the assessment of e-government service gaps?	Questionnaire survey	Researcher, government employees, business and citizens	ascertain measurement dimensions from various e-government assessment typologies applicable in the assessment of e-government service gaps
How can measurement dimensions from e-government assessment typologies be synthesised into a multi-dimensional conceptual model?	Integrated literature review, construct analysis, thematic analysis, constant-comparison and questionnaire survey	Researcher, government employees, business and citizens	synthesise measurement dimensions from e-government assessment typologies into a multi-dimensional conceptual model
How can the conceptual model be validated to become a theoretical model in assessing e-government service gaps in a developing country?	Expert review	Researcher and experts	validate the conceptual model and modify it to become a theoretical model for assessing e-government service gaps in the context of a developing country

4.10 Data analysis

Data analysis is the procedure of reducing collected data (quantitative or qualitative) to a controllable scope, developing summaries, looking for patterns, and applying the appropriate data analysis techniques to answer the research question of the study. The procedure also consists of merging data and comparing the sets of data and results they are attempting to explain (Palinkas et al., 2015). Depending on which methods have been used in data collection, data should be analysed using appropriate data analysis techniques (Hussein, 2009; King et al., 2017). In multi-methodology research, particularly in cases where mixed methods are used, data analysis consists of analysing quantitative data through quantitative techniques and qualitative data using qualitative techniques. These two data analysis techniques are explained in the following subsequent subsections.

4.10.1 Quantitative data analysis

Different statistical tools and techniques can be applied to analyse quantitative data. The quantitative data gathered in this study was analysed statistically using Statistical Package for Social Sciences (SPSS) version 23.0. SPSS is one of the most common and powerful packages for statistical analysis of data (Morgan, 2007). The analysis commenced by coding data and exporting quantitative data from Google worksheets directly to SPSS file. Furthermore, two (2) main procedures were used to analyse quantitative data: descriptive and inferential statistics (Amrhein et al., 2019). Firstly, descriptive statistics encompassed the use of tables to provide the following: summaries of data by category; the measures of central tendency, for example, mean; and measures of variability, for instance, standard deviation. Secondly, inferential statistics, for example, the principal component analysis (PCA) (Rodríguez-Ardura & Meseguer-Artola, 2020) was used to identify and extract significant factors enhancing e-government service gaps.

Other test statistics performed included the following:

a) reliability test to ascertain that the items of the questionnaire survey constituted a reliable instrument;
b) measuring the sampling adequacy of the study population using Kaiser Meyer Olkin (KMO);
c) bivariate analysis to determine the correlations of variables;

d) testing normality in the distribution data using Kolmogorov-Smirnov and Shapiro-Wilk;
e) testing for correlation using Bartlett's test of Sphericity;
f) testing of collinearity, linearity and normality diagnostics; and
g) regression analysis to explain the causal mechanisms of e-government service gaps

The descriptive and inferential statistical results are elaborated and presented in Chapter Five. To achieve the overall aim of this research the analysis of data was based on a taxonomy that covered five (5) levels of analysis as shown in the table below:

Table 4.11: Taxonomy for analysing quantitative data in this study

Level of analysis	Items of analysis	Analysis procedure
Level 1	Data preparation: data cleaning, screening, coding and handling of missing values as well as testing for reliability.	Descriptive statistics
Level 2	General description of the respondents: profile the respondents in terms of gender, age, level of education, internet and computer proficiency and experience in using e-government (frequency tables and bivariate analysis.	Descriptive and Inferential statistics
Level 3	Examine factors enhancing e-government service gaps and dimensions for measuring e-government service gaps using mean.	Descriptive statistics
Level 4	Extract significant factors enhancing e-government service gaps using PCA.	Inferential statistics
Level 5	Conduct theoretical modelling using regression analysis.	Inferential statistics

4.10.2 Qualitative data analysis

Qualitative data analysis is the process of arranging data according to themes and patterns so that they can be transformed into the findings by linking these patterns/themes in the coding levels to literature or other theories (Astalin, 2013; Williams, 2007). The purpose of coding texts is to get access to the main ideas and assess what is going on in the collected data. Such a process also allows amorphous data to be converted into ideas.

Generally, qualitative data can be analysed using one of the following techniques: pattern matching and explanation building; data display and analysis; template analysis; analytic induction; grounded theory; discourse analysis; and narrative analysis. The first technique is based on a deductive approach while the remaining techniques are grounded on an inductive approach. This study employed a template analysis technique proposed by King (2004) to code qualitative data through ATLAS.ti v7.5.7 software package. Template analysis is a technique within the thematic analysis framework (Brooks & King, 2014) which enabled the researcher to develop a catalogue of codes to form an analytic template representing priori themes identified from the conceptual model presented in Chapter Three. According to Saldana (2009: 3), "a code in qualitative [data] analysis is most often [thought as] a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute … of data". Thus, a code can be considered as a remark linked to excerptions of respondent relevant to the research question.

The development of a coding template which gives summaries of themes that are identified by the researcher is central to the template analysis technique (Brooks et al., 2015). A theme is conceived as a repeated element of participants' narrations on perceptions and/ or experiences about a phenomenon which is regarded as relevant to the study by the researcher (Thomas & Harden, 2008; Maguire & Delahunt, 2017). Coding in the thematic analysis is the development of themes from the participants' narrations and attaching labels (codes) to catalogue them (Fletcher, 2017; King et al., 2017). In the subsection that follows, the researcher presents assumptions underpinning the use of template analysis in this study.

4.10.2.1 Assumptions underpinning the use of template analysis in this study

The following are key assumptions underpinning the use of template analysis technique in this study:

Assumption one: Template analysis is not entirely tied to a single epistemology; instead, it can be used in studies grounded on various epistemological positions (King et al., 2017). Therefore, due to the flexibility of the technique, template analysis can be adapted to the requirements of a specific study and its philosophical stance. Thus, template analysis was used in this study to discover underlying mechanisms of a phenomenon and uncover the reality that exists independent of human minds since the study was underpinned by a critical realist stance (Brooks & King, 2014).

Assumption two: Template analysis is abduction and retroduction in nature since it begins with the development of priori themes and/or codes (template) from the conceptual model and employ the template to analyse interview data (Brooks et al., 2015). As a result, the researcher could develop a new understanding of the object of inquiry by moving forward and backwards between theory and data (Fischer, 2001; Levin-Rozalis, 2010); thereby, moving the analysis beyond the theoretical framework.

Assumption three: Template analysis can be employed to investigate different perspectives about a phenomenon (King, 2004). This study is investigating the phenomenon of e-government service gaps from government employees, businesses and citizens; thus, template analysis is appropriate in analysing data from these different users.

Assumption four: King (2004) glorifies template analysis as a useful technique in explaining the causal relationship. Furthermore, cluster analysis research can ascertain divergence and convergence views of participants. Therefore, template analysis conforms to this study (suites a study adopting a critical realist stance), as it facilitates the explanation of the causal relationship among the constructs and makes a comparison of the perspectives of participants on the factors enhancing e-government service gaps in a developing context possibly through cluster analysis.

Assumption five: Template analysis does not rigidly prescribe data analysis procedure; hence, it is revised and refined to adapt to the needs of a particular study. Thus, the technique encouraged the inclusion of emerging themes from the interview data.

Assumption six: Template analysis emphasises on hierarchical coding in which abstract themes are followed by more specific themes (Brooks & King, 2014). Therefore, this technique is suitable for investigating multi-dimensional constructs since these constructs encompass abstract and specific dimensions.

The next subsection gives a detailed description of how the template analysis technique was used in this study to analyse interview data.

4.10.2.2 Application of template analysis technique

This study developed seven (7) procedural steps to provide a more rigorous data analysis process rather than following the traditional steps proposed by King (2004). The seven steps of the template analysis proposed in this study are: (1) define priori themes, (2) transcribe interviews and familiarise with the data, (3) develop initial templates by conducting initial coding of data, (4) clustering of themes and developing final templates, (5) using templates to analyse data, (6) using templates to write up and interpret findings and (7) conduct quality checks.

Define priori themes

Brooks and King (2014) aver that the development of priori themes saves time in qualitative data analysis. Thus, priori themes are useful in hastening the initial coding stage of qualitative data analysis which is usually seen as time-consuming. Priori themes were developed in advance of coding empirical data because the researcher assumed that the study of e-government service gaps should focus on certain aspects. The priori themes provided a coherent initial point for data analysis. To represent the constructs of the model for assessing e-government service gaps, the following five (5) main themes were developed from the conceptual model and semi-structured interview guide (Brooks & King, 2014; Miles & Huberman, 1994; Thomas & Harden, 2008):

a) infrastructure
b) interoperability
c) digital divide
d) human factor
e) policy

Such framing also helped the researcher to focus the interview data to each specific construct. However, it should be noted that to avoid the possibility of premature theoretical closure and the 'blinkered-effect' in subsequent analysis phases, the researcher treated the priori themes as tentative and consequently allowed the analysis procedure to reveal more. Hence, priori themes could be redefined, removed or new themes added to the analytic templates. Besides, the researcher started with few priori themes to avoid the trap of concentrating on fitting data into pre-defined themes instead of looking for hidden patterns. Thus, the researcher kept an open-minded perspective throughout the analysis phase.

Transcribe interviews and familiarise with the data

At this stage, the researcher listened to the audio recordings and transcribed all the data that was recorded during the interviews into Microsoft Word 2007 processing documents. No translations were required since all interviews were conducted in the English language. Given that template, analysis does not intend to perform line-by-line coding, the researcher needed to be familiar with interview data as much as possible. Familiarisation of data was useful for the researcher to derive meaning from a specific segment of texts that was associated with the participant's full narration. Therefore, to familiarise with the interview data, the researcher read through all the 30 interview transcripts four (4) times before attempting to code the data and where possible audio recordings were played again. During the familiarisation process, the researcher focused on the subset of data which was intended for coding rather than the complete data. This is because keeping the memory of the entire narration of the participant was deemed impossible. After being satisfied with the familiarisation of data, the researcher proceeded to develop the initial template through initial coding.

Develop initial templates by conducting initial coding of data

This stage of qualitative data analysis is commonly applied in the most thematic techniques in which the researcher note down items that are deemed useful in understanding the phenomenon (Glaser, 2002; Hsieh & Shannon, 2005; Thomas & Harden, 2008). In essence, the study commenced the development of initial templates through initial coding in which items that were found useful in the study of e-government service gaps were highlighted in different text colours. The procedure for conducting initial coding was done in two folds: the portion of the interview data that linked to the research question was identified and indexed with a code in brackets derived from the prior themes. Furthermore, a new theme was developed if no priori theme existed; alternatively, a priori theme was modified to align with the subset of data.

It should be noted that three separate initial templates (government employees, businesses and citizens) were developed since the researcher was interested in comparing the perspectives of the three subunits through cross-case analysis. The initial templates were developed from a subset of data of six (6) interview transcripts rather than the entire data. However, to ensure that the initial templates were comprehensive and encompassed varied accounts of the participants, three (3) interview transcripts per template were considered from each sub-unit of analysis.

Clustering of themes to produce final templates

The initial templates were entered into ATLAS.ti v7.5.7 software package to enable clustering of priori and emerging themes as well as subsequent analysis of data. The software allowed the researcher to map themes with relevant sub-themes and quotations. Clustering is a multivariate approach used in template analysis to identify and group codes and/or themes that are similar to each other (Brooks & King, 2014). Thus, codes that belonged to a specific cluster were arranged together (see Appendix D). The final templates were developed using hierarchical clustering in which codes were nested within broader themes. Clustering enabled the researcher to check the relationship between codes; classify and reduce them into meaningful and manageable themes. In addition, hierarchical clustering was useful to ensure that the reflections of participants could fit into the analytic templates while avoiding coding the bulk of data into a single theme.

As well, clustering helped the researcher to understand the findings and contextualise the interpretations of the interview data. Codes were considered to be clustered if they captured a shared meaning. Retroduction and abduction approaches were employed during the clustering of codes, in which the researcher would move back to stages 1, 2 and 3 to listen to audio recordings, check priori themes and recode data. Abduction and retroduction processes were necessary to ensure that clusters captured shared meaning instead of mere semantic resemblances among theme headings.

Using the templates to analyse data

After successfully clustering the themes and codes and developing the final templates, the researcher uploaded all the 30 interview transcripts on the qualitative data analysis software and worked through each transcript to code sections of data that were possibly relevant to the study. During the analysis, more themes emerged, for example, themes such as lack of government-owned infrastructure; budget disparity and policy inconsistency was not among the priori themes and were not even thought of during the development of the conceptual model in Chapter Three. While it was almost impossible to produce a perfect template and code all entire data from the interview transcripts into the template, the researcher kept an in-depth analysis to make valid and original contributions to the ongoing research on assessing e-government. Figure 4.9 shows various quotations that were linked to the theme infrastructure.

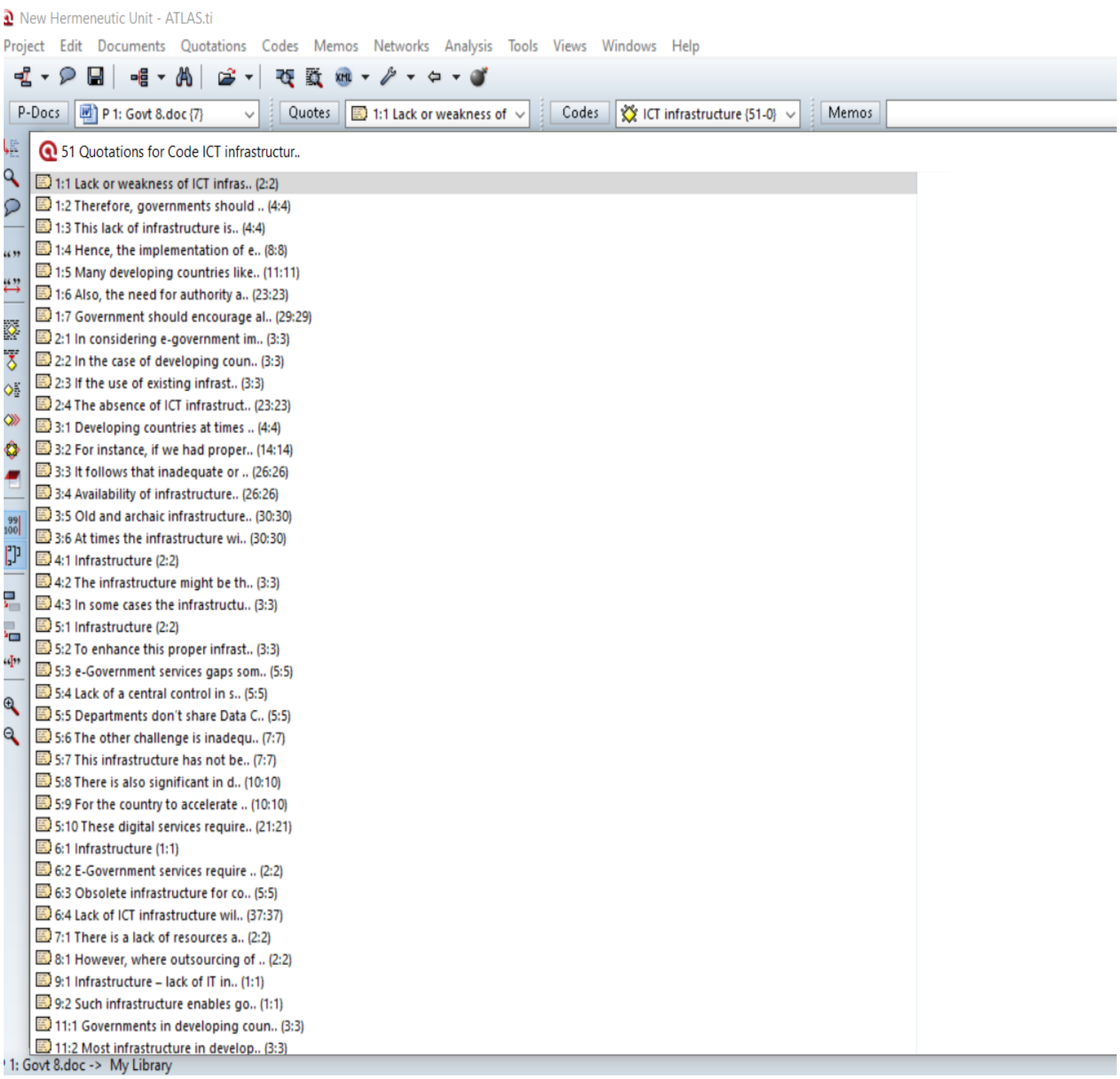


Figure 4.9: Quotations linked to the theme infrastructure generated from ATLAS.ti v7.5.7 software package

Using the template to write up and interpret findings

There are two (2) methods of presenting findings from template analysis (Brooks & King, 2014). First and foremost, qualitative findings can be presented using the thematic configuration (structure) of the template (theme-by-theme), explaining the meaning of themes and illustrating with direct quotes from the data (Ryan & Bernard, 2003). The method is assumed to be effective in organising and interpreting findings from large data sets. Nonetheless, theme-by-theme does not allow for cross-case analysis and presentation of perspectives from subunits of analysis (individual cases). In contrary to theme-by-theme, findings in this study were presented using a case-by-case method, in which findings from each case (unit of analysis) were examined, taking note of significant accounts (narratives) of the participants. The presentation of case themes was then followed by a discussion of divergence and convergence views between cases in a separate chapter.

However, this method leads to the repetition of themes in instances where there are strong similarities between cases. Nevertheless, since this method allowed for cross-case analysis, it was considered suitable to present data from the three (3) case studies (government employees, business and citizens). Direct quotes from data were used to help to bring the case of truth and believability in clarifying the meaning of themes and enabled the reader to get a feel of experiences captured by themes. Furthermore, direct quotations were interpreted to support the arguments developed from the theme and attach meaning to the findings. Brooks and King (2012) advised that template analysis does not facilitate comprehensive interpretation of findings; hence, the researcher relied deeply on critical thinking and prior knowledge of the object of inquiry in interpreting the findings of the study while using the template as a guide. The research findings are presented and interpreted in Chapter Six while the discussion of findings is done in Chapter Eight.

4.10.3 Analysing expert feedback and suggestions

The feedback from experts was analysed qualitatively guided by the five quality parameters of for validating the model. Using the validation template as a means of collecting the experts' evaluation and comments about the conceptual model, the responses were grouped by quality parameters. On the other hand, suggestions provided by the experts were analysed using abduction and retroduction approaches by moving forth and backwards between the data and the existing knowledge checking if the suggested constructs and/or dimensions found support from the literature.

4.11 Situatedness of data presentation, interpretation and discussion

The levels in which the findings of the study are presented, interpreted and discussed need to be located within a specific realm. In situating the analysis of the study findings, the researcher adopted Layder's (1993) stratified model of context but combined self and situated activity into one composite layer to align the model with the critical realist ontology. By design, the Layder's model consists of four (4) layers: self (social experiences), situated activity (social interactions), setting (immediate area for social activities) and context (broader macro-social system). “Layder's [stratified model] is a useful conceptual tool to link the multiple-layers of data [analysis]” (Ahmer et al., 2017: 64). The stratified model illustrates the scope of possible areas of interest in scientific research.

This study was interested in two major issues: factors enhancing e-government service gaps in the context of a developing country and the model for assessing these gaps. Therefore, the study needs to present the findings from the situated activity and interpret data within the setting of the activity and eventually discuss the findings within the broader context of the study. Figure 4.10 shows the situatedness of the findings of the study based on a stratified reality within the realm of critical realism and Layder’s stratified model.

Figure 4.10: Situatedness of data presentation, interpretation and discussion

Figure 4.10 shows the interplay between data presentation, interpretation and discussion of findings. During the presentation, interpretation and discussion of the findings, the researcher continuously referred to the three (3) layers presented in Figure 4.10 above. In the model presented above, the first layer which is the situated activity relates to the interactions of users within the e-government system (e-Taxation); that is, G2E, G2B and G2C as well as their experiences. The users share experiences of the performance of the e-Taxation system which is formed through interactions with the system. Thus, the study used the experiences (perception structure) of the users to present the reasons for the existence of e-government services gaps and the factors enhancing these gaps.

The setting in this study denoted by e-government in Zimbabwe which represents the immediate environment of the context in which the situated activity is located in addition to where power and authority structures influence the implementation of e-government projects. This is where factors such as policies and infrastructure which has the potential to inhibit or promote the implementation of e-government are located. Lastly, the context is characterised by elements of the study that are not identifiable (observed) in the situated activity. However, the context layer enabled the researcher to compare the findings of the study with the existing knowledge of e-government in developing countries. Furthermore, the context point to the fact that there is a difference in conditions around the implementation of e-government, even if there might be hidden. For example, the findings of why e-government service gaps exist in developing countries and factors enhancing e-government service gaps may not be valid in the developed context because of fundamental contextual differences chief among them lack of access to the internet and modernisation status. Layder also indicated that the context consists of reproduced social reality. Therefore, the discussion of findings attempted to reproduce the social reality about e-government in developing countries by adding new insights on factors enhancing e-government service gaps to the existing knowledge.

4.12 Methodological triangulation: A multi-level unification of methods

Triangulation is the procedure in which at least three methods are used, or unified, to validate the findings of the study by providing, in any case, three viewpoints on a single phenomenon being studied (Eastwood et al., 2014; Khaldi, 2017; Mcevoy & Richards, 2006). Similarly, the underlying assumptions about methodological triangulation in critical realism are to capture a unified reality from different methods (Modell, 2009). Conventionally, methodological triangulation plays an important role in a research strategy that is underpinned by critical realism. This is because multiple methods possibly provide complementary insight into the same phenomenon. The procedure involves converging and confirming research findings from diverse methods employed to investigate a single phenomenon (Downward & Mearman, 2007). Thus, methodological triangulation is regarded as a hallmark in critical realists (Eastwood et al., 2016) and the backbone of multi-methodology research (Creswell, 2009; Cameron, 2011).

Multi-methodology in this study is treasured for its purpose in enabling the triangulation of findings to provide complementary evidence on factors enhancing e-government service gaps and ensure that there was consistency of reality in the development of the model. The three major contributions of triangulation are to validate, deepen and widen the understanding of the phenomenon under investigation.

Creswell (2009) proposed the following four (4) variants models for implementing triangulation: convergence; data transformation; validating quantitative data; and multi-level models. This study adopted the multi-level model as shown in Figure 4.11.

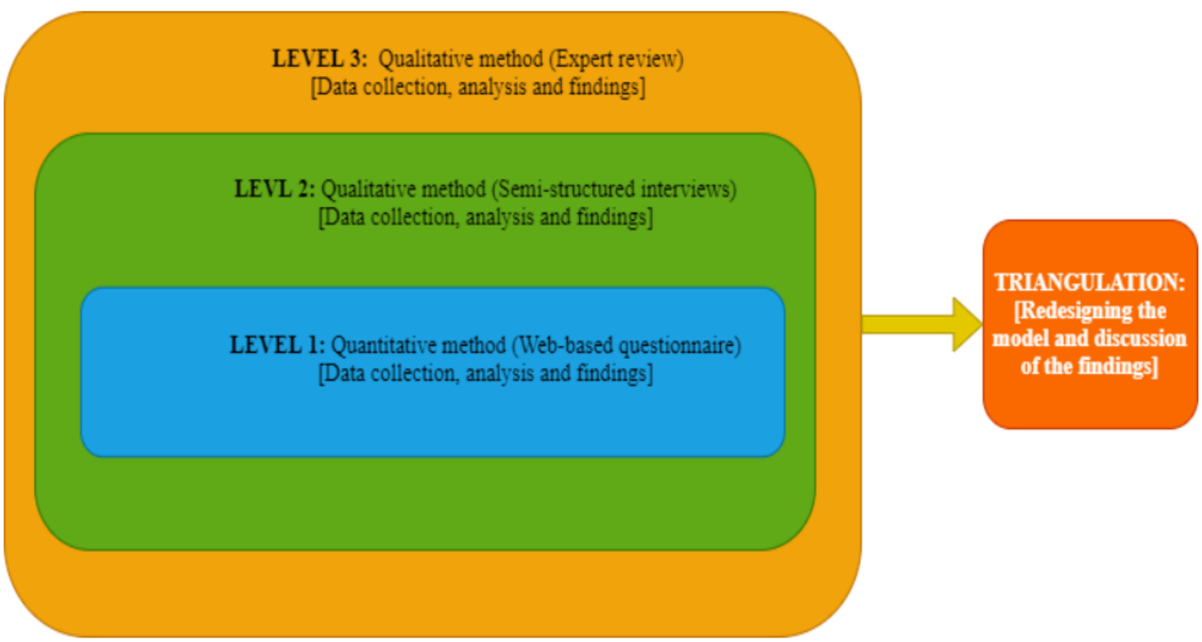


Figure 4.11: Stratified and sequential multi-level model for method triangulation

A sequential multi-level model is a triangulation procedure that involved the collection of empirical data sequentially from different levels to unravel the phenomenon being investigated (Eastwood et al., 2014). The findings from each level were then combined to facilitate model redesign and discussion to form a holistic model and envision about the phenomenon of e-government in developing context. Thus, the purpose of triangulation in a critical realism study was to provide a single reality from multiple methods and multiple perspectives about e-government in the developing context.

Data was collected and analysed using quantitative and qualitative methods. The multi-level model was accomplished by gathering data through web-based questionnaire surveys, semi-structured interviews and expert review. The study started by performing statistical analysis to reveal correlations within constructs and dimensions for assessing e-government service gaps as well as showing causal powers rooted in generative mechanisms. Nevertheless, statistical analyses were not adequate for making causal explanations in line with the philosophy of critical realism (Mingers, 2001; Mingers & Standing, 2017). Thus, there was a need for qualitative methods to complement statistical analysis by enhancing an in-depth study about context-specific factors enhancing e-government service gaps; hence, the researcher used qualitative research methods (semi-structured interviews and expert review).

4.13 Quality checks of multi-methodology research

This subsection presents the quality checks of multi-methodology research. Although Willig (2013) suggest that quality checks should be situated under the epistemological stance due to its close link to knowledge claims, however, this study deliberately chooses to discuss it in this section because logically quality evaluation denotes the end of the methodological journey. The attributes employed to evaluate the quality of findings vary according to the type of data and research (Shenton, 2004; Hsieh & Shannon, 2005; Elo et al., 2014). Quality checks such as validity, reliability and generalisability are ordinarily preferred in evaluating quantitative data (Heale & Twycross, 2015; Mohajan, 2017; Purpura et al., 2015) while properties such as credibility, dependability, confirmability and transferability (Elo et al., 2014; Morrow, 2005; Nowell et al., 2017) are usually used in scoping the validity checks of qualitative data.

Nevertheless, multi-methodology researchers uphold that validity checks of quantitative and qualitative data should reflect trustworthiness in collecting and analysing data (Shenton, 2004; Forero et al., 2018). Trustworthiness is a quality dimension used by researchers to convince readers that their research findings are worthy of attention. This study scoped the quality attributes of trustworthiness in the following manner:

a) Validity (credibility and transferability)
b) Reliability (dependability)
c) Objectivity (confirmability)

The table below presents a brief description of the quality attributes of trustworthiness.

Table 4.12: Trustworthiness parameters of the study

Quality attribute	Description	Reference (s)
Validity	Validity in qualitative findings primarily pertains to the preciseness of data presentation and interpretation. It encompasses two factors: (1) internal validity- determining if underlying assumptions derived from the data are profound and (2) external validity— ascertaining if findings are applicable in other contexts or wider population.	(Ritchie & Lewis, 2003; Kempster & Parry, 2011; Anisimova & Thomson, 2012)
Credibility	The credibility of a study is the extent to which the findings correspond to the truthful meanings of the narrations of the participants. Thus, credibility is aimed at demonstrating the originality of data and can be achieved through the following activities: method triangulation, member checking and thick descriptions.	(Morrow, 2005; Muskat et al., 2012)
Transferability	Transferability is the degree to which the findings of the study are useful to similar contexts or settings. Thus, in qualitative research transferability pertains to the transfer of findings from one case study to the other.	(Elo et al., 2014)
Reliability	Reliability is the degree to which different studies conducted in the same context obtain similar findings of the object of inquiry.	(Hollweck, 2016)
Dependability	Dependability denotes the constancy of data over time and under diverse circumstances.	(Elo et al., 2014)
Objectivity	The findings of the study should reflect, in so far as possible, the phenomenon being studied rather than the opinions of the researcher. Thus, objectivity entails that the findings of the study should be free from the researcher's bias.	(Ryan, 2018)
Confirmability	Confirmability is interested in showing that the findings and interpretations are undoubtedly inferred from the data. In simple terms, confirmability refers to schemes employed to limit biases by ascertaining that the data constitutes the information provided by the participants.	(Nowell et al., 2017)

The table below summarises the validity, reliability and objectivity of findings based on the guiding principles/strategies of credibility, transferability, dependability and confirmability as applicability to this study.

Table 4.13: Measures undertaken to ensure trustworthiness of the findings

Criteria	Guiding principle/strategy	Action mechanism
Validity (credibility & transferability)	Data collection procedures reflect what participants in reality experience and perceive (Anisimova & Thomson, 2012).	• The researcher used probing questions to encourage participants to give more details on any item that was partially answered. • Participants were challenge to give the meaning of their narrations rather than merely outlining their experience. • Five participants were asked to review the interpretation of the findings to check whether their life experiences were correctly reflected. The researcher did minor changes because of this procedure.
	Data collection procedure should not modify the participants' original perceptual experiences and thoughts (Kant, 2014).	• During the interview, participants were encouraged to express views and opinions in their own terminology and experiences. • The researcher sent back interview transcripts from audio recordings to the interviewees to validate the correctness of their responses.
	Triangulation (Korstjens & Moser, 2018).	Three research methods (semi-structured interviews, questionnaires and expert reviews) were used in data collection.
	There is a general perception that a person studying a Doctorate is the fountain of knowledge; resulting in power discrepancy between the researcher and participants. Thus, the power discrepancy between the researcher and participants should be minimised (Morrow, 2005).	• To minimise power differential in knowledge space, the researcher remained humble and calm throughout the interview sessions to show a character that was eager to learn from the experiences of the participants. • The researcher also made a sincere effort to build a strong rapport with the participants by indicating that their contributions were important in the success of the study.
	Research presents the phenomena accurately as perceived by the participants (Ritchie & Lewis, 2003).	• The researcher presented the entire views from the participants even those that challenged the assumptions about the object of inquiry. • Each theme presented for analysis was supported by the excerptions of the

		participants.
Reliability (Dependability)	Data collection method employ uniform and taxonomical line of questions (Darmayanti et al., 2018).	The researcher used semi-structured interview guides which allowed the interviewer to follow a set of questions during the interview sessions.
	The context in which data is collected is stable over time (Youngs & Piggot-irvine, 2012).	Data was collected over a period of two months since the context of the study was expected to remain stable over this period.
	The data should be used as evidence in supporting conclusions drawn from data analysis (Lewis & Ritchie, 2003).	Discussion of the findings and the conclusions made were extensively supported by primary data.
	Conclusions drawn from data analysis should be ascertained by existing literature in the problem domain (Reichertz, 2004).	The researcher constantly linked the discussions and conclusions of the findings to the existing literature.
	Use of overlapping methods for data collection (Shenton, 2004).	In addition to the questionnaire, the researcher used semi-structured interviews, expert review.
	The procedure of analysing data and developing themes is substantially reported (Lewis & Ritchie, 2003).	The template analysis procedure was used to generate themes from the interview data.
Objectivity (confirmability)	Data should be analysed by different researchers to guarantee the consistency of findings (Carter & Little, 2007).	The analysis of data by different researchers was not possible since the researcher regarded studying for a PhD as 'unaccompanied' journey.
	The findings should provide mutual confirmation (Hyett et al., 2014).	The researcher used multiple methods (semi-structured interviews, questionnaires and expert review) to ensure that confirmability was achieved through method triangulation.
	The study findings should reflect the voices of the participants (Yavuz, 2012).	The chapters on data presentation, analysis and discussion (chapters 5, 6 and 8) were sent to six interview participants to ascertain if there were no biases imposed on the findings of the study.
	The data and findings are audited by independent reviewers (Brooks & King, 2014).	The conceptual model was presented to experts for review, validation and confirming the applicability of the model in the context of a developing country.

(Source: Adapted to fit the study from Hijazy, 2016)

4.14 The stratified world and critical realism research framework

The framework presented in the figure below is a product of the researcher's mental model of the study grounded in the Three Worlds Framework and critical realism philosophy.

Figure 4.12: The stratified world and critical realism research framework

4.15 Ethical considerations

Basically, ethics in a scientific investigation refer to what is right in conducting a study. Researchers are expected to make a sincere effort to adhere to general acceptable principles of conducting a scientific investigation as agreed by the research community. While researchers are supposed to fulfil the pursuit for truth, Saunders (2009) contends that the search for truth ought not to be fulfilled by the violation of the rights of the participants. Before conducting the study, the researcher obtained research approval from ZIMRA and ethics clearance certificate from the Research Ethics Committee (REC). Hence, the study was governed by the following principles proposed by Saunders as well as the Research Ethics Committee (REC) – ethics approval application form of Cape Peninsula University of Technology (CPUT).

a) *Informed consent*: Participants in the interview were informed about the purpose of the study as well as the procedure of data collection, analysis and presentation. The researcher also made it clear that participation in the study was voluntary; therefore, the participant could withdraw any time without consequences of any kind. In addition, the participants were informed that they had the right to refuse to answer any questions that could be viewed as damaging. Finally, participants were asked to grant their consent to participate in this study by filling and signing a written consent form.

b) *Confidentiality, Privacy and Anonymity*: The ethical considerations oblige researchers to treat privacy, confidentiality and anonymity with extreme caution (Berg, 2001; Reid et al., 2018). Thus, the researcher assured the participants that confidentiality, privacy and anonymity of collected data will be strictly guaranteed; this enabled participants to be open and give honest responses. The cover page of the questionnaire also stated that information that was obtained in connection with this study and that could be identified with participants remained anonymous and confidential. Also, the confidentiality of interviewees during data presentation was maintained by the use of codes. The researcher created four codes: Govt employee 1, Bus 1, CIT 1 and Expert 1 to refer to government employees, businesses, citizens and experts respectively.

4.16 Chapter summary

The aim of this chapter was to present, discuss and justify the philosophy and methodology used in conducting this study. The chapter began with the presentation and appraisal of the Three Worlds Framework which connects the philosophy of science, science and everyday life. The study demonstrated how the framework can be used in situating the problem statement of an empirical study as well as translating everyday life problems into objects of inquiry so that they can be pursued using scientific investigations. The chapter also presented taxonomy of various philosophical paradigms and their underlying assumptions that have been used in information systems research. To justify the adoption of a particular research stance, the researcher needed to have a broader understanding of different philosophical research paradigms used in a scientific investigation. Therefore, an appraisal of these philosophies was necessary to demonstrate their awareness which enabled the researcher to recognise their strengths and weaknesses so as to select an appropriate research philosophy. A substantial discussion and justification of critical realism as a philosophical stance of the study was also presented.

Furthermore, the key elements of the research methodology used in this study and the justification of their adoption were discussed in detail. The chapter also discussed the suitability of adopting multiple case studies and survey strategy in a single study. Also, the chapter justified the use of semi-structured interviews, questionnaires and expert reviews as the research methods of the study. Various sampling techniques were presented and justified for use. Data analysis techniques deemed suitable for the study were also discussed in this chapter. The chapter ends by presenting the quality checks, triangulation, research framework and ethical considerations. The next chapter presents and interprets quantitative results guided by data analysis procedures discussed in this chapter.

CHAPTER FIVE

QUANTITATIVE RESULTS

> "The results of quantitative research specify an explanation into what is and is not significant. The data produced by quantitative research are always numerical; thus if there are no numbers involved, then there is no quantitative research".

5.1 Introduction

The previous chapter presented the research philosophy and research methodology underpinning this study giving appropriate justifications. The main focus of this chapter is the presentation and interpretation of quantitative results of the empirical research conducted from three e-government stakeholders, namely, government, business and citizens. The purpose of this chapter is in two folds: to investigate factors that enhance e-government service gaps in Zimbabwe; and to determine the significant measurement dimensions suitable for assessing e-government service gaps in the context of a developing country.

This chapter presents and interprets the data that was collected from government employees, businesses and citizens using the quantitative method (online questionnaire survey). The chapter also provides the response rates, demographic characteristics, the reliability of the questionnaire designed to solicit the factors enhancing e-government service gaps and dimensions for measuring e-government service gaps. Furthermore, the chapter presents descriptive and inferential statistics. The purpose of the chapter is achieved in the manner presented in Figure 5.1.

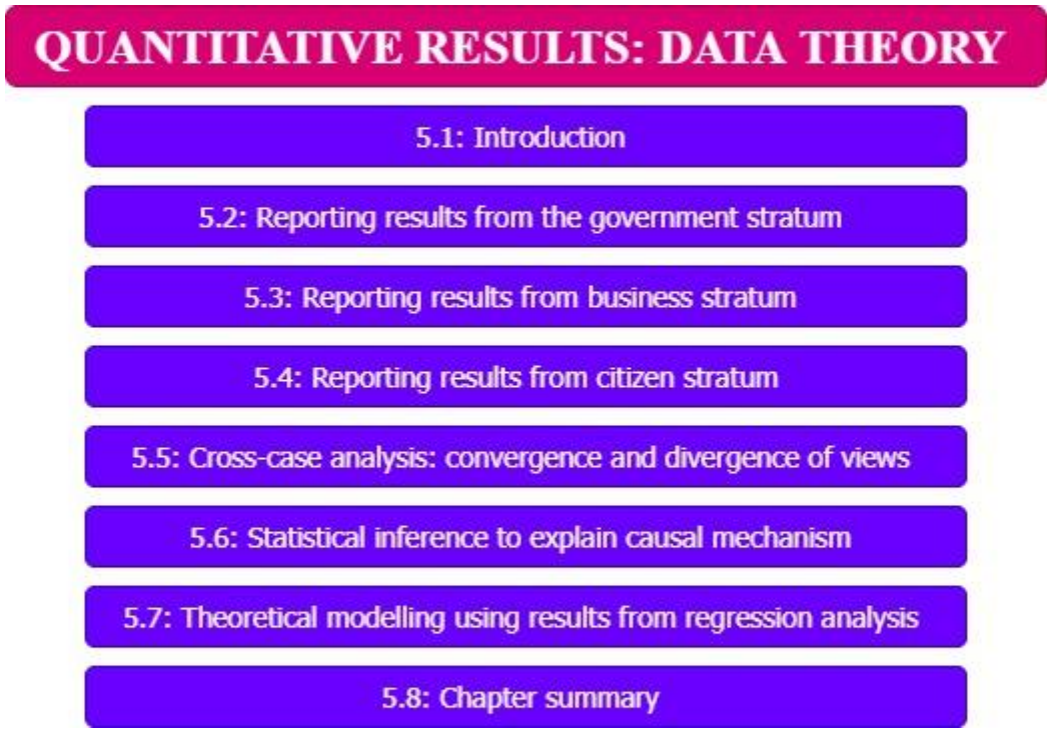


Figure 5.1: Chapter outline

5.2 Reporting results from the government stratum

The study collected data from government employees who are responsible for the design and deployment of e-government projects as well as the users of e-government system.

5.2.1 Response rate

According to Morton et al. (2012), the validity of data obtained from questionnaire surveys depend on the response rate. By definition, a response rate is the percentage of the participants who respond to the survey (Mellahi & Harris, 2016; Morton et al., 2012). Thus, the questionnaire survey should have a good response rate to provide valid and representative findings. The researcher sent 120 questionnaires to government employees and received 90 responses. Thus, using the following formula: the response rate is the number of responses/total number of sent questionnaires*100, the response rate of the questionnaire was 75%, which is considered a very good response rate for representing the reality within the field of IS research (Mellahi & Harris, 2016; Pinsonneault & Kraemer, 1993; Sivo et al., 2006). Accordingly, these studies reported that a response rate of at least 70% is sufficient to make tenable conclusions about reality. Thus, since the response rate of the study was above

70% the researcher can conclude that the findings truthfully represent the reality about e-government within the government departments.

5.2.2 Demographic profile of survey respondents

The study sought to examine the demographic profiles of the respondents within the government department. This is because the researcher anticipated that the demographic profiles could influence the usage of the internet and the utilisation of e-government services. Various studies have observed that such demographic profiles determine the adoption of e-government in both developed and developing countries (Bwalya, 2009; Kaur & Singh, 2015; Kumar et al., 2007; Munyoka, 2019; Ronchi & Ronchi, 2019; Yera et al., 2020). Table 5.1 shows the frequencies and percentages of profiles of government employees who participated in this survey.

Table 5.1: Demographic profiles of government employees

Variable		Frequency	Percent %
Gender	Females	31	34.4
	Males	59	65.6
	Total	**90**	**100**
Variable		**Frequency**	**Percent %**
Age	Less than 40 years	49	54.4
	Above 40 years	41	43.6
	Total	**90**	**100**
Variable		**Frequency**	**Percent %**
Education	Diploma	11	12.2
	First Degree	31	34.4
	Masters	48	53.3
	Total	**90**	**100**

(Source: Primary data, 2020)

As can be seen in Table 5.1, female employees represented 34.4% of the respondents, while male employees accounted for 65.6%. The results suggest that government departments are dominated by male employees. In terms of age structure, the majority of the respondents were aged below 40 years (54.4%) while 43.6% were above 40 years of age. The results show that the majority of government employees are generally young. In terms of education, the results show that more than half (53.3%) of the respondents were holders of Master's degree, followed by first-degree holders (34.4%). Thus, together, degree holders constituted

87.7% of the total respondents. This shows that government employees have high education status. This finding could be attributed to the increased number of universities in Zimbabwe and their cohorts for the past 10 years.

5.2.3 Computer knowledge and internet proficiency

The researcher was also keen to determine computer knowledge and internet proficiency among respondents, given that these attributes are considered by previous studies prerequisite in the effective use of e-government (Chandra & Malaya, 2011; Deursen & Dijk, 2010). The results of computer knowledge and internet proficiency are given in Table 5.2 as frequencies and percentages.

Table 5.2: Computer knowledge and internet proficiency variables

Variable		**Frequency**	**Percent %**
Computer knowledge	Moderate	13	14.4
	Good	24	26.7
	Very good	53	58.9
	Total	**90**	**100.0**
Variable		**Frequency**	**Percent %**
Internet proficiency	Fair	9	10.0
	Good	15	16.7
	Very good	16	17.8
	Excellent	50	55.6
	Total	**90**	**100.0**

(Source: Primary data, 2020)

The results in Table 5.2 shows that more than half (58.9%) of respondents identified themselves as having very good computer knowledge. Furthermore, according to the table, more than half (55.6%) of the respondents rated their internet proficiency as excellent. The findings were expected since the majority of the respondents (see Table 5.1) are within the "tech-savvy" age group (54.4%), which is below 40 years (Vaportzis et al., 2017).

5.2.4 E-government experience

Apart from computer knowledge and internet proficiency, the study also sought to determine if respondents had adequate experience in the use of e-government. This was based on the presumption that e-government experience could influence the validation of the conceptual model. Likewise, several studies have reported that experience in the use of e-government is one of the most important variables in assessing e-government projects (Rana et al., 2017; Rocha et al., 2014; Weerakkody et al., 2016). Table 5.3 shows the frequencies and percentages of e-government experience of government employees who participated in this survey.

Table 5.3: E-government experience of the respondents

Variable		Frequency	Percent %
e-government experience	Moderate experience	26	28.9
	Good/ very good experience	64	71.1
	Total	**90**	**100.0**

(Source: Primary data, 2020)

As shown in Table 5.3, the majority of the respondents indicated that they had a good to a very good experience in e-government (71.1%). This was followed by moderate experience (29.9%). Accordingly, this implies that respondents had adequate experience in the use of e-government; thus, the researcher collected meaningful data on the validation of e-government Zimbabwe.

5.2.5 Methods used to access e-government services

The survey assessed the methods used by respondents to access e-government services (see Table 5.4); given that it is a prerequisite for e-government access and use. Similarly, in the view of many scholars, access to and use of e-government largely depends on the availability of tools such as computers, mobile phones, Tablet PCs, community information centres and internet cafés (Al Mudawi et al., 2020; Alibaygi et al., 2011; Furuholt & Sæbø, 2018; Kyem, 2016; Sareen et al., 2013).

Table 5.4: Method used to access e-government services by government employees

Variable		Frequency	Percent %
	Office computer	72	80.0
	Mobile phone	40	44.4
	Home computer	18	20.0
	Tablet PC	3	3.3
	Computer at cyber café	3	3.3
	Community information centre	5	5.6

(Source: Primary data, 2020)

The results, given in Table 5.4, show that the majority (80%) of the respondents indicated that they use office computer to access e-government services. This was expected since government employees spend their time in offices; hence, the office computer becomes their means of accessing e-government services. Thus, it can be stated that computers have significant penetration in government departments. However, it should be noted that a significant number (44.4%) of respondents are using mobile phones to access e-government services. This could be attributed to the COVID-19 restrictions which have compelled some government employees to continually work from home.

5.2.6 Preparation of data for statistical analysis

Data preparation is a prerequisite and fundamental procedure in quantitative analysis (Osborne, 2010; Van Den Broeck et al., 2005). In this study, data preparation encompassed the following stepwise procedures:

5.2.6.1 Handling of missing values

Handling of missing values is an essential step in preparing data for statistical analysis since the procedure has an effect in subsequent data analysis stages (Kang, 2014). While handling of missing values is assumed to be part of data preparation for statistical analysis, however, in this study, missing values were handled in the design phase of the questionnaire surveys. The Google forms were initiated with a ‘required’ function in every question so that the responded could not answer the next question, except if the preceding one had been filled; hence, there were no missing values in this study.

5.2.6.2 Checking and removing outliers

Outliers are cases signifying values that are largely different - lower or higher from all other responses (Cousineau, 2011; Leys et al., 2018; Osborne, 2010; Whitley & Ball, 2002). Simply put, outliers are cases with farthest values from other ‘pattern’ cases; as a result, they are likely to distort the normality of data-set and analysis of data. The study determined outliers using Mahalanobis distance D^2 measure which is embedded within the regression function of the SPSS package (Ghodang et al., 2018; Leys et al., 2018; Mullen et al., 1995). The measure for multivariate outliers is Mahalanobis distance at $p \leq .001$; therefore, the dataset with values equal to 0.001 or below was regarded as outliers and deleted accordingly.

Thus, based on this measure, 5 cases were deleted from the questionnaire; thereby, reducing data for analysis to 85 cases. However, before removing outliers, the data on SPSS was checked with Google worksheet (original questionnaire) to ascertain that outliers were not a result of errors in coding responses but actually originated from primary data.

5.2.6.3 Determining the suitability of data-set for factor analysis

To ensure that the data-set was suitable for factor analysis method, the study performed the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Barlett's Test of Sphericity (BTS). The Kaiser-Meyer-Olkin Measure of sampling adequacy is a datum that shows the dimension of the discrepancy of study variables that might be stimulated by underlying factors (Chan & Idris, 2017; Williams et al., 2010). On the contrary, BTS determines the null hypothesis that the correlation matrix is an identity matrix. In determining the suitability of factor analysis, it has been observed that the KMO should be greater than 0.6 whereas the BTS value should be significant at $\alpha < .06$ (Hadia et al., 2016). In this study, the KMO value (0.839) and BTS (x^2 =1932.126, p=0.000) show that the data-set was suitable for factor analysis. Thus, the suitability of data-set for factor analysis was supported by KMO and BTS. The results are shown in Table 5.5.

Table 5.5: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.839
Bartlett's Test of Sphericity	Approx. Chi-Square	1932.126
	df	300
	Sig.	.000

(Source: Primary data, 2020)

5.2.6.4 Examining the existence of common method variance (CMV) bias

Various studies have reported that data from questionnaire surveys is likely to be susceptible to CMV bias (Malhotra et al., 2006; Reio, 2010; Rodríguez-Ardura & Meseguer-Artola, 2020). According to Malhotra, Kim and Patil:

> "The term CMV relates to the amount of spurious covariance shared among variables because of the common method used in collecting data. Such method biases are problematic because the actual phenomenon under

investigation becomes hard to differentiate from measurement artefacts" (Malhotra, Kim & Patil, 2006: 1865).

The three (3) recommended statistical procedures for examining CMV under the Harman's single-factor test, as suggested by Tehseen et al. (2017) are as follows: partial correlation procedures; correlation matrix procedure; and the measured latent marker variable. In this study, Harman's (1960) single-factor test was considered suitable for checking the presence of CMV bias among the variables. The test was performed using principal component analysis (PCA) based on an un-rotated factor analysis on all variables under investigation (Rodríguez-Ardura & Meseguer-Artola, 2020). As a principle, a variance of more than 50% for a single-factor test explains the presents of the common variance bias (*op cit)*. The single factor test of 30.697% (see Table 5.6) suggests that there is no significant presence of CMV in the data-set since the calculated value is below the threshold of 50%. Thus, there was no common method bias on factors enhancing e-government service gaps.

Table 5.6: Common method variance

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.327	33.308	33.308	7.674	30.697	30.697
2	2.652	10.606	43.915			
3	2.186	8.743	52.658			
4	1.805	7.219	59.877			
5	1.570	6.278	66.155			
6	.997	6.088	72.244			
7	.989	5.086	77.329			
8	.907	3.988	81.317			
9	.703	2.812	84.130			
10	.666	2.665	86.795			
11	.584	2.335	89.130			
12	.498	1.994	91.124			
13	.394	1.574	92.698			
14	.329	1.318	94.016			
15	.311	1.244	95.260			
16	.286	1.143	96.403			
17	.238	.951	97.354			
18	.186	.745	98.099			
19	.124	.497	98.596			
20	.113	.452	99.048			
21	.072	.289	99.337			

22	.067	.267	99.604			
23	.055	.220	99.824			
24	.028	.110	99.934			
25	.016	.066	100.000			
Extraction Method: Principal Axis Factoring.						

Source: Primary data (2020)

5.2.6.5 Normality of the data

Checking for normality of data-set is one of the prerequisite to perform factor analysis (Delİce, 2001; Kim, 2013); any violation of data normality is likely to distort factor loading in factor analysis (Kim, 2013). Normality test can be determined by using the following techniques: skewness and kurtosis indices (Kankainen et al., 2004; Kim, 2013); Kolmogorov-Smirnov and Shapiro-Wilk Tests (Drezner et al., 2010). In this analysis, the data-set was checked for normality distribution using Kolmogorov-Smirnov and the Shapiro-Wilk Test. Data-set is assumed to be normally distributed if the significant values for both tests are greater than 0.050 (Hassani & Silva, 2015). The results are presented in Table 5.7.

Table 5.7: Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
INF1	.288	85	.073	.756	85	.079
INF2	.251	85	.210	.790	85	.068
INF3	.289	85	.094	.764	85	.058
INF4	.334	85	.082	.737	85	.075
INF5	.357	85	.065	.718	85	.052
INT1	.312	85	.055	.745	85	.064
INT2	.294	85	.067	.790	85	.072
INT3	.244	85	.098	.795	85	.089
INT4	.333	85	.110	.759	85	.077
INT5	.311	85	.061	.795	85	.067
DIG DIV1	.363	85	.086	.634	85	.057
DIG DIV2	.279	85	.063	.766	85	.059
DIG DIV3	.237	85	.130	.730	85	.061
DIG DIV4	.257	85	.097	.810	85	.083
DIG DIV5	.240	85	.220	.803	85	.074
HUM FACT1	.350	85	.059	.744	85	.088
HUM FACT2	.392	85	.064	.735	85	.059
HUM FACT3	.366	85	.077	.724	85	.082
HUM FACT4	.387	85	.097	.647	85	.086
HUM FACT5	.340	85	.200	.734	85	.075
POL1	.287	85	.093	.783	85	.081
POL2	.318	85	.084	.773	85	.073
POL3	.307	85	.242	.779	85	.063
POL4	.323	85	.210	.759	85	.054
POL5	.356	85	.231	.727	85	.076
Responsiveness	.378	85	.067	.672	85	.200
Flexibility	.378	85	.098	.672	85	.093

Integration	.378	85	.110	.672	85	.084
Ease of use	.378	85	.061	.672	85	.242
Interactivity	.378	85	.079	.672	85	.097
Reliability	.378	85	.068	.672	85	.220
Intangibility	.378	85	.058	.672	85	.059
Efficiency	.378	85	.075	.672	85	.064
Sufficiency	.378	85	.089	.672	85	.097
Accessibility	.378	85	.077	.672	85	.073
Accuracy	.378	85	.067	.672	85	.210
Relevance	.378	85	.057	.672	85	.094
Timeliness	.378	85	.059	.672	85	.082
Transparency	.378	85	.080	.672	85	.065
Actual performance	.378	85	.086	.672	85	.055
Expected performance	.378	85	.075	.672	85	.067
Satisfaction	.378	85	.082	.672	85	.098
a. Lilliefors Significance Correction						

(Source: Primary data, 2020)

As can be seen in Table 5.7, the test results of Kolmogorov-Smirnov and Shapiro-Wilk show that the data-set followed a normal distribution since the values of all the items are greater than the minimum acceptable index (0.050).

5.2.7 Reliability of the research instrument

The study conducted a reliability test to ascertain that the items of the questionnaire survey constituted a reliable instrument. The test statistic was based on the Cronbach's alpha (α) measure. Accordingly, this measure has been widely used in quantitative surveys to assess the reliability of a questionnaire after data collection (Chan & Idris, 2017; Colliver et al., 2012; Cronbach & Meehl, 1955; Feng & Yamat, 2019; Napitupulu et al., 2018; Taherdoost, 2018). The rule of thumb for Cronbach's Coefficient (α) is given in Table 5.8.

Table 5.8: Rule of thumb for Cronbach's Coefficient Alpha (α)

Alpha Coefficient Range	Strength of Association
<0.5	Poor reliability
0.5 to 0.75	Moderate reliability
0.75 to 0.9	Good reliability
>0.9	Excellent reliability

(Source: Adapted from Koo & Li, 2016: 158)

The reliability procedure embedded in the SPSS was employed to test the internal consistency for all the items of each construct assumed to enhance and measure e-government service gaps. Table 5.8 shows the results of the reliability test.

Table 5.9: Reliability test for construct enhancing and measuring e-government service gaps

Construct	Cronbach's Alpha
Infrastructure	
INF1	.910
INF2	.911
INF3	.907
INF4	.907
INF5	.909
Interoperability	
INT1	.908
INT2	.907
INT3	.907
INT4	.908
INT5	.906
Digital divide	
DIG DIV1	.905
DIG DIV2	.906
DIG DIV3	.907
DIG DIV4	.908
DIG DIV5	.907
Human factor	
HUM FACT1	.908
HUM FACT2	.912
HUM FACT3	.909
HUM FACT4	.909
HUM FACT5	.909
Policy	
POL1	.907
POL2	.911
POL3	.908
POL4	.911
POL5	.911
System functionality	
Responsiveness	.914
Flexibility	.913
Integration	.916
Ease of use	.913
Interactivity	.911
Reliability	.911
Intangibility	.917
Service delivery	
Efficiency	.912
Sufficiency	.912
Accessibility	.910
Accuracy	.911
Relevance	.909
Timeliness	.908
Transparency	.910
Service gap	
Actual performance	.912
Expected performance	.912
User satisfaction	
Satisfaction	.910

(Source: Primary data, 2020)

Table 5.9 shows that Cronbach's alpha coefficient of all the 42 items ranges between 0.905 and 0.917. Accordingly, this demonstrates excellent reliability since all the values are greater than 0.9. Thus, the research instrument, therefore, passed the reliability test and is deemed consistent and dependable in gathering valid data.

5.2.8 Bivariate analysis: determining the correlation of variables

Bivariate analysis refers to the analysis of two variables to determine relationships between them. Akoglu defines bivariate analysis as:

> "An analysis of a relation existing between statistical variables which tend to vary, be associated or occur together in a way not expected by chance alone by showing the strength and direction of the relationship between the variables" (Akoglu, 2018: 91).

Accordingly, the study performed a bivariate analysis to ascertain if the relationship between three (3) demographic variables (gender, age and education) and two e-government usage factors (computer knowledge and internet proficiency) was not by chance. The rule of thumb for interpreting the size of the relationship (correlation) is given in Table 5.10.

Table 5.10: The rule of thumb for interpreting the size of correlation (r)

Size of correlation	Interpretation of the strength
0.7<r<1 (-0.7<r<-1)	Strong positive (negative) correlation
0.5<r<0.7 (0.5<r<0.7)	Moderate positive (negative) correlation
0.3<r<0.5 (-0.3<r<-0.5)	Weak positive (negative) correlation
0.1<r<0.3 (-0.1<r<-0.3)	Very weak positive (negative) correlation
r< 0.1 (r<-0.1)	None positive (negative) correlation

(Source: Adapted from Akoglu, 2018; Mukaka, 2012; Schober & Schwarte, 2018)

5.2.8.1 Demographic variables and computer knowledge

The first bivariate analysis of the study was concerned with the correlation between demographic variables and computer knowledge. Table 5.11 shows the results indicating the correlation between demographic variables and computer knowledge.

Table 5.11: Correlation between demographic variables and computer knowledge

		Gender	Age	Education	Computer knowledge
Gender	Pearson Correlation	1			

	Sig. (2-tailed)				
	N	85			
Age	Pearson Correlation	.276**	1		
	Sig. (2-tailed)	.007			
	N	85	90		
Education	Pearson Correlation	-.049	.130	1	
	Sig. (2-tailed)	.639	.210		
	N	85	85	85	
Computer knowledge	Pearson Correlation	.598**	.727**	.016	1
	Sig. (2-tailed)	.001	.001	.314	
	N	85	90	85	90
**. Correlation is significant at the 0.01 level (2-tailed).					

(Source: Primary data, 2020)

As shown in Table 5.11, the value of r between gender and computer knowledge is (r=.598**). Based on the criteria listed in 5.10, this value indicates that there is a positive, linear relationship of moderate strength between gender and computer knowledge. The results were expected since various studies on computer literacy have reported a significant difference in computer knowledge between male and females; males tend to have more computer knowledge than females (Alakpodia, 2014; Gebhardt et al., 2019; Leach & Turner, 2015; Mahmood & Bokhari, 2012; Tella & Mutula, 2008; Zin et al., 2000). On the other hand, the value of r between age and computer knowledge (r=.727**) shows that there is a positive, linear relationship of strong strength. In the same vein, studies in digital literacy reported that different age groups have different computer knowledge, with younger people possessing more knowledge than older people (Boot et al., 2015; Comber et al., 1997; Czaja & Sharit, 1998; Juhaňák et al., 2019; Park et al., 2016; Perry et al., 2003; Van Deursen et al., 2011). In terms of education and computer knowledge, the study reveals that there is no relationship between these two variables. Similarly, in reviewing the literature, no data was found on the relationship between education and computer knowledge. Therefore, it can be argued that computer knowledge can be attained even by those with a low level of education.

5.2.8.2 Demographic variables and internet proficiency

The second bivariate analysis of the study was concerned with the correlation between demographic variables and internet proficiency. The results of the analysis are given in Table 5.12.

Table 5.12: Correlation between demographic variables and internet proficiency

		Gender	Age	Education	internet proficiency
Gender	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	85			
Age	Pearson Correlation	.276**	1	.	
	Sig. (2-tailed)	.007			
	N	85	85		
Education	Pearson Correlation	-.049	.130	1	
	Sig. (2-tailed)	.639	.210		
	N	85	85	85	
internet proficiency	Pearson Correlation	.695**	.790**	.050	1
	Sig. (2-tailed)	.004	.000	.627	
	N	85	85	85	85
**. Correlation is significant at the 0.01 level (2-tailed).					

(Source: Primary data, 2020)

Table 5.12 shows a positive, linear relationship of moderate strength between gender and internet proficiency (r=.695**). This result was expected since various studies on digital skills have reported a significant difference in internet proficiency between males and females; accordingly, males tend to have more internet proficiency than females (Ahmad et al., 2019; Colley & Comber, 2003; Dhillon & Laxmi, 2015; Kay, 2006; Kumar, 2017; Venkatesh et al., 2014). Furthermore, the table shows that there is a positive, linear relationship of strong strength (r=.790**) between age and internet proficiency. Similarly, studies on digital skills reported that there are age differences in digital skills (Boot et al., 2015; Niehaves & Plattfaut, 2014; Owusu-Ansah, 2014).

5.2.9 Factors enhancing e-government service gaps

This section examines the factors that enhance e-government service gaps in the context of a developing country like Zimbabwe using mean and standard deviation. The mean is the summation of values fractioned by the number of values whereas the standard deviation is a measure of the dispersion of scores about the mean (Hassani et al., 2010; Manikandan, 2011). Accordingly, studies have reported that mean values and the standard deviation provide a more accurate picture of the distribution of measurements of a phenomenon (Manikandan, 2011; Whitley & Ball, 2002). Furthermore, the mean values are consistent with the Likert scale of the questionnaire; hence, the values are easily inferred to the findings. To dissect the responses of the questionnaire to match the Likert scale and facilitate the interpretation of descriptive statistics (mean score values), a table of taxonomy was used (see, Table 5.13).

Table 5.13: Taxonomy for interpreting descriptive statistics

Scale item	Mean score
Strongly Disagree	0 to 1.4
Disagree	1.5 to 2.4
Neutral	2.5 to 3.4
Agree	3.5 to 4.4
Strongly Agree	4.5 to 5.0

A descriptive function in SPSS was used to compute the mean values and standard deviation for all items of the five (5) factors that enhance e-government service gaps. The results of the descriptive statistics are given in Table 5.13.

Table 5.14: Descriptive statistics for factors enhancing e-government service gaps

Factor		N	Mean	Std. Deviation
Infrastructure				
INF1	Infrastructure is the foundation of e-government implementation.	85	4.344	.6210
INF2	The country still faces difficulties in the deployment of infrastructure due to lack of adequate resources.	85	4.233	.7039
INF3	Several citizens do not have access to electronically enabled government services.	85	4.311	.6297
INF4	Unreliable infrastructure can degrade the performance of e-government systems.	85	4.433	.6712
INF5	The lack of infrastructure has created a service gap in access to e-government services.	85	4.311	.5537
Interoperability		**N**	**Mean**	**Std. Deviation**
INT1	Interoperability is fundamental to the success of connected government.	85	4.411	.6341
INT2	There is a lack of information sharing among the systems designed to provide e-government services.	85	4.100	.6543
INT3	E-government services are provided in a fragmented manner.	85	4.200	.7220
INT4	Due to the lack of interoperability, some of the services are still provided through non-electronic means.	85	4.067	.5959
INT5	Lack of interoperability results in the loss of entirely reaping the prospective benefits of e-government.	85	4.044	.8060
Digital divide		**N**	**Mean**	**Std. Deviation**
DIG DIV1	Digital divide creates service gaps particularly in the utilisation of e-government services.	85	4.456	.5008
DIG DIV2	Digital divide reflects the lack of and/or limited access to electronic services by citizens.	85	4.333	.7189
DIG DIV3	Digital divide prevents citizens from using e-government services.	85	4.056	.8787
DIG DIV4	The digital divide is certainly the prohibiting factor in access to e-government services.	85	4.044	.8730
DIG DIV5	Digital divide makes it difficult for the effective utilisation of e-government systems.	85	4.133	.7220
Human factor		**N**	**Mean**	**Std. Deviation**
HUM FACT1	E-government cannot be successful utilised if citizens do not have adequate ICT skills.	85	4.189	.5785
HUM FACT2	E-government cannot successfully be deployed when there is a lack of ICT skills.	85	3.789	.6619
HUM FACT3	E-government cannot be successfully deployed when there is a lack of experience.	85	4.022	.7340
HUM FACT4	E-government cannot be successfully deployed when there is poor project management.	85	4.122	.5574
HUM FACT5	E-government cannot be successfully deployed when there is a lack of collaboration among stakeholders.	85	4.311	.5737
Policy		**N**	**Mean**	**Std. Deviation**
POL1	There is a slow pace of government reforms to promote the adoption and implementation of e-government.	85	4.167	.7228
POL2	The country lacks vision and strategy in the implementation of e-government.	85	4.044	.6165
POL3	The government agencies are reluctant to modify workflows that promote the adoption of e-government.	85	3.989	.6270
POL4	The lack of clearly defined e-government implementation policy results in a lack of standardisation.	85	4.244	.6054
POL5	Without a clear vision and strategy, the adoption and implementation of e-government will remain low.	85	4.278	.5615

(Source: Primary data, 2020)

NOTE: N-Number of respondents

It can be seen from Table 5.14 that the mean scores for infrastructure range from 4.311 to 4.344; mean score values for interoperability range from 4.044 to 4.411; mean score values for digital divide range from 4.044 to 4.456; mean score values for human factor 3.789; and mean score values for policy range from 3.989 and 4.278. The aforesaid descriptive statistics are the cumulative scores received from the government employees. All the mean score values for the 25 items fall within the agreed scale (3.5 to 4.4) defined in Table 5.12. Thus, the descriptive statistics show that the respondents agreed that all the five factors investigated in this study enhance e-government service gaps in the context of a developing country.

It is apparent from the analysis that the most concerns under each factor as perceived by government employees are: INF4-unreliable infrastructure can degrade the performance of e-government systems (mean=4.433); INT1-interoperability is fundamental to the success of connected government (mean=4.411); DIG DIV-digital divide creates service gaps particularly in the utilisation of e-government services (mean=4.456); HUM FACT5- e-government cannot be successfully deployed when there is lack of collaboration among stakeholders (mean=4.311), and POL5-without clear vision and strategy the adoption and implementation of e-government will remain low (mean=4.78).

However, it is interesting to note that in all the 25 items, the following two (2) variables: HUM FACT2 (E-government cannot successfully be deployed when there is a lack of ICT skills) and POL3 (The government agencies are reluctant to modify workflows that promote the adoption of e-government) had the least mean values, which is 3.789 and 3.989 respectively. This finding is in agreement with Tehseen et al.'s (2017) findings which showed that negatively worded items for self-assessment like the ones stated above commonly receive low ratings. The next section discusses the extraction of items that measure the factors enhancing e-government service gaps.

5.2.10 Principal component analysis

According to Jolliffe et al. (2016: 1), the term principal component analysis (PCA) refers to “a technique for reducing the dimensionality of datasets by combining two or more correlated variables into a single factor to increase interpretability of data”. The essence of PCA is to discover principal components which can give a good summary of data variance and an adequate representation of factors at the abstract level (*ibid*). The study used the PCA to examine and extract factors that enhance e-government service gaps in the context of a developing country. Accordingly, PCA is compatible with broad tenets of critical realism in that the reduction in the dimensionality of data enables the researcher to observe the underlying structures and the covariance configuration (correlation) of measurement dimensions (Eastwood et al., 2014). The results of the extracted variables are presented in Table 5.15.

Table 5.15: Loading of items that measure the factors enhancing e-government service gaps

Variable	Initial	Extraction
INF1	1.000	.428
INF2	1.000	.590
INF3	1.000	.770
INF4	1.000	.534
INF5	1.000	.531
INT1	1.000	.692
INT2	1.000	.453
INT3	1.000	.627
INT4	1.000	.506
INT5	1.000	.771
DIG DIV1	1.000	.653
DIG DIV2	1.000	.582
DIG DIV3	1.000	.762
DIG DIV4	1.000	.730
DIG DIV5	1.000	.550
HUM FACT1	1.000	.674
HUM FACT2	1.000	.588
HUM FACT3	1.000	.766
HUM FACT4	1.000	.681
HUM FACT5	1.000	.796
POL1	1.000	.623
POL2	1.000	.861
POL3	1.000	.798
POL4	1.000	.751
POL5	1.000	.821
Extraction Method: Principal Component Analysis.		

(Source: Primary data, 2020)

It is apparent from this table that all the 25 items that measure the factors enhancing e-government service gaps had factor values ranging from 0.428 to 0.861. The results show that all values were significantly above 0.40, which is the minimum acceptable value for factor loading (Matsunaga, 2010; Swisher et al., 2004; Xia et al., 2019). Therefore, no items were eliminated since they all represented the extracted dimensions.

5.2.11 Total variance explained

This section examines the total variance (see Table 5.16) to ascertain if the study retained significant factors for further analysis. Accordingly, the Guttman rule demands that researchers retain all factors for which the eigenvalue is above 1.0 (Kanyongo, 2005; Larsen & Warne, 2010; Ruscio & Roche, 2012). Thus, under the extraction options, SPSS was configured to extract only factors with Eigenvalues of 1.0 or higher. The factors are ordered in the descending order based on the most explained variance to facilitate interpretation.

Table 5.16: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.327	33.308	33.308	8.327	33.308	33.308	4.551	18.205	18.205
2	2.652	10.606	43.915	2.652	10.606	43.915	3.711	14.846	33.051
3	2.186	8.743	52.658	2.186	8.743	52.658	3.216	12.863	45.914
4	1.805	7.219	59.877	1.805	7.219	59.877	2.928	11.713	57.627
5	1.570	6.278	66.155	1.570	6.278	66.155	2.132	8.528	66.155
6	.997	6.088	72.244						
7	.988	5.086	77.329						
8	.977	3.988	81.317						
9	.703	2.812	84.130						
10	.666	2.665	86.795						
11	.584	2.335	89.130						
12	.498	1.994	91.124						
13	.394	1.574	92.698						
14	.329	1.318	94.016						
15	.311	1.244	95.260						
16	.286	1.143	96.403						
17	.238	.951	97.354						
18	.186	.745	98.099						
19	.124	.497	98.596						
20	.113	.452	99.048						
21	.072	.289	99.337						
22	.067	.267	99.604						
23	.055	.220	99.824						
24	.028	.110	99.934						
25	.016	.066	100.000						
Extraction Method: Principal Component Analysis.									

(Source: Primary data, 2020)

From the rotated Eigenvalues, the number of significant factors from 25 items is five (5) for this study. Thus, the results in Table 5.16 confirm that factors enhancing e-government service gaps possibly fall into five (5) categories. This categorisation also confirms the specifications made on the questionnaire survey and the conceptual model presented in Chapter Three. Overall, the five components accounted for 66.16% of the total variance. This implies that there are other variables (approximately 34%) that could enhance e-government service gaps and these were determined using interviews and expert review (see Chapter Six).

In addition, the study conducted factor rotation using the *Varimax* rotation method to determine the strength of correlation among the items. Factor rotation is another technique which is frequently employed in factor analysis to choose factors to be retained for further analysis (Chan & Idris, 2017; Ng et al., 2020; Hadia et al., 2016). Chan and Idris (2017) reported that factor loadings represent a degree in which the factor explains a variable in factor analysis. The results of the rotated component matrix loading of each item are given in Table 5.17.

Table 5.17: Rotated Component Matrix[a] – loading of each item on its factor

Construct		Component				
		1	2	3	4	5
Infrastructure						
INF1	Infrastructure is the foundation of e-government implementation.	**.863**	-.067	-.041	.208	.202
INF2	The country still faces difficulties in the deployment of infrastructure due to lack of adequate resources.	**.724**	-.051	-.058	.042	.242
INF3	Several citizens do not have access to electronically enabled government services.	**.881**	-.077	.092	.202	.261
INF4	Unreliable infrastructure can degrade the performance of e-government systems.	**.829**	.276	.169	.161	-.087
INF5	The lack of infrastructure has created a service gap in access to e-government services.	**.884**	.178	.081	.082	.133
Interoperability						
INT1	Interoperability is fundamental to the success of connected government.	.288	**.873**	.254	.044	-.106
INT2	There is a lack of information sharing among the systems designed to provide e-government services.	.299	**.865**	.296	.058	.040
INT3	E-government services are provided in a fragmented manner.	.222	**.855**	.221	.084	.106
INT4	Due to the lack of interoperability, some of the services are still provided through non-electronic means.	.296	**.875**	.085	.058	-.014
INT5	Lack of interoperability results in the loss of entirely reaping the prospective benefits of e-government.	.237	**.750**	-.057	.119	.015
Digital divide						
DIG DIV1	Digital divide creates service gaps particularly in the utilisation of e-government services.	.206	.258	**.881**	.231	.143
DIG DIV2	Digital divide reflects the lack of and/or limited access to electronic services by citizens.	.247	.212	**.846**	.205	.152
DIG DIV3	Digital divide prevents citizens from using e-government services.	.105	.275	**.851**	.071	.151
DIG DIV4	The digital divide is certainly the prohibiting factor in access to e-government services.	.023	.234	**.813**	.265	.238
DIG DIV5	Digital divide makes it difficult for the effective utilisation of e-government systems.	.251	.271	**.822**	.216	.237
Human factor						
HUM FACT1	E-government cannot be successfully utilised if citizens do not have adequate ICT skills.	.093	.240	.216	**.733**	.156
HUM FACT2	E-government cannot successfully be deployed when there is a lack of ICT skills.	-.106	.220	.042	**.723**	.062
HUM FACT3	E-government cannot be successfully deployed when there is a lack of experience.	.089	.166	.030	**.884**	.009
HUM FACT4	E-government cannot be successfully deployed when there is poor project management.	.204	.131	.147	**.724**	-.158
HUM FACT5	E-government cannot be successfully deployed when there is a lack of collaboration among stakeholders.	.066	.109	.200	**.803**	-.192
Policy						
POL1	There is a slow pace of government reforms to promote the adoption and implementation of e-government.	.278	.034	.109	.143	**.859**
POL2	The country lacks vision and strategy in the implementation of e-government.	.190	.226	.074	.091	**.872**
POL3	The government agencies are reluctant to modify workflows that promote the adoption of e-government.	.206	.187	.059	.160	**.800**
POL4	The lack of clearly defined e-government implementation policy results in a lack of standardisation.	.105	-.036	.047	.139	**.851**
POL5	Without a clear vision and strategy, the adoption and implementation of e-government will remain low.	-.057	-.012	.076	.109	**.793**
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.						
a. Rotation converged in 9 iterations.						

(Source: Primary data, 2020)

NOTE: Significant items are put in bold to allow easy visual confirmation that Rotated Component Matrix produced expected results.

What is interesting in the data presented in Table 5.17 is that items are clustered according to the factors they seem to measure. Likewise, the rotated factor loadings show that the factors are desirable with at least five (5) variables per factor that are above 0.50 as per acceptable levels (Chan & Idris, 2017; Pearson & Mundfrom, 2010; Ruscio & Roche, 2012). Furthermore, it was noticed that the coefficients of the items varied across all components. For the first construct, infrastructure (INF) varies between 0.724 and 0.884, whilst for the second construct, interoperability (INT), the coefficient is between 0.750 and 0.875. The next subsection presents dimensions of a multi-dimensional model for assessing e-government service gaps.

5.2.12 Dimensions for a multi-dimensional model

The study also sought to determine dimensions for a multi-dimensional model in assessing e-government service gaps. Respondents were asked to indicate on the questionnaire the extent in which each dimension could be measure e-government service gaps. The taxonomy for interpreting the descriptive statistics is given in Table 5.18.

Table 5.18: Taxonomy for interpreting descriptive statistics

Scale item	Mean score
Not at all	0 to 1.4
Some extent	1.5 to 2.4
Moderate extent	2.5 to 3.4
Great extent	3.5 to 4.4
Very great extent	4.5 to 5.0

A descriptive function in SPSS was used to compute the mean values and standard deviation for all items of the dimensions that possibly constitute a multi-dimensional model for assessing e-government service gaps. The results of the descriptive statistics are given in Table 5.19.

Table 5.19: Dimensions of a multi-dimensional model for assessing e-government service gaps

Element	N	Mean	Std. Deviation
System functionality			
Responsiveness	85	4.42	.491
Flexibility	85	4.02	.497
Integration	85	4.13	.490
Ease of use	85	4.44	.492

Interactivity	85	4.05	.489
Reliability	85	4.44	.490
Intangibility	85	4.00	.496
Service delivery	**N**	**Mean**	**Std. Deviation**
Efficiency	85	4.42	.487
Sufficiency	85	4.44	.477
Accessibility	85	4.16	.468
Accuracy	85	4.00	.458
Relevance	85	4.06	.497
Timeliness	85	4.09	.433
Transparency	85	4.01	.459
Service gaps	**N**	**Mean**	**Std. Deviation**
Actual performance	85	4.42	.466
Expected performance	85	4.44	.474
User satisfaction			
Satisfaction	85	4.39	.482

(Source: Primary data, 2020)

It can be seen from the data in Table 5.19 that the mean values of all the seventeen (17) dimensions defined in the questionnaire survey ranged from 4.00 to 4.44. Descriptive statistics show that these scores are high. Accordingly, the results indicate that all the responses were related to the great extent of the Likert scale (see Table 5.13). Furthermore, all the values of the standard deviation were less than 0.5 which indicates comparatively low variations in responses (Barde, 2019). Hence, this suggests that the respondents had similar views about the extent to which each dimension could measure e-government service gaps. However, it is interesting to note that the following dimensions had high mean values (mean=4.44): ease of use, reliability, sufficiency and expected performance. This could suggest that these dimensions have a higher impact on measuring e-government service gaps compared to other elements. Thus, it can be concluded that government employees expect an e-government system to be easy to use, reliable, provide sufficient services and above all meet their expectations.

5.2.13 Measuring correlation of the multi-dimensional constructs

In statistical analysis, a correlation coefficient is a quantitative measurement that determines both the direction and the strength of association among variables (Akoglu, 2018; Leys et al., 2018; Mukaka, 2012). While descriptive statistics present essential information about the phenomenon, it is also imperative to examine relationships of constructs. This is because correlation analysis ensures that only significant constructs are considered for theoretical modelling. Thus, to determine the relationship between multi-dimensional constructs for assessing e-government service gaps and significant constructs for further analysis, the study employed a correlation matrix. The results of the correlation analysis are presented in Table 5.20.

Table 5.20: Correlation matrix of multi-dimensional constructs

	System functionality	Service delivery	Service gaps	User satisfaction
System functionality	1			
Service delivery	.784**	1		
Service gaps	.764**	.781**	1	
User satisfaction	.772**	.790**	.864**	1
**. Correlation is significant at the 0.01 level (2-tailed).				

(Source: Primary data, 2020)

As presented in Table 5.20, there is a positive, linear relationship of strong strength (r=.784**) between system functionally and service delivery. The same also applies to the constructs system functionality and service gaps, where there is a strength of the statistical association that corresponds to strong correlation (r=.764**). In the same vein, there is a positive, linear relationship of strong strength (r=.772**) between system functionally and user satisfaction. The same also applies to the constructs service delivery and service gaps where there is a strength of the statistical association that corresponds to strong correlation (r=.781**). Similarly, there is a positive, linear relationship of strong strength (r=.790**) between service delivery and user satisfaction. The same also applies to the constructs service gaps and user satisfaction where there is the strength of the statistical association that corresponds to strong correlation (r=.864**). The analysis is based on the rule of thumb for interpreting the size of the relationship (correlation) given in Table 5.8. All the same, it is interesting to note that the relationship between service gaps and user satisfaction was observed to have higher correlation compared to other constructs. Thus, this result suggests that e-government service gaps have a strong influence on user satisfaction.

5.3 Reporting results from the business stratum

Having presented the results from the government stratum, this section reports the results from the business stratum in the same manner with the previous section.

5.3.1 Response rate

As pointed out earlier (Subsection 5.2.1), a good response rate is required to validate a questionnaire (Fincham, 2008; Mellahi & Harris, 2016; Morton et al., 2012). The researcher distributed 130 questionnaires to business owners, managers and employees. From the questionnaires distributed, 95 responses were received. Based on the formula for calculating response rate (see Subsection 5.2.1) the response rate of the questionnaire was 73%, which is higher than the minimum acceptable response rate of 70% (King, 2005; Mellahi & Harris, 2016; Pinsonneault & Kraemer, 1993; Sivo et al., 2006; et al., 2015). Thus, since the response rate was above 70% the researcher can conclude that the findings truthfully represent the reality about e-government from the business perspective.

5.3.2 Demographic profile of survey respondents

The questionnaire sought to examine the demographic profiles of the respondents within the business community since this information largely influences the utilisation of information system and e-government is not an exception. Likewise, many studies have observed that demographic profiles are key determinants of e-government adoption in both developed and developing countries (Bwalya, 2009; Kaur & Singh, 2015; Kumar et al., 2007; Munyoka, 2019; Ronchi & Ronchi, 2019; Yera et al., 2020). Table 5.21 shows the frequencies and percentages of profiles of business owners, managers and employees who participated in this survey.

Table 5.21: Demographic profiles of business owners/managers/employees

Variable		**Frequency**	**Per cent %**
Gender	Female	28	29.5
	Male	67	70.5
	Total	**95**	**100.0**
Variable		**Frequency**	**Per cent %**
Age	Less than 40 years	60	63
	Above 40 years	35	37
	Total	**95**	**100.0**
Variable		**Frequency**	Per cent %
Education	Diploma	14	14.7
	First Degree	18	18.9
	Masters	63	66.3
	Total	**95**	**100.0**

	Variable	Frequency	Per cent %
Business type	Large firm	64	67.4
	SME	23	24.2
	Sole trader	8	8.4
	Total	**95**	**100.0**

(Source: Primary data, 2020)

As shown in Table 5.21, females represented 37% of the respondents, while males accounted for 63%. The results suggest that business organisations in Zimbabwe are dominated by males in terms of ownership, management and employment. This might hold since the business sector in the African context is traditionally viewed as male-dominated (Anunobi & Anunobi, 2002; Mandipaka, 2014; Shava & Rungani, 2014). The results also show that the majority (63%) of respondents were less than 40 years. This suggests that the business community is dominated by early and middle-aged adults. In terms of education, the results show that the majority (63.3%) of respondents are holders of a Master's degree, followed by first degree (18.9%). Overall, the results suggest that business owners, managers and employees are highly educated. Likewise, this is attributed to the increased number of universities in Zimbabwe and their cohorts for the past 10 years to take education to the people. Furthermore, in terms of business type, the majority (67.4%) of the respondents was from large firms, followed by SMEs (24.2%) and sole traders accounted for only 8.4%. The results suggest that the business in Zimbabwe is dominated by large firms.

5.3.3 Computer knowledge and internet proficiency

The researcher was also keen to ascertain computer knowledge and internet proficiency among respondents, given that these elements are regarded as prerequisites in the effective use of e-government systems (Chandra & Malaya, 2011; Deursen & Dijk, 2010). The results are given in Table 5.22.

Table 5.22: Computer knowledge and internet proficiency variables

Variable		Frequency	Per cent %
Computer knowledge	Moderate	8	8.4
	Good	34	35.8
	Very good	53	55.8
	Total	**95**	**100.0**
Variable		**Frequency**	**Per cent %**

Internet proficiency	Good	16	16.8
	Very good	37	38.9
	Excellent	42	44.2
	Total	**95**	**100.0**

(Source: Primary data, 2020)

The results in Table 5.22 show that more than half (55.8%) of respondents identified themselves as having very good computer knowledge. In the same vein, the majority (83%) of the respondents rated their internet proficiency as very good to excellent. The results were expected since the majority (63%) of the respondents are within the "tech-savvy" age group, which is below 40 years (Vaportzis et al., 2017).

5.3.4 E-government experience

The study also sought to find out if respondents had adequate experience in the use of e-government. This was based on the presumption that e-government experience could influence the adoption and evaluation of e-government. Studies have observed that experience in the use of e-government is one of the most important variables in the evaluation of e-government (Rana et al., 2017; Rocha et al., 2014; Weerakkody et al., 2016). Table 5.23 shows the frequencies and percentages of e-government experience of business owners, managers and employees who participated in this survey.

Table 5.23: E-government experience of the respondents

Variable		Frequency	Per cent %
of e-government experience	Moderate experience	37	89
	Good experience	53	61
	Total	**95**	**100.0**

(Source: Primary data, 2020)

As shown in Table 5.23, the majority (61%) of the respondents indicated that they have a good experience in e-government. This was followed by moderate experience (39%). The results suggest that a significant number of businesses in Zimbabwe utilise e-government services. Accordingly, this implies that the researcher collected meaningful data to validate the conceptual model.

5.3.5 Method used to access e-government services

The survey assessed the methods used by respondents to access e-government services (Table 5.25), given that it is a prerequisite in the utilisation of e-government. Correspondingly, in the view of many scholars, access to and use of e-government largely depends on the availability of tools such as computers, mobile phones, Tablet PCs, community information centres and internet cafés (Mudawi et al., 2020; Alibaygi et al., 2011; Furuholt & Sæbø, 2018; Kyem, 2016; Sareen et al., 2013).

Table 5.24: Method used to access e-government services by government employees

Variable		Frequency	Per cent %
Method	Office computer	55	57.9
	Mobile phone	43	46.3
	Home computer	31	32.6
	Tablet PC	2	2.1
	The computer at cyber café	3	3.2
	Community information centre	2	2.1

(Source: Primary data, 2020)

The results, given in Table 5.24, show that the majority (57.9%) of the respondents indicated that they use office computer to access e-government services. This was expected since business managers and employees spend most of their time in offices; hence, the office computer has been utilised mostly in accessing e-government services. Thus, it can be stated that computers have significant penetration in a business organisation. However, it should be noted that a significant number of respondents are using mobile phones to access e-government services (46.3%). This could be attributed to the fact that some managers and employees are working from home due to restrictions of the COVID-19.

5.3.6 Preparation of data for statistical analysis

As mentioned in the previous section (Section 5.2.6), researchers are mandated to prepare data for statistical analysis (Weston & Gore, 2006). This subsection describes the procedure used to ensure that the quantitative data from the business stratum was suitable for statistical analysis.

5.3.6.1 Missing values and outliers

The procedure for handling missing values and dealing with outliers was similar to the one described in Subsection 5.2.6.1. Accordingly, there were no missing values on the 2 sets of questionnaires. Using the measure for multivariate outliers (Mahalanobis distance at $p \leq .001$) five (5) data-sets with values equal to 0.001 or below in the questionnaire were regarded as outliers and deleted accordingly. Thus, based on this measure, cases for statistical analysis were reduced to 90. Also, it is important to note that the values regarded as outliers were checked against the original questionnaire to ascertain that outliers were not determined erroneously before deletion.

5.3.6.2 Determining the suitability of data-set for factor analysis

Likewise, to ensure that the data-set was suitable for factor analysis method, the study performed the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Barlett's Test of Sphericity (BTS). The KMO value is 0.869 (see Table 5.26), exceeding the minimum value of 0.6 (Hadia et al., 2016); whereas the BTS was significant at x^2 =1932.126, p=0.000. Thus, the suitability of data-set for factor analysis was supported by KMO and BTS.

Table 5.25: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.869
Bartlett's Test of Sphericity	Approx. Chi-Square	2476.769
	df	300
	Sig.	.000

(Source: Primary data, 2020)

5.3.6.3 Examining the existence of common method variance (CMV) bias

Harman's (1960) single-factor test was used to check the presence of CMV bias among the variables. The procedure was performed using PCA based on an un-rotated factor analysis on all variables under investigation (Rodríguez-Ardura & Meseguer-Artola, 2020). The single-factor test of 32.789% (see Table 5.26) suggests that there is no significant presence of bias in the data-set since the calculated value is below the threshold of 50% (Eichhorn, 2014; Reio, 2010; Xia et al., 2019). Thus, there was no common method bias on factors enhancing e-government service gaps.

Table 5.26: Common method variance

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.775	35.100	35.100	8.197	32.789	32.789
2	2.586	10.343	45.442			
3	2.320	9.281	54.723			
4	1.917	7.667	62.390			
5	1.529	6.115	68.505			
6	.929	4.517	73.023			
7	.904	4.137	77.160			
8	.850	3.400	80.560			
9	.767	3.068	83.628			
10	.666	2.662	86.290			
11	.640	2.559	88.849			
12	.476	1.905	90.754			
13	.442	1.766	92.520			
14	.426	1.705	94.226			
15	.368	1.472	95.698			
16	.290	1.159	96.857			
17	.234	.938	97.795			
18	.181	.724	98.518			
19	.143	.572	99.090			
20	.095	.380	99.470			
21	.060	.241	99.711			
22	.032	.129	99.840			
23	.026	.105	99.945			
24	.013	.051	99.995			
25	.001	.005	100.000			
Extraction Method: Principal Axis Factoring.						

(Source: Primary data, 2020)

5.3.6.4 Normality of the data

The data-set was checked for normality distribution using Kolmogorov-Smirnov and Shapiro-Wilk Test. Data-set is assumed to be normally distributed if the significant values for both tests are greater than 0.050 (Drezner et al., 2010; Facchinetti, 2009). The results of the normality test are presented in Table 5.27.

Table 5.27: Test for normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
INF1	.253	90	.093	.762	90	.082
INF2	.248	90	.075	.755	90	.076
INF3	.243	90	.082	.771	90	.091
INF4	.237	90	.066	.843	90	.064
INF5	.322	90	.082	.720	90	.059
INT1	.269	90	.076	.714	90	.087
INT2	.371	90	.091	.709	90	.079
INT3	.297	90	.064	.788	90	.063
INT4	.259	90	.086	.797	90	.077
INT5	.255	90	.063	.751	90	.068
DIG DIV1	.300	90	.077	.681	90	.089

DIG DIV2	.387	90	.068	.688	90	.092
DIG DIV3	.339	90	.063	.750	90	.084
DIG DIV4	.278	90	.079	.821	90	.078
DIG DIV5	.267	90	.092	.789	90	.069
HUM FACT1	.304	90	.080	.808	90	.088
HUM FACT2	.294	90	.065	.835	90	.094
HUM FACT3	.351	90	.094	.740	90	.080
HUM FACT4	.395	90	.079	.671	90	.065
HUM FACT5	.325	90	.063	.744	90	.093
POL1	.309	90	.059	.774	90	.075
POL2	.303	90	.087	.752	90	.082
POL3	.288	90	.069	.778	90	.066
POL4	.293	90	.088	.778	90	.073
POL5	.337	90	.094	.723	90	.062
Responsiveness	.356	90	.000	.737	90	.059
Flexibility	.356	90	.000	.737	90	.087
Integration	.356	90	.088	.737	90	.079
Ease of use	.356	90	.091	.737	90	.092
Interactivity	.356	90	.080	.737	90	.080
Reliability	.356	90	.065	.737	90	.065
Intangibility	.356	90	.094	.737	90	.079
Efficiency	.356	90	.080	.737	90	.086
Sufficiency	.356	90	.065	.737	90	.063
Accessibility	.356	90	.093	.737	90	.077
Accuracy	.356	90	.082	.737	90	.068
Relevance	.356	90	.076	.737	90	.063
Timeliness	.356	90	.091	.737	90	.093
Transparency	.356	90	.064	.737	90	.075
Actual performance	.356	90	.059	.737	90	.082
Expected performance	.356	90	.087	.737	90	.066
Satisfaction	.356	90	.082	.737	90	.093
a. Lilliefors Significance Correction						

(Source: Primary data, 2020)

As the table above show, the test results of Kolmogorov-Smirnov and Shapiro-Wilk show that the data-set follows a normal distribution since the values of all the items are greater than the minimum acceptable index (0.050).

5.3.7 Reliability

A reliability test was conducted to ascertain if items of the questionnaire survey constituted a reliable instrument in assessing e-government service gaps. The test statistic was based on the Cronbach's alpha (α) measure. The results are given in Table 5.28.

Table 5.28: Reliability test

Factor	Cronbach's Alpha
Infrastructure	
INF1	.896
INF2	.903
INF3	.891

INF4	.901
INF5	.897
Interoperability	
INT1	.894
INT2	.893
INT3	.895
INT4	.896
INT5	.891
Digital divide	
DIG DIV1	.898
DIG DIV2	.894
DIG DIV3	.897
DIG DIV4	.904
DIG DIV5	.898
Human factor	
HUM FACT1	.893
HUM FACT2	.910
HUM FACT3	.901
HUM FACT4	.897
HUM FACT5	.897
Policy	
POL1	.895
POL2	.893
POL3	.893
POL4	.893
POL5	.894
System functionality	
Responsiveness	.915
Flexibility	.910
Integration	.919
Ease of use	.914
Interactivity	.913
Reliability	.913
Intangibility	.915
Service delivery	
Efficiency	.914
Sufficiency	.917
Accessibility	.912
Accuracy	.912
Relevance	.910
Timeliness	.906
Transparency	.889
Service gap	
Actual performance	.915
Expected performance	.919
User satisfaction	
Satisfaction	.921

Table 5.28 shows that the Cronbach's alpha coefficient of all the 42 items ranges between 0.889 and 0.921. Accordingly, this demonstrates good reliability since all the values are greater than 0.75 (Koo & Li, 2016). Thus, the research instrument, therefore, passed the reliability test and is deemed consistent and dependable in gathering valid data.

5.3.8 Bivariate analysis: determining the correlation of variables

The study performed bivariate analysis to ascertain if the relationship between the three (3) demographic variables (gender, age and education) and two e-government usage factors (computer knowledge and internet proficiency) was not by chance.

5.3.8.1 Demographic variables and computer knowledge

The first bivariate analysis of the study was concerned with the correlation between demographic variables and computer knowledge. Table 5.29 shows the results of the correlation analysis between demographic variables and computer knowledge.

Table 5.29: Correlation between demographic variables and computer knowledge

		Gender	Age	Education	Computer knowledge
Gender	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	90			
Age	Pearson Correlation	.276**	1		
	Sig. (2-tailed)	.007			
	N	90	90		
Education	Pearson Correlation	-.049	.130	1	
	Sig. (2-tailed)	.639	.210		
	N	90	90	90	
Computer knowledge	Pearson Correlation	.792**	.784**	.106	1
	Sig. (2-tailed)	.001	.001	.308	
	N	90	90	90	90
**. Correlation is significant at the 0.01 level (2-tailed).					

(Source: Primary data, 2020)

As Table 5.29 shows, there is a positive, linear relationship of strong strength between gender and computer knowledge ($r=.792^{**}$). The results were expected since various studies on computer literacy have reported a significant difference in computer knowledge between male and females; males tend to have more computer knowledge than females (Alakpodia, 2014; Gebhardt et al., 2019; Leach & Turner, 2015; Mahmood & Bokhari, 2012; Tella & Mutula, 2008; Zin et al., 2000). In the same vein, there is a positive, linear relationship of strong strength between age and computer knowledge ($r=.784^{**}$). Accordingly, studies in digital literacy reported that different age groups have different computer knowledge, with younger people possessing more knowledge than older people (Boot et al., 2015; Comber et al., 1997; Czaja & Sharit, 1998; Juhaňák et al., 2019; Park et al., 2016; Perry et al., 2003; Van Deursen et al., 2011). In terms of education and computer knowledge, the bivariate analysis did not show any correlations between these two variables. Similarly, in reviewing the literature, no data was found on the relationship between education and computer knowledge. Therefore, it can be argued that people are likely to get computer knowledge irrespective of their level of education.

5.3.8.2 Demographic variables and internet proficiency

The second bivariate analysis of the study was concerned with the correlation between demographic variables and internet proficiency. The results of the correlation analysis are presented in Table 5.31.

Table 5.30: Correlation between demographic variables and internet proficiency

		Gender	Age	Education	internet proficiency
Gender	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	90			
Age	Pearson Correlation	.276**	1		
	Sig. (2-tailed)	.007			
	N	90	90		
Education	Pearson Correlation	-.049	.130	1	
	Sig. (2-tailed)	.639	.210		
	N	90	90	90	
internet proficiency	Pearson Correlation	.705**	.794**	.050	1
	Sig. (2-tailed)	.001	.000	.627	
	N	90	90	90	95

**. Correlation is significant at the 0.01 level (2-tailed).

(Source: Primary data, 2020)

Table 5.30 shows a positive, linear relationship of strong strength between gender and internet proficiency (r=.705**). This result was expected since various studies on digital skills have reported a significant difference in internet proficiency between male and females; males tend to have more internet proficiency than females (Ahmad et al., 2019; Colley & Comber, 2003; Dhillon & Laxmi, 2015; Kay, 2006; Kumar, 2017; Venkatesh et al., 2014). Furthermore, the table shows that there is a positive, linear relationship of strong strength (r=.794**) between age and internet proficiency. Similarly, studies on digital skills reported that there are age differences in digital skills (Niehaves & Plattfaut, 2014). In terms of education and internet proficiency, the study reveals that there is no relationship between these two variables. Likewise, in reviewing the literature, no data was found on the relationship between education and internet proficiency. Thus, it can be argued that internet proficiency is not influenced by the level of education.

5.3.9 Factors enhancing e-government service gaps

This section examines the factors that enhance e-government service gaps in the context of a developing country like Zimbabwe from a business perspective. The descriptive statistics are given in Table 5.31.

Table 5.31: Factors enhancing e-government service gaps (N=number of respondents)

Factor		N	Mean	Std. Deviation
Infrastructure				
INF1	Infrastructure is the foundation of e-government implementation.	90	4.284	.7244
INF2	The country still faces difficulties in the deployment of infrastructure due to lack of adequate resources.	90	4.221	.9013
INF3	Several citizens do not have access to electronically enabled government services.	90	4.179	.9107
INF4	Unreliable infrastructure can degrade the performance of e-government systems.	90	4.021	.8119
INF5	The lack of infrastructure has created a service gap in access to e-government services.	90	4.453	.5792
Interoperability		**N**	**Mean**	**Std. Deviation**
INT1	Interoperability is fundamental to the success of connected government.	90	4.358	.6829
INT2	There is a lack of information sharing among the systems designed to provide e-government services.	90	4.021	.6185
INT3	E-government services are provided in a fragmented manner.	90	4.116	.6501
INT4	Due to the lack of interoperability, some of the services are still provided through non-electronic means.	90	4.168	.6942
INT5	Lack of interoperability results in the loss of entirely reaping the prospective benefits of e-government.	90	4.305	.7157
Digital divide		**N**	**Mean**	**Std. Deviation**
DIG DIV1	Digital divide creates service gaps particularly in the utilisation of e-government services.	90	4.263	.8149
DIG DIV2	Digital divide reflects the lack of and/or limited access to electronic services by citizens.	90	4.295	.5234
DIG DIV3	Digital divide prevents citizens from using e-government services.	90	4.042	.5819
DIG DIV4	The digital divide is certainly the prohibiting factor in access to e-government services.	90	4.063	.7829
DIG DIV5	Digital divide makes it difficult for the effective utilisation of e-government systems.	90	4.200	.7380
Human factor		**N**	**Mean**	**Std. Deviation**
HUM FACT1	E-government cannot be successful utilised if citizens do not have adequate ICT skills.	90	4.032	.7213
HUM FACT2	E-government cannot successfully be deployed when there is a lack of ICT skills.	90	3.926	.8153
HUM FACT3	E-government cannot be successfully deployed when there is a lack of experience.	90	4.074	.5695
HUM FACT4	E-government cannot be successfully deployed when there is poor project management.	90	4.318	.5108
HUM FACT5	E-government cannot be successfully deployed when there is a lack of collaboration among stakeholders.	90	4.316	.5882
Policy		**N**	**Mean**	**Std. Deviation**
POL1	There is a slow pace of government reforms to promote the adoption and implementation of e-government.	90	4.200	.6291
POL2	The country lacks vision and strategy in the implementation of e-government.	90	4.389	.6407
POL3	The government agencies are reluctant to modify workflows that promote the adoption of e-government.	90	4.242	.6477
POL4	The lack of clearly defined e-government implementation policy results in a lack of standardisation.	90	4.232	.6433
POL5	Without a clear vision and strategy, the adoption and implementation of e-government will remain low.	90	4.358	.5633

(Source: Primary data, 2020)

The results, as shown in Table 5.31, indicate that the mean scores for infrastructure range from 4.021 to 4.453; mean score values for interoperability range from 4.021 to 4.358; mean score values for digital divide range from 4.044 to 4.456; mean score values for human factor range from 3.926 to 4.316; and mean score values for policy range from 4.200 and 4.389. The aforesaid descriptive statistics are the cumulative scores received from business owners, managers and employees. Accordingly, all the mean score values for the 25 items fall within the agreed scale (3.5 to 4.4). Thus, the descriptive statistics show that the respondents agreed that all the five factors investigated in this study enhance e-government service gaps in the context of a developing country.

Interestingly, while the respondents agreed about all the 25 items, there were differences in mean values under each factor. For instance, under the infrastructure, INF5 (The lack of infrastructure has created a service gap in the access of e-government services) had a higher mean value compared to the other four items. Thus, the item could be regarded as having high explanatory power in determining infrastructure variables that enhance e-government service gaps. The same also applies to the following variables: INT1 (Interoperability is fundamental to the success of connected government); DIG DIV2 (Digital divide reflects the lack of and/or limited access to electronic services by citizens); HUM FACT4 (E-government cannot be successfully deployed when there is poor project management); and POL2 (The country lacks vision and strategy in the implementation of e-government). The next section presents the extraction of items that measures the five factors.

5.3.10 Principal component analysis

The study used the PCA to examine and extract significant factors enhancing e-government service gaps in the context of a developing country. The results are given in Table 5.32.

Table 5.32: Loading of items that measure the factors enhancing e-government service gaps

Variable	Initial	Extraction
INF1	.956	.653
INF2	.886	.405
INF3	.960	.543
INF4	.872	.610
INF5	.924	.549

INT1	.950	.905
INT2	.984	.653
INT3	.972	.728
INT4	.944	.482
INT5	.947	.852
DIG DIV1	.938	.498
DIG DIV2	.991	.611
DIG DIV3	.979	.444
DIG DIV4	.970	.799
DIG DIV5	.930	.705
HUM FACT1	.931	.642
HUM FACT2	.986	.518
HUM FACT3	.953	.490
HUM FACT4	.983	.460
HUM FACT5	.720	.445
POL1	.990	.943
POL2	.934	.640
POL3	.981	.747
POL4	.996	.858
POL5	.911	.609
Extraction Method: Principal Axis Factoring.		

(Source: Primary data, 2020)

As can be seen in Table 5.32, all the 25 items that measure the factors enhancing e-government service gaps had factor values ranging from 0.405 to 0.943. The results show that all values were significantly above 0.40 which is the minimum acceptable value for factor loading (Matsunaga, 2010; Swisher et al., 2004; Xia et al., 2019). Therefore, no items were removed since they all represented the extracted dimensions.

5.3.11 Total variance explained

This section examines the total variance (see Table 5.33) to ascertain if the study retained significant factors. Accordingly, the Guttman rule demands researchers to retain all factors for which the Eigenvalues is above 1.0 (Kanyongo, 2005; Larsen & Warne, 2010; Ruscio & Roche, 2012).

Table 5.33: Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.775	35.100	35.100	8.433	33.734	33.734	4.126	16.505	16.505
2	2.586	10.343	45.442	2.271	9.083	42.817	3.993	15.973	32.479
3	2.320	9.281	54.723	1.978	7.912	50.729	2.768	11.072	43.551
4	1.917	7.667	62.390	1.471	5.883	56.613	2.704	10.816	54.367
5	1.529	6.115	68.505	1.236	4.942	61.555	1.797	7.188	61.555
6	1.129	4.517	73.023						
7	1.034	4.137	77.160						
8	.850	3.400	80.560						
9	.767	3.068	83.628						
10	.666	2.662	86.290						
11	.640	2.559	88.849						
12	.476	1.905	90.754						
13	.442	1.766	92.520						
14	.426	1.705	94.226						
15	.368	1.472	95.698						
16	.290	1.159	96.857						
17	.234	.938	97.795						
18	.181	.724	98.518						
19	.143	.572	99.090						
20	.095	.380	99.470						
21	.060	.241	99.711						
22	.032	.129	99.840						
23	.026	.105	99.945						
24	.013	.051	99.995						
25	.001	.005	100.000						
Extraction Method: Principal Axis Factoring.									

(Source: Primary data, 2020)

From the rotated Eigenvalues, the number of significant factors from 25 items is five (5) for this study. Thus, the results in Table 5.33 confirm that factors enhancing e-government service gaps fall into five (5) categories. This categorisation also applies to the specifications made on the questionnaire survey and conceptual model presented in Chapter Three. The five components accounted for 61.16% of the total variance. Nevertheless, the study conducted factor rotation using *Varimax* rotation method to determine the strength of correlation among the items (Chan & Idris, 2017; Ng et al., 2020; Hadia et al., 2016). The results of the rotated component matrix loading of each item are given in Table 5.35.

Table 5.34: Rotated Component Matrix[a] – loading of each item on its factor

Construct		Component				
		1	2	3	4	5
Infrastructure						
INF1	Infrastructure is the foundation of e-government implementation.	**.808**	.152	.248	.252	.218
INF2	The country still faces difficulties in the deployment of infrastructure due to lack of adequate resources.	**.831**	-.095	.216	.104	.042
INF3	Several citizens do not have access to electronically enabled government services.	**.728**	.216	.206	.277	.161
INF4	Unreliable infrastructure can degrade the performance of e-government systems.	**.814**	.184	.054	.057	.287
INF5	The lack of infrastructure has created a service gap in access to e-government services.	**.834**	-.030	.263	.178	.202
Interoperability						
INT1	Interoperability is fundamental to the success of connected government.	.220	**.794**	.193	.190	.202
INT2	There is a lack of information sharing among the systems designed to provide e-government services.	.192	**.802**	.133	.256	.117
INT3	E-government services are provided in a fragmented manner.	.100	**.847**	-.157	.188	.075
INT4	Due to the lack of interoperability, some of the services are still provided through non-electronic means.	.163	**.817**	.282	.125	.022
INT5	Lack of interoperability results in the loss of entirely reaping the prospective benefits of e-government.	.117	**.700**	.120	.277	-.035
Digital divide						
DIG DIV1	Digital divide creates service gaps particularly in the utilisation of e-government services.	.167	.155	**.800**	.096	.081
DIG DIV2	Digital divide reflects the lack of and/or limited access to electronic services by citizens.	.154	.164	**.797**	.269	.070
DIG DIV3	Digital divide prevents citizens from using e-government services.	.129	.116	**.822**	.012	-.223
DIG DIV4	The digital divide is certainly the prohibiting factor in access to e-government services.	.088	.131	**.835**	-.174	-.145
DIG DIV5	Digital divide makes it difficult for the effective utilisation of e-government systems.	-.072	.188	**.800**	.141	.064
Human factor						
HUM FACT1	E-government cannot be successful utilised if citizens do not have adequate ICT skills.	.104	.141	.146	**.814**	-.272
HUM FACT2	E-government cannot successfully be deployed when there is a lack of ICT skills.	.101	.103	.085	**.784**	.148
HUM FACT3	E-government cannot be successfully deployed when there is a lack of experience.	.262	.288	-.217	**.817**	-.194
HUM FACT4	E-government cannot be successfully deployed when there is poor project management.	.200	.117	.035	**.869**	-.096
HUM FACT5	E-government cannot be successfully deployed when there is a lack of collaboration among stakeholders.	.164	.149	.118	**.823**	-.125
Policy						
POL1	There is a slow pace of government reforms to promote the adoption and implementation of e-government.	.180	.109	.118	-.256	**.858**
POL2	The country lacks vision and strategy in the implementation of e-government.	.223	.277	.002	.149	**.808**
POL3	The government agencies are reluctant to modify workflows that promote the adoption of e-government.	.204	.227	.170	.100	**.802**
POL4	The lack of clearly defined e-government implementation policy results in a lack of standardisation.	.272	.234	.011	.191	**.879**
POL5	Without a clear vision and strategy, the adoption and implementation of e-government will remain low.	.139	.231	.120	-.002	**.789**
Extraction Method: Principal Axis Factoring. Rotation Method: Varimax with Kaiser Normalization.						
a. Rotation converged in 11 iterations.						

(Source: Primary data, 2020)

NOTE: Significant items are put in bold font to provide a suitable visual confirmation that Rotated Component Matrix produced anticipated results.

From the data in Table 5.34, items are clustered according to the factors they seem to measure. Likewise, the rotated factor loadings show that the factors are desirable with at least five variables per factor that are above 0.50 as per acceptable levels (Chan & Idris, 2017; Pearson & Mundfrom, 2010; Ruscio & Roche, 2012). Thus, since each factor loading on each item was more than 0.50, therefore, the factor analysis results satisfied the inferential analysis. The next subsection presents dimensions of a multi-dimensional model for assessing e-government service gaps.

5.3.12 Dimensions for a multi-dimensional model

The study also sought to determine dimensions for a multi-dimensional model in assessing e-government service gaps. Respondents were asked to indicate on the questionnaire the extent to which each dimension could measure e-government service gaps. A descriptive function in SPSS was used to compute the mean values and standard deviations for all items of the dimensions that possibly constitute a multi-dimensional model for assessing e-government service gaps. The results of the descriptive statistics are given in Table 5.35.

Table 5.35: Dimensions of a multi-dimensional model for assessing e-government service gaps

Dimension	N	Mean	Std. Deviation
System functionality			
Responsiveness	90	4.40	.5602
Flexibility	90	4.09	.5613
Integration	90	4.11	.5607
Ease of use	90	4.40	.5633
Interactivity	90	4.12	.5636
Reliability	90	4.15	.5623
Intangibility	90	3.85	.5663
Service delivery	**N**	**Mean**	**Std. Deviation**
Efficiency	90	4.25	.5611
Sufficiency	90	4.40	.5652
Accessibility	90	4.15	.5643
Accuracy	90	4.19	.5612
Relevance	90	3.85	.5123
Timeliness	90	4.08	.5063
Transparency	90	3.85	.5603
Service gaps	**N**	**Mean**	**Std. Deviation**
Actual performance	90	4.12	.5623
Expected performance	90	4.40	.5463
User satisfaction			
Satisfaction	90	4.40	.5660

(Source: Primary data, 2020)

It can be seen from the data in Table 5.35 that the mean values of all the seventeen (17) elements for assessing e-government service gaps investigated in this study ranged from 3.85 to 4.40. Accordingly, the results indicate that all the responses were related to the great extent of the Likert scale (see Table 5.13). Furthermore, the standard deviations of all dimensions are clustered around 0.5 which suggests that the respondents had similar views about the extent to which each dimension could measure e-government service gaps (Barde, 2019).

Interestingly, the following dimensions had high mean values (mean=4.40): responsiveness; ease of use, reliability, sufficiency; expected performance; and user satisfaction. Likewise, this could suggest that these six (6) dimensions have a higher impact in assessing e-government service gaps compared to other dimensions. Thus, it can be concluded that business owners, managers and employees expect an e-government system to be responsive, easy to use, and reliable, provide sufficient services, meet their expectations and enhance their satisfaction. Nevertheless, it should be noted that the following had the least mean values (mean=3.85): intangibility, relevance and transparency. This could suggest that these three (3) dimensions have a moderate impact on the assessment of e-government service gaps.

5.3.13 Measuring correlation of the multi-dimensional constructs

To determine the relationship between multi-dimensional constructs for assessing e-government service gaps, the study conducted a correlation analysis. The results are presented in Table 5.36.

Table 5.36: Summary of the correlation matrix of multi-dimensional constructs

	System functionality	Service delivery	Service gaps	User satisfaction
System functionality	1			
Service delivery	.789**	1		
Service gaps	.767**	.785**	1	
User satisfaction	.777**	.794**	.860**	1
**. Correlation is significant at the 0.01 level (2-tailed).				

(Source: Primary data, 2020)

Table 5.36 shows that there is a positive, linear relationship of strong strength (r=.789**) between system functionally and service delivery. The same also applies to the constructs system functionality and service gaps, where there is a strength of the statistical association that corresponds to strong correlation (r=.767**). In the same vein, there is a positive, linear relationship of strong strength (r=.777**) between system functionally and user satisfaction. The same also applies to the constructs service delivery and service gaps where there is a strength of the statistical association that corresponds to strong correlation (r=.785**). Similarly, there is a positive, linear relationship of strong strength (r=.794**) between service delivery and user satisfaction. The same also applies to the constructs service gaps and user satisfaction where there is a strength of the statistical association that corresponds to strong correlation (r=.860**). Likewise, it is interesting to note that the relationship between service gaps and user satisfaction was observed to have higher correlation compared to other constructs. Thus, this result suggests that e-government service gaps have a strong influence on user satisfaction.

5.4 Reporting results from the citizen stratum

Having presented the results from the government and business strata, this section reports the results from the citizen stratum in the same manner with the previous strata.

5.4.1 Response rate

The researcher sent 300 questionnaires to the citizens and received 225 responses. Based on the formula for calculating response rate (see Subsection 5.3.1), the response rate was 73%, which is higher than the least expected response rate of 70% (King & He, 2005; Mellahi & Harris, 2016; Pinsonneault & Kraemer, 1993; Sivo et al., 2006; et al., 2015). Thus, since the response rate was above 70% the researcher concluded that the findings truthfully represented the reality of e-government from the citizens' perspective.

5.4.2 Demographic profile of survey respondents

The questionnaire sought to analyse the demographic profiles of the citizens who participated in this study (see Table 37). Likewise, many studies have observed that demographic profiles are key determinants of e-government adoption in both developed and developing countries

(Bwalya, 2009; Kaur & Singh, 2015; Kumar et al., 2007; Munyoka, 2019; Ronchi & Ronchi, 2019; Yera et al., 2020).

Table 5.37: Demographic profile

Variable		Frequency	Per cent %
Gender	Female	111	49.3
	Male	114	50.7
	Total	**225**	**100.0**
Variable		**Frequency**	**Per cent %**
Age	Less than 40 years	198	84
	Above 40 years	36	16
	Total	**225**	**100.0**
Variable		**Frequency**	**Per cent %**
Education	Diploma	12	5.3
	First Degree	122	50.2
	Masters	83	36.9
	PhD	8	3.6
	Total	**225**	**100.0**

(Source: Primary data, 2020)

It can be seen from the data in Table 5.37 that nearly the same number of males (50.7%) and females (49.3%) participated in the survey. The results suggest that males and females were fairly represented in the study even though this data is not consistent with the gender distribution in Zimbabwe. This gives credence to the fact that the views of citizens about e-government in Zimbabwe were well-balanced. The table also reveals that the majority (84%) of the respondents were aged below 40 years while 16% were above 40 years of age. This implies that the respondents were generally young. This finding is consistent with Adams et al.'s (2019) findings which revealed that nearly a third of the population in Sub-Sahara Africa is youth.

Further, in terms of education, half (50.2%) of the respondents were holders of the first degree, followed by a Master’s degree (36.9%). Interestingly, the sample comprised of the respondents who were Doctoral holders (3.6%). Collectively, the citizens that are degree holders account for 94.7%. Thus, taken together, the findings show that the majority of the citizens who participated in this study were highly educated. Again, this finding could be attributed to the increased number of universities in Zimbabwe and their cohorts for the past 10 years; thereby supporting the expectations of the researcher.

5.4.3 Computer knowledge and internet proficiency

The researcher was also keen to ascertain computer knowledge and internet proficiency among respondents, given that these elements are regarded as prerequisites in the access to and usage of e-government (Chandra & Malaya, 2011; Van Deursen & Van Dijk, 2010). The results of computer knowledge and internet proficiency are presented in Table 5.38.

Table 5.38: Computer knowledge and internet proficiency variables

Variable		Frequency	Per cent %
computer knowledge	Moderate	18	8.0
	Good	61	27.1
	Very good	145	64.9
	Total	**225**	**100.0**
Variable		**Frequency**	**Per cent %**
internet proficiency	Good	28	12.4
	Very good	88	39.1
	Excellent	109	48.4
	Total	**225**	**100.0**

(Source: Primary data, 2020)

As can be seen from the table (above), the majority of the respondents (64.9%) identified themselves as having very good computer knowledge. Furthermore, nearly half of the respondents rated their internet proficiency as excellent (48.4%), followed by a very good rating (39.1%). The findings were expected since the majority of the respondents (84%) are within the "tech-savvy" age group, which is below 40 years (Vaportzis et al., 2017).

5.4.4 E-government experience

The study also sought to find out if respondents had adequate experience in the use of e-government. This was based on the presumption that e-government experience could influence the adoption and evaluation of e-government. Studies have observed that experience in the use of e-government is one of the most important variables in the evaluation of e-government (Rana et al., 2017; Rocha et al., 2014; Weerakkody et al., 2016). Table 5.40 shows the frequencies and percentages of e-government experience of citizens who participated in this survey.

Table 5.39: E-government experience of the respondents

Variable		Frequency	Per cent %
e-government experience	Little experience	31	13.8
	Moderate experience	104	46.2
	Good experience	70	31.1
	Very good experience	20	8.9
	Total	**225**	**100.0**

(Source: Primary data, 2020)

It can be seen from the data in Table 5.39 that the respondents had varying experiences in the use of e-government — from little to very good. Nearly half of the respondents (46.2%) indicated a moderate experience whereas less than a third of those who responded (31.1%) indicated that they had a good experience. Thus, the experience of e-government among citizens could be classified as being moderate to good. Accordingly, this experience was assumed to be adequate in the validation e-government in a developing context.

5.4.5 Method used to access e-government services

The survey assessed the methods used by respondents to access e-government services, given that it is a prerequisite for accessing and using e-government. Similarly, several studies have revealed that access to and use of e-government largely depends on the availability of computers, mobile phones, Tablet PCs, community information centres and internet cafés (Mudawi et al., 2020; Alibaygi et al., 2011; Furuholt & Sæbø, 2018; Kyem, 2016; Sareen et al., 2013). The table below presents the methods used by citizens to access e-government services.

Table 5.40: Method used to access e-government services by government employees

Variable		Frequency	Per cent %
Means of accessing e-government	Mobile phone	119	52.9
	Home computer	86	38.2
	Tablet PC	18	8.0
	Community information centre	116	51.6

(Source: Primary data, 2020)

The results, given in Table 5.40, show that just over 50% of the respondents either use mobile phones or community information centres to access e-government services. The results suggest a significant penetration of mobile phones in Zimbabwe as well as the considerable deployment of community information centres. Similarly, in the view of many scholars, mobile phones and community information centres are the common means of accessing e-government in developing countries (Ayoung et al., 2016; Kyem, 2016; Ndinde & Kadodo, 2014; Ohemeng & Ofosu-Adarkwa, 2014).

5.4.6 Preparation of data for statistical analysis

According to Kwak and Kim (2017), quantitative data should be prepared for statistical analysis to enhance the statistical power of the findings. Following this notion, the study ensured that the following procedures were performed before statistical analysis:

5.4.6.1 Handling of missing values

In this study, missing values were handled in the design phase of the questionnaire surveys. Likewise, the Google forms were initiated with a "required" function in every question so that the responded could not answer the next question, except if the preceding one had been filled; hence, there were no missing values in this study.

5.4.6.2 Checking and removing outliers

Using the measure for multivariate outliers (Mahalanobis distance at $p \leq .001$) ten (10) data-sets with values equal to 0.001 or below were regarded as outliers and deleted accordingly. Thus, based on this measure, cases for analysis were reduced to 215. Also, it is important to note that the values regarded as outliers were checked against the original questionnaire to ascertain that the outliers were not determined erroneously before deletion.

5.4.6.3 Determining the suitability of data-set for factor analysis

To ensure that the data-set was suitable for factor analysis method, the study performed the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Barlett's Test of Sphericity (BTS). The KMO value is 0.836 (see Table 5.41), exceeding the minimum value of 0.6 (Hadia et al., 2016). Furthermore, the BTS was significant at $x^2 = 2087.914$, $p=0.000$; and therefore, factor analysis was statistically suitable for use.

Table 5.41: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.836
Bartlett's Test of Sphericity	Approx. Chi-Square	2087.914
	df	276
	Sig.	.000

(Source: Primary data, 2020)

5.4.6.4 Assessing multivariate normality, linearity and Homoscedasticity

Several studies have reported that data from large samples, particularly more than 200 should be tested for multivariate normality, linearity and Homoscedasticity (Ibiyemi et al., 2016; Oppong et al., 2016). The supposition of multivariate normality is fulfilled if each variable in a data-set is normally distributed around constant values relative to all other variables (Nimon, 2014). Linearity in data-set postulates that there is a straight-line association within variables; whereas, the assumption in Homoscedasticity is that the variance in scores for a single continuous variable is approximately similar in all indices to other continuous variables (*ibid*).

As shown in Figure 5.2, the standardised residuals were clustered along the line in the normal probability plot. This shows that the standardised residuals were normally distributed; hence, the assumption of multivariate normality was satisfied. Similarly, the u-shaped in Figure 5.3 and the random scatter in Figure 5.4 reveal that the assumptions of linearity and Homoscedasticity were fulfilled.

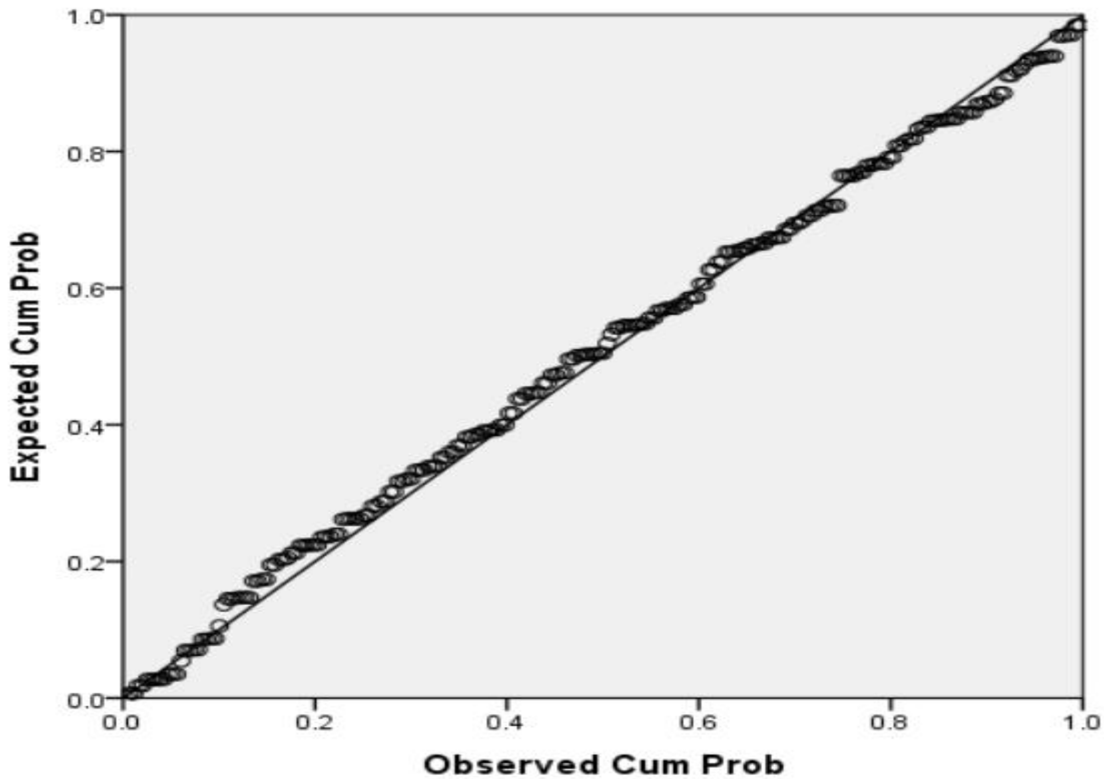


Figure 5.2: Normal Probability Plot of the Standardised Residuals

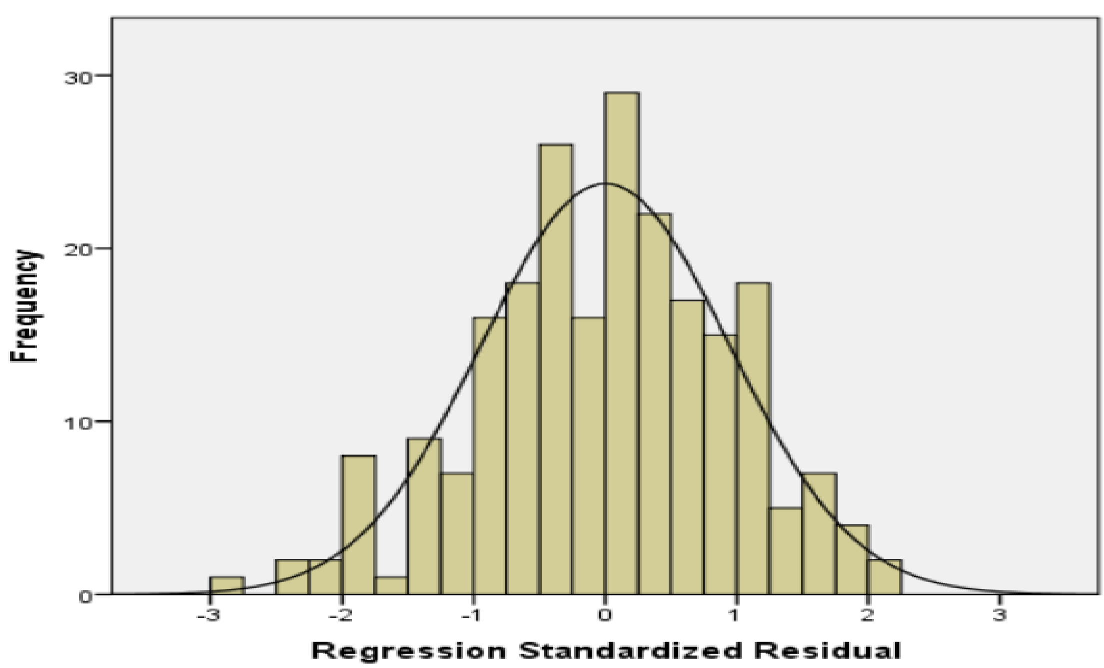


Figure 5.3: Histogram of the Standardised Residuals

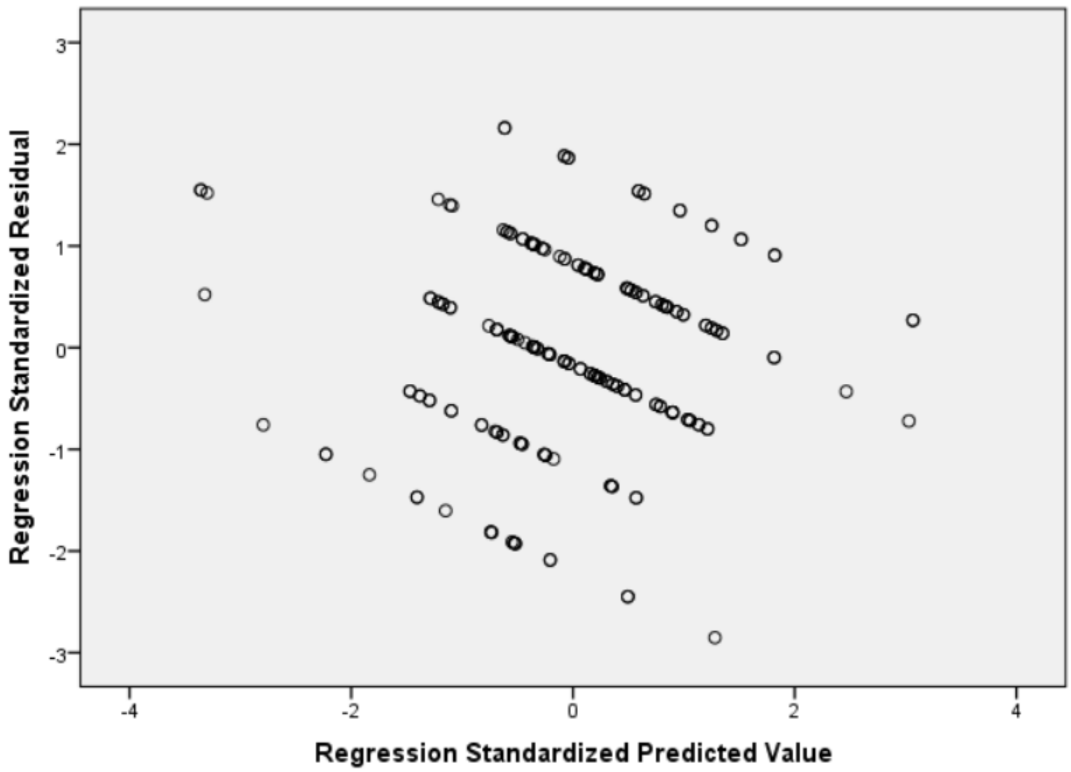


Figure 5.4: Scatter plot of the Standardised Residuals by the Standardised Predicted Values

5.4.7 Reliability test

The study conducted a reliability test to ascertain if items of the questionnaire survey constituted a reliable instrument in assessing e-government service gaps. The test statistics were based on the Cronbach's alpha (α) measure. The results are given in Table 5.42.

Table 5.42: Reliability test

Factor	Cronbach's Alpha
Infrastructure	
INF1	.893
INF2	.891
INF3	.886
INF4	.886
INF5	.884
Interoperability	
INT1	.887
INT2	.886
INT3	.887
INT4	.888
INT5	.885
Digital divide	
DIG DIV1	.885
DIG DIV2	.884

DIG DIV3	.886
DIG DIV4	.885
DIG DIV5	.888
Human factor	
HUM FACT1	.885
HUM FACT2	.886
HUM FACT3	.888
HUM FACT4	.886
HUM FACT5	.883
Policy	
POL1	.890
POL2	.886
POL3	.885
POL4	.883
POL5	.883
System functionality	
Responsiveness	.886
Flexibility	.888
Integration	.886
Ease of use	.885
Interactivity	.884
Reliability	.886
Intangibility	.883
Service delivery	
Efficiency	.884
Sufficiency	.886
Accessibility	.885
Accuracy	.886
Relevance	.886
Timeliness	.887
Transparency	.888
Service gaps	.885
Actual performance	.886
Expected performance	.885
User satisfaction	
Satisfaction	.888

(Source: Primary data, 2020)

Table 5.42 shows that the Cronbach's alpha coefficient of all the 25 items ranges between 0.883 and 0.893. According to Koo and Li (2016: 158), this demonstrates "good reliability since all the values are greater than 0.75". Thus, the research instrument, therefore, passed the reliability test and is deemed consistent and dependable in gathering valid data.

5.4.8 Bivariate analysis: determining the correlation of variables

A bivariate analysis was performed to ascertain if the relationship between three (3) demographic variables (gender, age and education) and two e-government usage factors (computer knowledge and internet proficiency) was not by chance.

5.4.8.1 Demographic variables and computer knowledge

The first bivariate analysis of the study was concerned with the correlation between demographic variables and computer knowledge. Table 5.43 shows the results of the bivariate analysis between demographic variables and computer knowledge.

Table 5.43: Correlation between demographic variables and computer knowledge

		Gender	Age	Education	Computer knowledge
Gender	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	215			
Age	Pearson Correlation	-.113	1		
	Sig. (2-tailed)	.092			
	N	215	215		
Education	Pearson Correlation	-.121	.511**	1	
	Sig. (2-tailed)	.069	.000		
	N	215	215	215	
Computer knowledge	Pearson Correlation	.749*	.752**	.190	1
	Sig. (2-tailed)	.026	.000	. 780	
	N	215	215	215	215
*. Correlation is significant at the 0.05 level (2-tailed).					
**. Correlation is significant at the 0.01 level (2-tailed).					

(Source: Primary data, 2020)

As can be seen in Table 5.43, there is a positive, linear relationship of strong strength between gender and computer knowledge ($r=.749^{*}$). The results were expected since various studies on computer literacy have reported a significant difference in computer knowledge between male and females; males tend to have more computer knowledge than females (Alakpodia, 2014; Gebhardt et al., 2019; Leach & Turner, 2015; Mahmood & Bokhari, 2012; Tella & Mutula, 2008; Zin et al., 2000). In the same vein, there is a positive, linear relationship of strong strength between age and computer knowledge ($r=.752^{**}$). Accordingly, studies in digital literacy reported that different age groups have different computer knowledge, with younger people possessing more knowledge than older people (Boot et al., 2015; Comber et al., 1997; Czaja & Sharit, 1998; Juhaňák et al., 2019; Park et al., 2016; Perry et al., 2003; Van Deursen et al., 2011). In terms of education and computer knowledge, the study reveals that there is no relationship between these two variables. Similarly, in reviewing the literature, no data was found on the relationship between education and computer knowledge. Therefore, it can be argued that people are likely to get computer knowledge irrespective of their level of education.

5.4.8.2 Demographic variables and internet proficiency

The second bivariate analysis of the study was concerned with the correlation between demographic variables and internet proficiency. The results are given in Table 5.44.

Table 5.44: Correlation between demographic variables and internet proficiency

		Gender	Age	Education	internet proficiency
Gender	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	215			
Age	Pearson Correlation	-.113	1		
	Sig. (2-tailed)	.092			
	N	215	215		
Education	Pearson Correlation	-.121	.511**	1	
	Sig. (2-tailed)	.069	.000		
	N	215	215	215	
internet proficiency	Pearson Correlation	.709**	. 714**	.047	1
	Sig. (2-tailed)	.000	.000	.479	
	N	215	215	215	215
**. Correlation is significant at the 0.01 level (2-tailed).					

(Source: Primary data, 2020)

Table 5.44 shows a positive, linear relationship of strong strength between gender and internet proficiency (r=.709**). This result was expected since various studies on digital skills have reported a significant difference in internet proficiency between males and females; males tend to have more internet proficiency than females (Ahmad et al., 2019; Colley & Comber, 2003; Dhillon & Laxmi, 2015; Kay, 2006; Kumar, 2017; Venkatesh et al., 2014). Furthermore, the table shows that there is a positive, linear relationship of strong strength (r=.714**) between age and internet proficiency. Similarly, studies on digital skills reported that there are age differences in digital skills (Niehaves & Plattfaut, 2014). Similarly, in reviewing the literature, no data was found on the relationship between education and internet proficiency. Thus, it can be concluded that the level of education has little or no bearing on ones’ internet proficiency.

5.4.9 Factors enhancing e-government service gaps

This section examines the factors that enhance e-government service gaps in the context of a developing country like Zimbabwe from the citizens' perspective. The descriptive statistics are given in Table 5.45.

Table 5.45: Factors enhancing e-government service gaps

Factor		N	Mean	Std. Deviation
Infrastructure				
INF1	Infrastructure is the foundation of e-government implementation.	215	4.418	.6772
INF2	The country still faces difficulties in the deployment of infrastructure due to lack of adequate resources.	215	4.302	.7241
INF3	Several citizens do not have access to electronically enabled government services.	215	4.307	.6609
INF4	Unreliable infrastructure can degrade the performance of e-government systems.	215	4.484	.6275
INF5	The lack of infrastructure has created a service gap in access to e-government services.	215	4.236	.6765
Interoperability		**N**	**Mean**	**Std. Deviation**
INT1	Interoperability is fundamental to the success of connected government.	215	4.320	.6910
INT2	There is a lack of information sharing among the systems designed to provide e-government services.	215	4.120	.6470
INT3	E-government services are provided in a fragmented manner.	215	4.022	.7702
INT4	Due to the lack of interoperability, some of the services are still provided through non-electronic means.	215	4.164	.7225
INT5	Lack of interoperability results in the loss of entirely reaping the prospective benefits of e-government.	215	4.409	.6422
Digital divide		**N**	**Mean**	**Std. Deviation**
DIG DIV1	Digital divide creates service gaps particularly in the utilisation of e-government services.	215	4.249	.5978
DIG DIV2	Digital divide reflects the lack of and/or limited access to electronic services by citizens.	215	4.142	.7054
DIG DIV3	Digital divide prevents citizens from using e-government services.	215	4.013	.7038
DIG DIV4	The digital divide is certainly the prohibiting factor in access to e-government services.	215	4.271	.6829
DIG DIV5	Digital divide makes it difficult for the effective utilisation of e-government systems.	215	4.013	.7054
Human factor		**N**	**Mean**	**Std. Deviation**
HUM FACT1	E-government cannot be successful utilised if citizens do not have adequate ICT skills.	215	4.276	.7037
HUM FACT2	E-government cannot successfully be deployed when there is a lack of ICT skills.	215	3.800	.7559
HUM FACT3	E-government cannot be successfully deployed when there is a lack of experience.	215	4.133	.6944
HUM FACT4	E-government cannot be successfully deployed when there is poor project management.	215	4.396	.6471
HUM FACT5	E-government cannot be successfully deployed when there is a lack of collaboration among stakeholders.	215	4.333	.6682
Policy		**N**	**Mean**	**Std. Deviation**
POL1	There is a slow pace of government reforms to promote the adoption and implementation of e-government.	215	4.196	.6594
POL2	The country lacks vision and strategy in the implementation of e-government.	215	3.996	.7647
POL3	The government agencies are reluctant to modify workflows that promote the adoption of e-government.	215	4.129	.7235
POL4	The lack of clearly defined e-government implementation policy results in a lack of standardisation.	215	4.160	.6690
POL5	Without a clear vision and strategy, the adoption and implementation of e-government will remain low.	215	4.218	.5760

(Source: Primary data, 2020)

As can be seen in Table 5.45, the mean scores for infrastructure range from 4.236 to 4.484; mean score values for interoperability range from 4.022 to 4.409; mean score values for digital divide range from 4.013 to 4.271; mean score values for human factor range from 3.800 to 4.396; and mean score values for policy range from 3.996 and 4.218. Accordingly, all the mean score values for the 25 items fall within the agreed scale (3.5 to 4.4). Thus, the descriptive statistics show that the respondents agreed that all the five factors investigated in this study enhance e-government service gaps in the context of a developing country. Accordingly, the highest mean values observed in each factor suggest that the citizens in the developing context are to some extent concerned about the following issues: performance of e-government systems; loss of prospective benefits of e-government; access to e-government services; successful deployment and implementation of e-government. As a result of these concerns, it can be concluded that citizens in the study context face a real problem in accessing e-government services and obtaining comprehensive services. The next section discusses the extraction of items that measures the five factors presented in Table 5.45.

5.4.10 Principal component analysis

The study used the PCA to examine and extract significant factors enhancing e-government service gaps in the context of a developing country for inclusion in the model. The results are given in Table 5.46.

Table 5.46: Loading of items that measure the factors enhancing e-government service gaps

	Initial	Extraction
INF1	.932	.833
INF2	.989	.724
INF3	.932	.796
INF4	.905	.630
INF5	.949	.796
INT1	.859	.778
INT2	.885	.612
INT3	.868	.586
INT4	.967	.711
INT5	.954	.599
DIG DIV1	.880	.629
DIG DIV2	.855	.736
DIG DIV3	.943	.618
DIG DIV4	.882	.462
DIG DIV5	.967	.711
HUM FACT1	.999	.648

HUM FACT2	.909	.614
HUM FACT3	.997	.614
HUM FACT4	.823	.578
HUM FACT5	.907	.696
POL1	.893	.728
POL2	.918	.519
POL3	.923	.829
POL4	.832	.590
POL5	.849	.622
Extraction Method: Principal Axis Factoring.		

(Source: Primary data, 2020)

Data from this table shows that all the 25 items that measure the factors enhancing e-government service gaps had factor values ranging from 0.462 to 0.833. The results show that all values were significantly above 0.40 which is the minimum acceptable value for factor loading (Matsunaga, 2010; Swisher et al., 2004; Xia et al., 2019). Therefore, no items were removed since they all represented the extracted dimensions.

5.4.11 Factor rotation

The study conducted factor rotation using the *Varimax* rotation method to determine the strength of correlation among the items (25 predictor variables of 5 main constructs) as well as the factors to be retained for further analysis (Chan & Idris, 2017; Hadia et al., 2016). Chan and Idris (2017) reported that factor loadings represent a degree in which the factor explains a variable in factor analysis. The results of the rotated component matrix loading of each item are given in Table 5.47.

Table 5.47: Rotated component matrix loading

Construct		Component				
		1	2	3	4	5
Infrastructure						
INF1	Infrastructure is the foundation of e-government implementation.	**.802**	-.022	.152	-.027	.131
INF2	The country still faces difficulties in the deployment of infrastructure due to lack of adequate resources.	**.735**	.194	.126	.033	-.047
INF3	Several citizens do not have access to electronically enabled government services.	**.783**	.218	.132	.175	-.027
INF4	Unreliable infrastructure can degrade the performance of e-government systems.	**.756**	-.029	.101	.250	.222
INF5	The lack of infrastructure has created a service gap in access to e-government services.	**.756**	.176	.169	.105	.064
Interoperability						
INT1	Interoperability is fundamental to the success of connected government.	.135	**.776**	.108	.180	.173
INT2	There is a lack of information sharing among the systems designed to provide e-government services.	.167	**.729**	.118	.220	.083
INT3	E-government services are provided in a fragmented manner.	.234	**.773**	.289	.093	.025
INT4	Due to the lack of interoperability, some of the services are still provided through non-electronic means.	.183	**.724**	.112	.105	.221
INT5	Lack of interoperability results in the loss of entirely reaping the prospective benefits of e-government.	.214	**.792**	.197	.143	.176
Digital divide						
DIG DIV1	Digital divide creates service gaps particularly in the utilisation of e-government services.	.229	.263	**.758**	.179	.158
DIG DIV2	Digital divide reflects the lack of and/or limited access to electronic services by citizens.	.095	.150	**.806**	-.006	.162
DIG DIV3	Digital divide prevents citizens from using e-government services.	-.036	.141	**.741**	.206	.102
DIG DIV4	The digital divide is certainly the prohibiting factor in access to e-government services.	.147	.157	**.786**	.275	.219
DIG DIV5	Digital divide makes it difficult for the effective utilisation of e-government systems.	.118	.220	**.783**	.118	.220
Human factor						
HUM FACT1	E-government cannot be successful utilised if citizens do not have adequate ICT skills.	.222	.139	.210	**.721**	.113
HUM FACT2	E-government cannot successfully be deployed when there is a lack of ICT skills.	.135	.128	.082	**.766**	-.084
HUM FACT3	E-government cannot be successfully deployed when there is a lack of experience.	.062	.108	.060	**.756**	.045
HUM FACT4	E-government cannot be successfully deployed when there is poor project management.	.093	.164	.183	**.703**	.122
HUM FACT5	E-government cannot be successfully deployed when there is a lack of collaboration among stakeholders.	.140	.173	.161	**.706**	.161
Policy						
POL1	There is a slow pace of government reforms to promote the adoption and implementation of e-government.	.163	-.080	.063	-.036	**.615**
POL2	The country lacks vision and strategy in the implementation of e-government.	.185	-.008	.118	.160	**.685**
POL3	The government agencies are reluctant to modify workflows that promote the adoption of e-government.	.193	.127	.222	.047	**.696**
POL4	The lack of clearly defined e-government implementation policy results in a lack of standardisation.	.173	.294	.051	.163	**.673**
POL5	Without a clear vision and strategy, the adoption and implementation of e-government will remain low.	.159	.173	.028	.177	**.659**
Extraction Method: Principal Axis Factoring. Rotation Method: Varimax with Kaiser Normalization.						
a. Rotation converged in 7 iterations.						

(Source: Primary data, 2020)

From the table, it can be seen that items are clustered according to the factors they seem to measure. Likewise, the rotated factor loadings show that the factors are desirable with at least five variables per factor that are above 0.5 as per acceptable levels (Maskey et al., 2018). This shows that the predictor variables measuring the same construct are highly and significantly correlated. Thus, since each factor loading on each item was more than 0.50, therefore, the factor analysis results satisfied the inferential analysis. Furthermore, it can be observed that the coefficient values of the construct differed across all components. For instance, infrastructure varied between 0.756 and 0.803. Nevertheless, it is important to note that item INF4 (unreliable infrastructure can degrade the performance of e-government systems) and INF5 (the lack of infrastructure has created a service gap in the access of e-government services) had similar coefficient values. This finding suggests that degradation in performance of an e-government system will eventually result in service gaps.

5.4.12 Dimensions for assessing e-government service gaps

The study also sought to determine dimensions for a multi-dimensional model in assessing e-government service gaps. Respondents were asked to indicate on the questionnaire the extent to which each element could measure e-government service gaps. A descriptive function in SPSS was used to compute the mean values and standard deviation for all items of dimensions that possibly constitute a multi-dimensional model for assessing e-government service gaps. The results of the descriptive statistics are given in Table 5.48.

Table 5.48: Dimensions of a multi-dimensional model for assessing e-government service gaps

Construct	N	Mean	Std. Deviation
System functionality			
Responsiveness	215	3.883	.5904
Flexibility	215	3.943	.5846
Integration	215	3.909	.5492
Ease of use	215	4.013	.6019
Interactivity	215	3.952	.5547
Reliability	215	3.948	.6454
Intangibility	215	3.870	.5290
Service delivery	**N**	**Mean**	**Std. Deviation**
Efficiency	215	3.939	.5251
Sufficiency	215	3.943	.5214
Accessibility	215	3.930	.6088

Accuracy	215	3.926	.5519
Relevance	215	3.996	.5723
Timeliness	215	3.974	.6123
Transparency	215	3.913	.6347
Service gaps	**N**	**Mean**	**Std. Deviation**
Actual performance	215	3.948	.5424
Expected performance	215	3.952	.5468
User satisfaction	**N**	**Mean**	**Std. Deviation**
Satisfaction	215	3.887	.6306

(Source: Primary data, 2020)

It can be seen from the data in Table 5.48 that the mean values of all the seventeen (17) dimensions for assessing e-government service gaps investigated in this study ranged from 3.85 to 4.40. Accordingly, the results indicate that all the responses were related to the great extent of the Likert scale (see Table 5.13). Furthermore, the standard deviations of all dimensions are clustered around 0.5 which suggests that the respondents had similar views about the extent to which each dimension could measure e-government service gaps (Barde, 2019). Interestingly, the following dimensions had high mean values (mean=4.40): responsiveness; ease of use, reliability, sufficiency; expected performance; and user satisfaction.

Likewise, this could suggest that these six (6) dimensions have a higher impact on assessing e-government service gaps compared to other elements. Thus, it can be concluded that business owners, managers and employees expect an e-government system to be responsive, easy to use, and reliable, provide sufficient services, meet their expectations and enhance their satisfaction. Nevertheless, it should be noted that the following had the least mean values (mean=3.85): intangibility, relevance and transparency. This could suggest that these three (3) dimensions have a moderate impact on the assessment of e-government service gaps.

5.4.13 Measuring correlation of the multi-dimensional constructs

To determine the relationship between multi-dimensional constructs for assessing e-government service gaps, the study conducted a correlation analysis. The results are presented in Table 5.49.

Table 5.49: Correlation matrix of multi-dimensional constructs

	System functionality	Service delivery	Service gaps	User satisfaction
System functionality	1			
Service delivery	. 830**	1		
Service gaps	.796**	.760**	1	
User satisfaction	.772**	.805**	.893**	1
**. Correlation is significant at the 0.01 level (2-tailed).				

(Source: Primary data, 2020)

As can be seen in Table 5.49, there is a positive, linear relationship of strong strength (r=.830**) between system functionally and service delivery. The same also applies to the constructs system functionality and service gaps, where there is a strength of the statistical association that corresponds to strong correlation (r=.796**). In the same vein, there is a positive, linear relationship of strong strength (r=.772**) between system functionally and user satisfaction. The same also applies to the constructs service delivery and service gaps where there is the strength of the statistical association that corresponds to strong correlation (r=.760**). Similarly, there is a positive linear relationship of strong strength (r=.805**) between service delivery and user satisfaction. The same also applies to the constructs service gaps and user satisfaction where there is a strength of the statistical association that corresponds to strong correlation (r=.893**). Likewise, it is interesting to note that the relationship between service gaps and user satisfaction was observed to have higher correlation compared to other constructs. Thus, this result suggests that e-government service gaps have a strong influence on user satisfaction.

5.5 Cross-case analysis: Convergence and divergence of views

The previous sections presented findings from each unit of analysis. The purpose of this section is to present cross-case analyses from quantitative findings. This analysis was merged with qualitative data in the discussion chapter.

5.5.1 Response rate and demographic profiles

This subsection compares the response rate and demographic profiles of the respondents among the three units of analysis. The comparative analysis is presented in Table 5.50.

Table 5.50: Comparative analysis of the response rate and demographic profiles

Item	Government	Business	Citizens
Response rate	75%	73%	73%
Gender			
Female	34.4%	29.5%	49.3%
Male	65.6%	70.5%	50.7%
Age			
Less than 40 years	54.4%	63%	84%
Above 40 years	43.6%	37%	16%
Education			
Diploma	12.2%	14.7%	5.3%
First Degree	34.4%	18.9%	50.2%
Masters	53.3%	66.3%	36.9%
PhD	-	-	3.6%

(Source: Primary data, 2020)

As can be seen in Table 5.50, government stratum had a high response rate (75%) compare to business (73%) and citizens (73%). This could be attributed to the fact that government employees have more access to the internet; hence, they found it easy to respond to the online survey. In terms of gender, citizen stratum had more females (49.3%) compared to other strata. This result was expected since the general population from which the sample for citizens was drawn has for females. Nevertheless, in terms of males, the business stratum had more males (70.5%) compared to the other strata; thus suggesting the dominance of males in the business community. Age-wise, more citizens (84%) were below the age of forty years, implying that the majority of the population are youths. In terms of education, more business people in the study (66.3%) had attained a Master's Degree. However, the findings show that only the citizens' stratum had respondents with Doctoral qualification. Nonetheless, this does not imply that government employees and business people do not have Doctoral qualification.

5.5.2 Computer knowledge, internet proficiency and e-government experience

This subsection presents a comparative analysis for computer knowledge, internet proficiency and e-government experience. Table 5.51 presents comparative data from the three cases.

Table 5.51: Comparative data from the three cases

Item	Government	Business	Citizens
Computer knowledge	**%**	**%**	**%**
Moderate	14.4	8.4	8.0
Good	26.7	35.8	27.1
Very good	58.9	55.8	64.9
Internet proficiency	**%**	**%**	**%**
Fair	10.0	-	-
Good	16.7	16.8	12.4
Very good	17.8	38.9	39.1
Excellent	55.6	44.2	48.4

(Source: Primary data, 2020)

Table 5.51 shows that the citizen stratum had very good computer knowledge (64.9%) compared to government and business strata. Also, the findings show that government employees had excellent internet proficiency (55.6%) compared to other strata. This could be attributed to the fact that government employees have more access to the internet; as a result, their know-how on the use of the internet was expected to be high compared to business and citizen layers.

5.5.3 Factors enhancing e-government service gaps

This subsection presents a comparative analysis among the three cases on factors enhancing e-government service gaps. The summary of the data is presented in Table 5.52.

Table: 5.52: A comparative analysis of factors enhancing e-government service gaps

Factor		Government	Business	Citizens
Infrastructure		**Mean**	**Mean**	**Mean**
INF1	Infrastructure is the foundation of e-government implementation.	4.344	4.284	4.418
INF2	The country still faces difficulties in the deployment of infrastructure due to lack of adequate resources.	4.233	4.221	4.302
INF3	Several citizens do not have access to electronically enabled government services.	4.311	4.179	4.307
INF4	Unreliable infrastructure can degrade the performance of e-government systems.	4.433	4.021	4.484
INF5	The lack of infrastructure has created a service gap in access to e-government services.	4.311	4.453	4.236
Interoperability		**Mean**	**Mean**	**Mean**
INT1	Interoperability is fundamental to the success of connected government.	4.411	4.358	4.320
INT2	There is a lack of information sharing among the systems designed to provide e-government services.	4.100	4.021	4.120
INT3	E-government services are provided in a fragmented manner.	4.200	4.116	4.022
INT4	Due to the lack of interoperability, some of the services are still provided through non-electronic means.	4.067	4.168	4.164
INT5	Lack of interoperability results in the loss of entirely reaping the prospective benefits of e-government.	4.044	4.305	4.409
Digital divide		**Mean**	**Mean**	**Mean**
DIG DIV1	Digital divide creates service gaps particularly in the utilisation of e-government services.	4.456	4.263	4.249
DIG DIV2	Digital divide reflects the lack of and/or limited access to electronic services by citizens.	4.333	4.295	4.142
DIG DIV3	Digital divide prevents citizens from using e-government services.	4.056	4.042	4.013
DIG DIV4	The digital divide is certainly the prohibiting factor in access to e-government services.	4.044	4.063	4.271
DIG DIV5	Digital divide makes it difficult for the effective utilisation of e-government systems.	4.133	4.200	4.013
Human factor		**Mean**	**Mean**	**Mean**
HUM FACT1	E-government cannot be successful utilised if citizens do not have adequate ICT skills.	4.189	4.032	4.276
HUM FACT2	E-government cannot successfully be deployed when there is a lack of ICT skills.	3.789	3.926	3.800
HUM FACT3	E-government cannot be successfully deployed when there is a lack of experience.	4.022	4.074	4.133
HUM FACT4	E-government cannot be successfully deployed when there is poor project management.	4.122	4.318	4.396
HUM FACT5	E-government cannot be successfully deployed when there is a lack of collaboration among stakeholders.	4.311	4.316	4.333
Policy		**Mean**	**Mean**	**Mean**
POL1	There is a slow pace of government reforms to promote the adoption and implementation of e-government.	4.167	4.200	4.196
POL2	The country lacks vision and strategy in the implementation of e-government.	4.044	4.389	3.996
POL3	The government agencies are reluctant to modify workflows that promote the adoption of e-government.	3.989	4.242	4.129
POL4	The lack of clearly defined e-government implementation policy results in a lack of standardisation.	4.244	4.232	4.160
POL5	Without a clear vision and strategy, the adoption and implementation of e-government will remain low.	4.278	4.358	4.218

(Source: Primary data, 2020)

Table 5.52, shows that the mean values for all the items measuring infrastructure were clustered around 4, which means that all the cases had similar views about the items scoping the infrastructure factor. However, the analysis of items under infrastructure shows that items INF1 (Infrastructure is the foundation of e-government implementation); INF2 (The country still faces difficulties in the deployment of infrastructure due to lack of adequate resources) and INF4 (Unreliable infrastructure can degrade the performance of e-government systems) were rated high by citizens. This finding suggests that the implementation and performance of e-government largely depend on reliable infrastructure.

Nevertheless, the citizens seem to be concerned about the difficulties facing the country in the deployment of infrastructure which is expected to support the implementation of e-government. Furthermore, the lack of access to e-government services (item INF3) was highly acknowledged by government employees (mean = 4.311). This finding was interesting since the researcher expected citizens to be concerned about lack of access o e-government than other strata. In addition, the business highly acknowledged that lack of infrastructure results in e-government service gaps (mean=4.453).

Similarly, in terms of interoperability, all the five items were clustered around 4, which signify that all the three cases had similar opinions on the items measuring the interoperability factor. However, it should be noted that government employees highly acknowledge that interoperability is fundamental to the success of connected government (mean = 4.411) while noting that e-government services are provided in a fragmented manner (mean = 4.200). This shows that government employees in reality understand that the successful implementation and usage of e-government systems is achievable when these systems are interoperable. On the other hand, item INT5 (lack of interoperability results in the loss of entirely reaping the prospective benefits of e-government) was highly acknowledged by citizens (mean=4.409). Accordingly, it can be observed that lack of interoperability deprives citizens in realising the benefits of e-government services.

In terms of the digital divide, all the five items were clustered around 4, which demonstrate all the three cases had similar views on items measuring the digital divide. Further analysis shows that government employees highly acknowledged that the digital divide creates service gaps in the utilisation of e-government services (mean = 4.456). Besides, government employees acknowledged that digital divide reflects the lack of and/or limited access to electronic services by citizens (mean = 4.333). However, this element was highly expected by the citizens. The item DIG DIV5 (Digital divide makes it difficult for the effective utilisation of e-government systems) was highly acknowledged by business people (mean = 4.200).

In terms of the human factor, the findings in Table 5.58 shows that the mean values for the item HUM FACT 2 (E-government cannot successfully be deployed when there is lack of ICT skills) were clustered around 3 across cases. This finding suggests that the deployment of e-government does not entirely depend on ICT skills. There was no significant difference among the three cases on the statement that *"e-government cannot be successfully deployed when there is a lack of collaboration among stakeholders"* since the mean values ranged between 3.789 and 3.800. In terms of business, business people seem to be highly concerned by the fact that *"There is a slow pace of government reforms to promote the adoption and implementation of e-government"* (mean =4.200).

Also, government employees were highly concerned about the lack of clearly defined e-government implementation policy, which results in a lack of standardisation (mean=). It should be noted that government employees did not highly agreed with the statement that *"The government agencies are reluctant to modify workflows that promote the adoption of e-government"* (mean = 3.989). Likewise, negatively worded items for self-assessment tend to receive a low rating. Hence, it was not surprising to observe the same results.

5.5.4 Dimensions for assessing e-government service gaps

This subsection presents a comparative analysis of findings on dimensions for assessing e-government service gaps across cases (see Table 5.53).

Table 5.53: Comparative data across cases

Construct	Government	Business	Citizens
System functionality	**Mean**	**Mean**	**Mean**
Responsiveness	4.42	4.40	3.883
Flexibility	4.02	4.09	3.943
Integration	4.13	4.11	3.909
Ease of use	4.44	4.40	4.013
Interactivity	4.05	4.12	3.952
Reliability	4.44	4.15	3.948
Intangibility	4.00	3.85	3.870
Service delivery	**Mean**	**Mean**	**Mean**
Efficiency	4.42	4.25	3.939
Sufficiency	4.44	4.40	3.943
Accessibility	4.16	4.15	3.930
Accuracy	4.00	4.19	3.926
Relevance	4.06	3.85	3.996
Timeliness	4.09	4.08	3.974
Transparency	4.01	3.85	3.913
Service gaps	**Mean**	**Mean**	**Mean**
Actual performance	4.42	4.12	3.948
Expected performance	4.44	4.40	3.952
User satisfaction	**Mean**	**Mean**	**Mean**
Satisfaction	4.39	4.40	3.887

(Source: Primary data, 2020)

As shown in Table 5.53, the mean values for the dimensions across cases were different. All the mean values from the government employees and citizens were clustered around 4 and 3 respectively except ease of use. According to the government perspective, the finding suggests that the entire constructs and their dimensions adequately measure e-government service gaps. Responsiveness was highly rated by the business people (mean = 4.40), suggesting that this stratum expected a system that responds to their requests timeliness. Furthermore, both ease of use and reliability were highly rated by the government employees (mean = 4.44); thus, this stratum expected an e-government system that is user-friendliness and dependable. However, intangibility, relevance, transparency were lowly rated by the business stratum; implying that in the business perspective these components have less impact in measuring e-government service gaps. Nevertheless, despite the differences in mean values, ease of use had mean values clustered around 4 across cases. This suggests that ease of use was a common attribute across cases; thus, government employees, business people and citizens all expect a user-friendly e-government system.

5.5.5 Factor loading across cases

As can be seen in Table 5.54, all items under the infrastructure loaded above 0.70 across cases (.724 to .884). However, it should be noted that more items under the government and business strata loaded above 0.8 compared to the citizen stratum. A likely explanation is that these higher factor loadings are a result of a better understanding of the impact of infrastructure on e-government implementation among government and business employees. In the same vein, all the items under the interoperability factor loaded above 0.70 across cases (0.70 to 0.875). Still, more items in the government and business strata loaded above 0.8 compared to the citizen stratum. These higher factor loadings are likely a result of a better understanding of the influence of interoperability on e-government adoption among government and business employees. Furthermore, it can be observed that factor loadings for the policy construct clustered around 0.60 from the citizen stratum and was the least compared to other strata. It could be that citizens are not acquainted with how the policy constructs influence the implementation of e-government.

Table 5.54: Factor loadings across the cases-a comparative analysis

Construct/factor		Government	Business	Citizens
Infrastructure				
INF1	Infrastructure is the foundation of e-government implementation.	.863	.808	.802
INF2	The country still faces difficulties in the deployment of infrastructure due to lack of adequate resources.	.724	.831	.735
INF3	Several citizens do not have access to electronically enabled government services.	.881	.728	.783
INF4	Unreliable infrastructure can degrade the performance of e-government systems.	.829	.814	.756
INF5	The lack of infrastructure has created a service gap in access to e-government services.	.884	.834	.756
Interoperability				
INT1	Interoperability is fundamental to the success of connected government.	.873	.794	.776
INT2	There is a lack of information sharing among the systems designed to provide e-government services.	.865	.802	.729
INT3	E-government services are provided in a fragmented manner.	.855	.847	.773
INT4	Due to the lack of interoperability, some of the services are still provided through non-electronic means.	.875	.817	.724
INT5	Lack of interoperability results in the loss of entirely reaping the prospective benefits of e-government.	.750	.700	.792
Digital divide				
DIG DIV1	Digital divide creates service gaps particularly in the utilisation of e-government services.	.881	.800	.758
DIG DIV2	Digital divide reflects the lack of and/or limited access to electronic services by citizens.	.846	.797	.806
DIG DIV3	Digital divide prevents citizens from using e-government services.	.851	.822	.741
DIG DIV4	The digital divide is certainly the prohibiting factor in access to e-government services.	.813	.835	.786
DIG DIV5	Digital divide makes it difficult for the effective utilisation of e-government systems.	.822	.800	.783
Human factor				
HUM FACT1	E-government cannot be successful utilised if citizens do not have adequate ICT skills.	.733	.814	.721
HUM FACT2	E-government cannot successfully be deployed when there is a lack of ICT skills.	.723	.784	.766
HUM FACT3	E-government cannot be successfully deployed when there is a lack of experience.	.884	.817	.756
HUM FACT4	E-government cannot be successfully deployed when there is poor project management.	.724	.869	.703
HUM FACT5	E-government cannot be successfully deployed when there is a lack of collaboration among stakeholders.	.803	.823	.706
Policy				
POL1	There is a slow pace of government reforms to promote the adoption and implementation of e-government.	.859	.858	.615
POL2	The country lacks vision and strategy in the implementation of e-government.	.872	.808	.685
POL3	The government agencies are reluctant to modify workflows that promote the adoption of e-government.	.800	.802	.696
POL4	The lack of clearly defined e-government implementation policy results in a lack of standardisation.	.851	.879	.673
POL5	Without a clear vision and strategy, the adoption and implementation of e-government will remain low.	.793	.789	.659

(Source: Primary data, 2020)

5.6 Statistical inference to explain causal mechanism

Critical realists postulate that events do not happen by chance (Dalkin et al., 2015; Hedström, 2008; Mingers, 2017); hence, they are interested in explaining the causal mechanisms that generate those events. Thus, in critical realism research, data analysis should go beyond descriptive statistics and correlation analysis (Danermark, 2019; Mingers et al., 2013; Sorrell, 2018). In fact, according to Mingers et al. (2013: 800), "descriptive [statistics] and correlations between variables alone cannot uncover evidence regarding causal mechanisms that generate actual events observed, or predict future incidents". Hence, this section presents statistical inferences to explain the causal mechanisms in e-government service gaps based on regression analysis.

Generally, regression analysis can be defined as a statistical procedure that explores the relationship between several independent (predictor) variables and a single dependent variable (Gefen et al., 2000; Sangmook Kim, 2017). This study carried out three blocks of regression analysis and each block was analysed in terms of its contribution to the development of the model. Furthermore, block analysis was influenced by the multi-dimensional nature of the model. In addition, three procedures were performed within each block as follows: "observing regularity; offering a hypothetical causal mechanism to explain regularity; and isolating the mechanism itself" (Ron, 2002: 133).

5.6.1 Explaining the extent to which factors under investigation enhance e-government service gaps in a developing context

This subsection concerns the analysis of the extent to which infrastructure, interoperability, digital divide, human factor and policy enhance e-government service gaps in the context of a developing country. The results of the regression analysis are presented in Table 5.55.

Table 5.55: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Sig
1	.857[a]	.674	.665	1.637	.000
a. Predictors: (Constant), Infrastructure, Interoperability, Digital divide, Human factor, Policy					

(Source: Primary data, 2020)

It can be seen from the data in Table 5.55 that the regression analysis generated R and R-Square values of 0.857 and 0.674 respectively. The R-value of 85.7% indicates a good level of prediction while R^2 of 67% shows a significant explanatory power of the model. The remaining 32.6% of the variations can be explained by other factors not worked in the regression model by using research methods other than the questionnaire survey. This provides evidence on the existence of other factors that influences e-government service gaps in developing context. Table 5.56 presents the regression coefficients to isolate the causal powers:

Table 5.56: Coefficients to isolate the causal powers

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.674	1.637		12.116	.000
	Infrastructure	-.643	.120	-.685	-5.271	.000
	Interoperability	-.639	.125	-.659	-4.104	.000
	Digital divide	.617	.126	.632	2.517	.000
	Human factor	-.690	.132	-.620	-3.728	.000
	Policy	-.558	.125	-.562	-2.462	.000
a. Dependent Variable: Service gaps						

(Source: Primary data, 2020)

Table 5.56 shows that all the predictors (independent variables) were found to be significant. From the table, it can be seen that all factors are significant at p=0.000 with negative coefficients values indicating that lack of infrastructure, interoperability, digitisation, human capacity and clear policy direction in implementing e-government will result in e-government service gaps. Notably, the most significant factor to enhance e-government service gaps is infrastructure with a beta weight of (β =-0.685), closely followed by interoperability (β = -0.659) and the digital divide (β= 0.620), whereas human factor and policy had beta values (β -.612) and (β -.562) respectively. Nevertheless, it should be noted that the digital divide is the only factor with a positive value since its influence moves in the opposite direction with other constructs.

5.6.2 Explaining the extent to which measurement elements determine e-government service gaps

Whereas the study investigated the factors enhancing e-government service gaps, it was also important to determine the elements that could measure these gaps. Thus, this subsection concerns the analysis of the extent to which measurement elements determine e-government service gaps. The results of the regression analysis are presented in Table 5.57.

Table 5.57: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Sig
1	.828[a]	.685	.671	.344	.000
a. Predictors: (Constant), Expected performance, Responsiveness, Ease of use, Intangibility, Integration, Accessibility, Reliability, Flexibility, Transparency, Interactivity, Actual performance, Sufficiency, Efficiency, Accuracy, Relevance, Timeliness					

(Source: Primary data, 2020)

It can be seen from the data in Table 5.57 that 68.5% (R^2= .685) of variations in dimensions measuring e-government service gaps are explained by 16 constructs. The remaining 31.5% is explained by other dimensions not determined in the regression model by using research methods other than the questionnaire. Therefore, these must be determined during interviews and expert review. Table 5.58 presents the regression coefficients to isolate the causal powers:

Table 5.58: Regression coefficients results

Model		Unstandardised Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.680	.163		.660	.000
	Responsiveness	.696	.052	.695	12.271	.000
	Flexibility	.581	.054	.572	10.012	.000
	Integration	.687	.057	.665	11.201	.000
	Ease of use	.721	.059	.774	12.324	.000
	Interactivity	.518	.051	.508	9.271	.000
	Reliability	.532	.056	.524	9.012	.000
	Intangibility	.328	.050	.305	8.271	.000
	Efficiency	.640	.060	.624	8.342	.000
	Sufficiency	.691	.058	.660	12.169	.000
	Accessibility	.669	.053	.667	9.307	.000
	Accuracy	.678	.059	.663	9.005	.000
	Relevance	.313	.060	.307	7.307	.000
	Timeliness	.371	.057	.367	2.990	.000

	Transparency	.312	.052	.302	2.170	.000
	Actual performance	.695	.055	.686	12.726	.000
	Expected performance	.694	.058	.667	12.025	.000
a. Dependent Variable: Service gaps						

(Source: Primary data, 2020)

Table 5.58 shows that all the predictors (independent variables) were found to be significant. From the table, it can be seen that all measurement elements are significant at p=0.000 with positive coefficients values indicating that the elements could be acceptably used to measure e-government service gaps in the proposed multi-dimensional model. However, it is important to note that the most significant measurement element was the ease of use with a beta weight of (β = 0.774), followed by responsiveness (β = 0.695) and actual performance (β = 0.686). This shows that these elements have a great influence on measuring service e-government gaps. On the other hand, the beta weights for intangibility, relevance, timeliness and transparency ranged between β =0.312 and β = 0.371. This finding suggested that these four dimensions have little influence in measuring e-government service gaps.

5.6.3 Explaining the extent to which e-government service gaps influence user satisfaction

This subsection concerns the analysis of the extent to which e-government service gaps influence user satisfaction. The results of the regression analysis are presented in Table 5.59.

Table 5.59: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Sig
1	.761[a]	.580	.577	.390	0.000
a. Predictors: (Constant), Expected performance , Actual performance					

(Source: Primary data, 2020)

It can be seen from the data in Table 5.9 that R and R-Square values of 0.761 and 0.580, respectively, were generated from the regression analysis. The results indicate a good level of prediction of the model and significant explanatory power of 58.0%. The remaining 42% of the variations could be explained by other factors not exploited in the regression analysis model. Table 5.59 presents the regression coefficients to isolate the causal powers:

Table 5.60: Coefficients

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.355	.157		8.262	.004
	Actual performance	.680	.052	.705	10.271	.000
	Expected performance	.621	.052	.674	10.012	.000
a. Dependent Variable: User satisfaction						

(Source: Primary data, 2020)

Table 5.60 shows that the two (2) predictors (independent variables) were found to be significant. From the table, it can be seen that both factors are significant at p=0.000 with positive coefficients values indicating that an improvement in system performance will improve user satisfaction. The results were somehow expected. However, it is important to note that the most significant factor is the actual performance with a beta weight of (β =0.680); thus, it can be concluded that actual performance of e-government significantly influences user satisfaction. Hence, these factors should be part of the elements for assessing e-government service gaps.

5.7 Theoretical modelling using results from regression analysis

This section presents a theoretical model based on the results from the regression analysis showed in Tables 5.61. Standardised coefficients and their respective significant values were used for modelling the path of the conceptual model presented in Figure 5.5.

Table 5.61: Regression analysis results

Dependent variable	R^2	Independent variable	S.E. (b)	B (Standardised Coefficients)	t-statistic	Significant level
EP	.264	SF	.040	.614	12.165	.000
AP	.314	SF	.038	.660	13.722	.000
EP	.395	SD	.038	.629	16.403	.000
AP	.385	SD	.035	.620	16.055	.000
SF	.358	FESG	.245	.651	14.470	.000
SD	.345	FESG	.040	.642	13.722	.000
EP	.341	FESG	.045	.616	13.722	.000
AP	.290	FESG	.041	.629	13.722	.000
ESG	.685	AP	.055	.686	12.726	.000
ESG	.685	EP	.058	.667	12.025	.000

US	.580	AP	.052	.705	10.271	.000
US	.580	EP	.052	.674	10.012	.000

(Source: Primary data, 2020)

NB: EP= Expected performance of e-government system; AP= Actual performance of e-government system; FESG=Factors enhancing e-government service gaps; SD=Service Delivery; SF=System Functionality; ESG= E-government Service Gaps; US= User Satisfaction

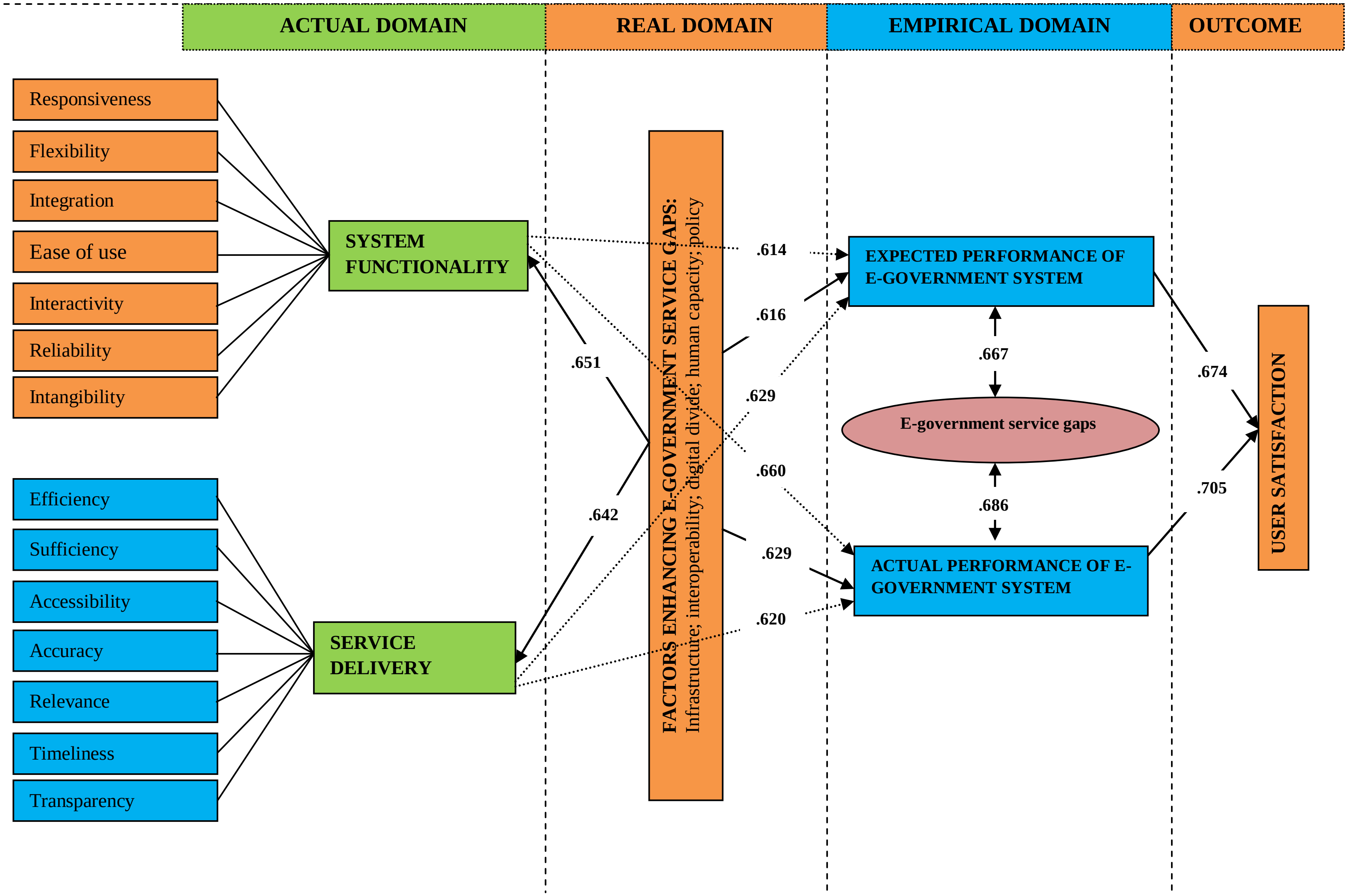


Figure 5.5: Modelling the path of a conceptual model for assessing e-government service gaps based on regression results in Table 5.61

The theoretical model in Figure 5.5 shows a path for modelling a conceptual model for assessing e-government service gaps based on regression results and the relationship among the constructs. Unidirectional causal mechanism relationships are shown by single-headed arrows either solid or dotted whereas; bi-directional causal mechanism relationships are represented by double-headed arrows. Essentially, the causal mechanisms for a model for assessing e-government service gaps are as follows:

a) Factors enhancing e-government service gaps have a causal mechanism relationship to system functionality (sig. =0.651); service delivery (sig. =0.624); expected performance of e-government (sig. = 0.616); and actual performance (sig. =0.629).
b) System functionality has causal mechanism relationships to actual performance and expected performance with significant values of (sig. =0.660) and (sig. =0.614) respectively.
c) Service delivery has causal mechanism relationships to actual performance and expected performance with significant values of (sig. =0.620) and (sig. =0.629) respectively.
d) Actual performance has a causal mechanism relationship to user satisfaction (sig. =0.705).
e) Expected performance has a causal mechanism relationship to user satisfaction (sig. =0.674).

5.8 Chapter summary

This chapter presented and interpreted the data that was collected from government employees, businesses and citizens using the quantitative method (online questionnaire survey). The chapter also provided the response rates, demographic characteristics, the reliability of the questionnaire designed to solicit the factors enhancing e-government service gaps and dimensions for measuring e-government service gaps. Furthermore, the chapter performed the following statistical analysis: single-factor test; Kolmogorov-Smirnov and Shapiro-Wilk Test; Kaiser-Meyer-Olkin (KMO) and Barlett’s Test of Sphericity; Cronbach’s alpha (α) measure; bivariate analysis; descriptive statistics; principal component analysis; and regression analysis. The next chapter presents qualitative findings from the case study.

CHAPTER SIX

QUALITATIVE FINDINGS

> "The use of quantitative methods in isolation does not allow researchers to get as close phenomena as those adopting qualitative case study research" (Bennett & Elman, 2006). "Hence, the marriage of qualitative methods and critical realism provides an in-depth understanding of phenomena" (Mingers et al., 2013).

6.1 Introduction

The previous chapter presented and analysed quantitative data from the questionnaire survey. However, since quantitative analysis could not explain fully the causal mechanisms enhancing e-government service gaps, it was necessary to conduct interviews to gain an in-depth understanding of the phenomenon as well as identify the complex mechanisms of the case study. Therefore, after completing quantitative data analysis, a qualitative study was conducted using semi-structured in-depth interviews.

This chapter represents the second stage of the sequential multi-methodology design. The phase used a qualitative research method to gain an in-depth understanding of the phenomenon as well as confirm and extend the findings of the quantitative survey presented in Chapter Five. In reporting the findings, the study maintained the original stratum (units of analysis) in the use of e-government services. The findings are structured according to the three units of analysis: government, business and citizens which are also the primary stakeholders in Zimbabwe's e-government. Figure 6.1 shows the outline of the chapter.

Figure 6.1: Chapter outline

6.2 Reporting findings from the government stratum

This section reports the factors enhancing e-government service gaps in Zimbabwe from the government stratum. The themes derived from government stratum using semi-auto coding in Atlas.ti7.5 are presented in Table 6.1. The use of semi-auto coding ensured that the researcher controlled the coding process through the "Confirm always" function.

Table 6.1: Codes generated from government stratum

Super code	Code family	Number of raw codes related to code family
Lack of requisite infrastructure	Lack of robust ICT infrastructure	16
	Lack of government-owned infrastructure	18
	Lack of electricity infrastructure	8
Total codes		**42**
Lack of interoperability	Lack of compatibility of devices	2
	Systems operate independently	9
	Lack of compatible infrastructure	4
Total codes		**15**
Lack of access	Lack of access to the internet	14
	Lack of access to e-government services	3
	Lack of access to computing devices	7
Total codes		**24**
Lack of e-government funding	Lack of financial support	9
	Funding dilemma	8
Total codes		**17**
Budget disparity	Overburdened budgets	6
	Budget politics	7
Total codes		**13**
Lack of the desire to support and coordinate e-government	Lack of coordination	4
	Lack of top management support	7
Total codes		**11**
Policy inconsistency	Rhetoric policy	8
	Unclearly defined policy	5
Total codes		**13**
The overall number of codes		**135**

(Source: Primary data, 2020)

It can be seen from Table 6.1 that a total of 135 raw codes were categorised into 20 code families and seven (7) super codes. The codes were generated from 13 government employees who are designers, implementers and users of e-government. The findings show that lack of infrastructure had the highest total number of raw codes (42), followed by lack of access (24) and lack of e-government funding (17). This suggests that these three factors have more impact on the design, deployment and utilisation of e-government. The following sub-sections present the explanations of the factors enhancing e-government service gaps derived from government employees:

6.2.1 Lack of requisite infrastructure

Three sub-themes shown in Table 6.1 as code families were identified under the factor (theme) lack of requisite infrastructure. These include lack of robust ICT infrastructure; lack of government-owned infrastructure; lack of connectivity; and lack of electricity infrastructure. However, it should be noted that lack of government-owned infrastructure had the highest number of raw codes (18), followed by lack of robust ICT infrastructure (16) and lack of electricity infrastructure (8). Thus, the findings suggest that lack of government-owned infrastructure and lack of robust ICT infrastructure are the major contributors of e-government service gaps under the factor lack of requisite infrastructure. Nevertheless, this does not disregard the effect of the lack of electricity supply in the delivery of e-government services. The three sub-themes were developed from some of the following quotations:

> *"The lack of government-owned infrastructure is not good for the performance of e-government and has led to many end-users ditching these schemes and opting for manual ways of doing things which is expensive"* [Govt employee 8]. *"Oh, I would say that the absence of robust ICT infrastructure inhibits the government to roll out e-government projects country-wide"* [Govt employee 3]. *"The infrastructure that has been regarded as obsolete in other countries, for example, copper, 2G and Wimax are being donated to Zimbabwe, of which it would not work as expected"* [Govt employee 4]. *"In cases where the government has the infrastructure, it is dilapidated and not able to match the needs of the modern-day e-government service provision such that due to large traffic they glitch and crush"* [Govt employee 6]. *"This infrastructure has not been improved for the past two (2) decades for it to support a seamless service* [Govt employee 9]. "*While our provincial and district offices are inter-connected and can interface on a real-time basis, all sub-offices except a few do not have access to the internet. This is a great challenge in terms of service delivery as the sub-offices cannot give the same service as other sister offices"* [Govt employee 12]. *"Power supply availability is a challenge in Zimbabwe; most places do not have a reliable power supply infrastructure for offices. For instance, places like rural Binga, Mutoko,*

and Guruve just to mention a few are not adequately covered with electricity networks; this makes it difficult to provide e-government services" [Govt employee 13].

From the narratives presented above, it can be observed that government employees are concerned with the lack of government-owned infrastructure because relying largely on infrastructure from the private players becomes expensive and unaffordable for the government to sustainably run e-government schemes. Therefore, in the absence of government-owned infrastructure, it becomes difficult for a country to implement sustainable e-government projects country-wide. In the same vein, government employees noted with great concern the lack of robust ICT infrastructure in the country. Accordingly, a robust ICT infrastructure provides for rapid deployment of e-government projects; hence, any inadequacies will negatively affect the successful implementation of these projects. Again, the government employees were concerned with the lack of electricity infrastructure which could inhibit the continuous delivery of e-government services. Without a stable electric power supply, e-government systems cannot run smoothly; user satisfaction is likely to be minified since the system might tend to be ordinarily offline. Thus, it follows that inadequate or lack of infrastructure will hinder the implementation of e-government.

6.2.2 Lack of interoperability

Interoperability is one of the issues within the e-government domain that need to be managed by any government intending to derive added value from e-government initiatives. Without interoperability, MDAs that support each other will find it difficult to share critical data and information. In this study, the participants reported that MDAs usually deploy e-services without considering the need for e-government interoperability, resulting in the existence of service gaps. The code families identified under the lack of interoperability theme are lack of compatibility of devices; systems operate independently; and lack of compatible infrastructure. The sub-theme systems operate independently had the highest raw codes (9), followed by lack of compatible infrastructure (4) raw codes and lack of compatibility of devices with two raw codes. These sub-themes were derived from some of the following excerpts:

"This scenario is prevalent even in systems domiciled within the same ministry. There is silo mentality in systems development, every MDA is concerned with the services it offers; hence, ignoring the need for interoperability" [Govt employee 8]. *"In Zimbabwe, there are many different systems operated in MDAs that do not talk to each other. For instance, there is SAP for accounting and many other specialists' systems for different functional areas like Human resources, procurement etc. and all these are not interoperable"* [Govt employee 6]. "*Interoperability is lacking in e-government systems as most systems exist in 'silos'. The same data is requested more than once in the same government offices, which should be availed by a click of a button (as one-stop-shop), rather than being a repetitive process within the same government"* [Govt employee 7]. *"Every government department has its system which is not integrated with other departments; thereby, creating e-government service gaps"* [Govt employee 13]. *"The implementation of e-government in Zimbabwe faces some technological difficulties. These include, but are not limited to, the lack of shared standards and compatible infrastructure among MDAs"* [Govt employee 5]. *"You will agree with me that departments often operate in silos with each having its reporting structure and communication channels; most of the times authority has to be sought for from the centre of power if the information is to be shared with other agencies"* [Govt employee 9].

These narratives confirm that most of the e-government systems in Zimbabwe are not integrated; they operate independently; hence, there is a lack of sharing of information among government departments. The findings show that e-government projects also fail due to the inability of government systems to interoperate. Government departments in Zimbabwe lack a shared and holistic strategy in the implementation of e-government projects. Furthermore, e-government projects are implemented in a silo and disintegrated manner; thus, making it difficult for the citizens to access the services since there is no single portal. However, it should be noted that lack of interoperability does not only occur due to systems operating independently, but a lack of compatible devices and infrastructure prevent information sharing, too.

6.2.3 Lack of access

The sub-themes derived under the lack of access factor revels that the majority of citizens in Zimbabwe do not have access to the internet, e-government services and computing devices due to poverty, low levels of income and inadequate network coverage. The following quotations were extracted from responses provided by government employees to confirm this assertion:

> *"There are still some hurdles regarding the access to e-government services in Zimbabwe, such as the digital divide and poverty; thereby, posing serious challenges in the adoption and implementation of e-government"* [Govt employee 2]. "*The levels of income in Zimbabwe in which the majority of the working class earn an average of US$1 a day make it difficult for citizens to pay for internet services or purchase data bundles to connect to the inter and access e-government services"* [Govt employee 10]. "*Digitisation of public services is also hampered by the limited access to the internet which has remained relatively expensive and unaffordable in Zimbabwe"* [Govt employee 7]. *"In Zimbabwe, most rural communities do not have access to the internet due to non-availability of internet services in those areas as a result of inadequate network coverage"* [Govt employee 12].

Overall, the responses from interview data provided evidence, which shows that poverty, low levels of income and inadequate network coverage together have contributed greatly to lack of access to the internet, e-government services and computing devices in Zimbabwe. Consequently, this has created service gaps in certain communities. Hence, concerted efforts need to be implemented towards improving access to the internet, computing devices and network coverage to promote access to e-government services country-wide.

6.2.4 Lack of e-government funding

This study reports that funding of e-government projects is a challenge in Zimbabwe due to lack of financial support and funding dilemma. According to the data analysed from government employees, lack of financial support had higher raw codes (9) compared to the funding dilemma (8). These two sub-themes were developed from the following quotations:

> *"There is a lack of funding for e-government projects as developing countries like Zimbabwe have many competing priorities to finance"* [Govt employee 5]. "*Due to the*

high cost of deploying e-government systems, many developing countries fall into a dilemma of funding e-government programs, investing in new technologies, even when a government entity has a plan for effective and accessible e-government" [Govt employee 2]. "*There is a lack of funding in Zimbabwe to acquire the necessary infrastructure required for the full implementation of the e-government; the central government seems to have many other priorities competing for the resources like the need to fund the everyday needs of the citizens"* [Govt employee 7]. *"I would consider the lack of financial support as one of the major obstacles to the implementation of e-government in many developing countries such as Zimbabwe since the implementation of e-government is deemed expensive"* [Govt employee 4].

The quotations presented above confirm that the successful implementation of e-government projects depends on adequate funding. Nevertheless, Zimbabwe is facing difficulties in financing e-government projects due to competing priorities to finance, for instance, funding the everyday needs of the citizens in which the majority survive on government hand-outs. Thus, even if the government has an effective plan for the digitisation of public services and is willing to accelerate the deployment of e-government projects, the funding dilemma will likely delay the commencement or completion of these projects. Thus, it can be observed that e-government funding is one of the critical factors which are holding back the effective implementation of e-government projects.

6.2.5 Budget disparity

Successful implementation of e-government requires sufficient budget across government departments; otherwise, other departments will lag in the implementation of e-government projects; hence, causing e-government service gaps. The following family codes were generated under the theme/factor budget disparity: overburdened budgets; and budget politics.

> *"I have noted that the abilities of government departments to place services online and to use technology for automating processes are hampered by budget politics; some MDAs are favoured when it comes to budget allocation. You would find that the Ministry of ICT, Postal and Courier Services which by its nature is supposed to champion the implementation of e-government in the country gets minimum budget*

> *compared to other Ministries"* [Govt employee 5]. *"There is a lot of budgetary politics in the government of Zimbabwe; some government departments do not get sufficient budget because they are neither preferred nor favoured"* [Govt employee 7]. *"In Zimbabwe, the Zimbabwe Revenue Authority has ample resources because of the mere fact that they collect Revenue and fall under the Ministry of Finance and Economic Development. For example, in the Chirundu Border Post, ZIMRA is connected to the internet yet other government departments which also play important roles in the operation of the "One-Stop Border Post" are not; hence, e-government gaps will exist as the saying goes that; the whole is greater than the sum of its parts"* [Govt employee 1]. "*At the same time, resources differ from ministry to ministry because some ministries receive better budgets than others. Therefore, we cannot be at the same level in the implementation of e-government; eventually, different levels of e-government implementation by MDAs lead to service gaps"* [Govt employee 3].

Thus, from these quotations, it can be noted that government departments do not get equal budget; hence, some are lagging in the implementation of e-government projects. Since budget allocation differs between government departments, implementation of e-government will also differ from one department to the other. This means that government departments will always be at different levels of e-government maturity; thereby, creating service disparities.

6.2.6 Lack of the desire to support and coordinate e-government

There were 11 codes related to the lack of will and the desire with two code families lack of top management support and lack of coordination. Accordingly, the lack of top management support had 7 raw codes whereas lack of coordination had 4 raw codes. These two sub-themes were developed from some of the following quotations:

> *"Lack of top management support ... has resulted in unavailability of the requisite infrastructure; the top management is not 'aggressively' lobbying for adequate resources to facilitate the deployment of robust infrastructure. As well, implementers of e-government are not being fully trained due to lack of resources; hence, several e-government projects in Zimbabwe are failing to take off according to the plan"* [Govt employee 3]. *"E-government services gaps sometimes exist for different reasons*

which include uncoordinated infrastructure deployment. Each Ministry or government department is concentrating on developing its system and deploying individual infrastructure without considering the need to coordinate such activities with other departments or even the private sector" [Govt employee 7]. *"Lack of coordination in systems development lead to MDAs competing in putting up ICT infrastructure; hence, there is a lot of fragmented (Silo) efforts in the deployment of e-government in Zimbabwe"* [Govt employee 1]. *"As it stands, every MDA developing systems is putting in place its infrastructure. The silo approach to systems development is evident even in the same Ministry, that is, departments do not share Data Centre and Network infrastructure even though it is the most expensive part*" [Govt employee 8].

The narratives given above reveal that the successful implementation of e-government also depends on the support of the top management of government departments. Top management in government departments should be committed to accept, support and adopt the e-government systems and applications. The support from high-level is vital to e-government development that is the gaining of required resources and training, the cooperation and coordination between partners and stakeholders for successful e-government implementation.

6.2.7 Policy inconsistency

During the interviews, participants noted with great concern that in Zimbabwe there is a lack of clearly defined policy for e-government implementation and rhetoric policy resulting in policy inconsistency. A total of 13 raw codes were derived under the policy inconsistency factor. Since there were 13 participants, this suggests that at least each participant mentioned one element about policy inconsistency in Zimbabwe. The following quotations were used in the development of the theme policy inconsistency:

"One other drawback is the policy inconsistency that the government of Zimbabwe grapples with; so nobody takes the government seriously when it outlines policies" [Govt employee 6]. *"There is only too much rhetoric and very little traction on the factors obtaining on the ground in the implementation of e-government projects"* [Govt employee 13]. "*There is a tendency to jump from policy to policy such that policy pronunciation becomes inconsistency with goals and aspirations of e-government"* [Govt employee 12]. *"Midway into the implementation of one policy, the*

government usually shift goals and launch another policy to the puzzlement of e-government designers; leading to 'half-done' and later deserted projects" [Govt employee 11].

The narratives from the interviewees show that government employees are concerned with policy inconsistency by the government. Thus, the interview quotations presented above seem to provide evidence that the lack of clearly defined e-government implementation policy results in incomplete and abandoned projects.

6.3 Reporting findings from the business stratum

This section reports the factors enhancing e-government service gaps in Zimbabwe from the business stratum. The themes derived from the business stratum using semi-auto coding in Atlas.ti7.5 are presented in Table 6.2.

Table 6.2: Codes generated from the business stratum

Super code	Code family	Number of raw codes related to code family
Lack of infrastructure investments	Lack of government-owned infrastructure	5
	Outdated ICT infrastructure	3
	Unreliable power supply infrastructure	2
Total codes		**10**
Lack of interoperability	Lack of compatibility of devices	3
	Systems operate independently	6
Total codes		**9**
Lack of access	Lack of access to the internet	8
	Inadequate network coverage	6
	Unaffordable computing devices	3
Total codes		**17**
Design-reality gap	Lack of experience in e-government design	3
	Lack of expertise in e-government design	5
Total codes		**8**
The overall number of codes		**48**

(Source: Primary data, 2020)

It can be seen from Table 6.2 that a total of 48 raw codes were categorised into 10 code families and four (4) super codes. The codes were generated from 7 business employees who are users of e-government systems. The findings show that lack of access had the highest total number of raw codes (17), followed by the lack of infrastructure investment (10) and lack of e-interoperability (9). This suggests that lack of access has more impact in enhancing e-government service gaps. The following sub-sections present the explanations of the themes derived from business employees:

6.3.1 Lack of infrastructure investments

The sub-themes derived under the factor lack of infrastructure investments include lack of government-owned infrastructure, outdated ICT infrastructure and unreliable power supply infrastructure. The sub-theme lack of government-owned infrastructure had the highest raw codes (5) followed by outdated ICT infrastructure (3 raw codes). The development of the sub-themes was supported by the following excerpts:

> *"In the case of Zimbabwe, the private sector owns approximately 75% of the total infrastructure deployed across the country whilst the government does not have adequate resources to set up the infrastructure for e-government. If the use of existing infrastructure is considered, which in most cases is privately-owned, it will be expensive and unaffordable"* [Bus 1]. *"The infrastructure is outdated and sometimes obsolete"* [Bus 2]. *"In terms of the ownership of ICT infrastructure, the private sector has more ownership compared to most government departments"* [Bus 7]. *"Most of the infrastructure in Zimbabwe is not timely updated to suit the current needs of the end-users"* [Bus 3]. *"The country lacks adequate electricity supply; electricity load shedding is very high in Zimbabwe, resulting in citizens failing to access internet services and online services such as e-government"* [Bus 6].

In summary, most of the infrastructure deployed in Zimbabwe is owned by the private sector. The government of Zimbabwe has not invested significantly in ICT infrastructure and largely rely on infrastructure from private players which becomes expensive for them to sustainably run e-government schemes. Besides, the infrastructure is outdated and sometimes obsolete, making it difficult to meet the needs of the users. In addition, the users of e-government are failing to access e-government due to inadequate electricity supply.

6.3.2 Lack of interoperability

This theme reveals that interoperability has been one of the biggest hindrances in providing "one-stop services" in Zimbabwe since the majority of e-government systems are deployed in silos with each government department implementing its system. The two sub-themes derived under the lack of interoperability factor are the lack of compatibility of devices (3 raw codes) and systems operate independently (6 raw codes). The following excerpts support the development of these sub-themes:

> *"Government departments in Zimbabwe are not willing to share data; as a result, the users need to mobilise between departments to get the required service"* [Bus 5]. *"Interoperability has been one of the biggest hurdles in providing e-government services in Zimbabwe as systems are procured in silos"* [Bus 3]. *"Government departments operate in silos where ministries have isolated databases"* [Bus 7]. *"Some of our gadgets hinder the electronic exchange or transfer of information as they are not compatible with the technology used in e-government projects"* [Bus 2]. "*Interoperability has been one of the biggest hindrances in providing "one-stop services" in Zimbabwe since the majority of e-government systems are deployed in silos with each government department implementing its system"* [Bus 1]. *"Government departments operate in silos where ministries have isolated databases and independent systems"* [Bus 4].

These quotations suggest that government departments in Zimbabwe provide incomplete services to the users; hence, there is limited user satisfaction since e-government users have to hop from one interface to another to accomplish a single task.

6.3.3 Lack of access

From a business perspective, the lack of access seems to be the most dominant factor that enhances e-government service gaps. The sub-themes derived under this factor are lack of access to the internet; inadequate network coverage; and unaffordable devices. The following quotations support the development of these sub-themes:

> *"As far as connectivity is concerned, it is true that we still have some marginalised communities in Zimbabwe especially the rural and semi-urban communities"* [Bus 3]. *"Many communities in Zimbabwe suffer from internet connectivity; therefore, citizens in those communities are not able to access e-government services"* [Bus 1]. *"Lack of access to the internet is also another factor; the charges for internet connectivity and*

data are beyond the reach of many ordinary citizens. For instance, the minimum package (home basic 10 gigabytes) provided by TelOne costs US$15 against an average monthly salary US$30" [Bus 5]. *"Accessibility of services will depend on the availability of devices at affordable prices. However, most citizens are unable to buy laptops, computers and smartphones to access e-government services due to inhibiting costs. On average, the cheapest laptop in Zimbabwe costs approximately US$450 whereas the Smartphone costs about US$50, while the average salary of the majority of citizens ranges between US$30 and US$35"* [Bus 7].

The excerpts presented above show that citizens are marginalised from e-government services due to lack of access to the internet, inadequate network coverage; and unaffordable devices. As consequence, those who do not have access to computers or the internet are unable to benefit from e-government services. Thus, the lack of access to the internet leads to a service gap phenomenon.

6.3.4 Design-reality gap

The two major themes derived under the factor design-reality gap are lack of experience in e-government design and lack of expertise in e-government design, with 5 and 3 raw codes respectively. The following excerpts support the development of these sub-themes:

> *"Development of such complex systems is mostly outsourced from consultants who have expertise in developing similar systems in other countries"* [Bus 4]. *"There are some ICT skills gaps among designers of e-government. Those selected to champion e-government projects usually lack the depth knowledge on e-government design"* [Bus 1]. *"Government departments lack top-notch skilled and experienced employees to drive e-government schemes. The top-notch ICT skilled employees are snatched by the private sector or usually find their way out of developing countries. This is why we find private companies with better e-services than governments from developing countries"* [Bus 6]. *"Some of the reasons why e-government service gaps exist in Zimbabwe despite intensive efforts in implementing e-government projects is the issue of skills gap among designers of e-government"* [Bus 3].

In a nutshell, service gaps exist in e-government systems because of a lack of expertise among the designers to implement successful e-government projects. The personnel who are meant to implement the systems do not have the necessary experience and expertise. In the same vein, government departments are failing to retain top-notch skilled and experienced employees to drive the implementation of e-government schemes; hence, these employees find their way to the private sector or outside the country.

6.4 Reporting findings from the citizen stratum

This section reports the factors enhancing e-government service gaps in Zimbabwe from the citizen stratum. The codes derived from the citizen stratum using semi-auto coding in Atlas.ti7.5 are presented in Table 6.3.

Table 6.3: Codes generated from the citizen stratum

Super code	Code family	Number of raw codes related to code family
Lack of requisite infrastructure	Lack of government-owned infrastructure	6
	Lack of electricity infrastructure	7
Total codes		**13**
Lack of interoperability	Lack of compatibility of devices	2
	Lack of systems integration	7
Total codes		**9**
Lack of access	Lack of access to the internet	8
	Inadequate network coverage	6
	Unaffordable computing devices	3
Total codes		**19**
Design-reality gap	Lack of experience in e-government design	4
	Lack of expertise in e-government design	6
Total codes		**10**
Lack of user involvement	Design assumptions	7
	Lack of consultations	5
Total codes		**12**
The overall number of codes		**62**

(Source: Primary data, 2020)

It can be seen from Table 6.3 that a total of 62 raw codes were categorised into 11 code families and five (5) super codes. The codes were generated from 9 citizens who are the users of e-government services. Likewise, the findings show that lack of access had the highest total number of raw codes (19), followed by the lack of required infrastructure (13), lack of user involvement (12) and the design-reality gap (10). Lack of interoperability had the least code families. The findings suggest that lack of access has more impact in enhancing e-government service gaps. The following sub-sections present the explanations of the themes derived from business employees:

6.4.1 Lack of requisite infrastructure

This theme combines two sub-themes; the lack of government-owned infrastructure and lack of electricity infrastructure which had six and seven raw codes, respectively. The number of raw codes suggests that the two sub-themes have a similar influence on e-government service gaps. The following excerpts form part of the narratives that were used to develop the theme lack of required infrastructure:

> *"Generally, governments in developing countries like Zimbabwe ... rely largely on infrastructure from private players which becomes expensive for them to sustainably run e-government schemes"* [CIT 3]. *"Lack of infrastructure through the lack of government in investing in required infrastructure"* [CIT 1]. *"The main problem which is being faced by Zimbabwe in the implementation of e-government is the lack of requisite infrastructure"* [CIT 8]. *"Lack of or deficiencies in ICT infrastructure is one of the major challenges for e-government implementation in Zimbabwe"* [CIT 2]. "*Zimbabwe like any other developing countries do not priorities procurement of infrastructure to enable effective deployment of e-government projects since priority is given to food security"* [CIT 6]. "*Currently there is no ICT infrastructure in certain rural areas such as Binga, Gokwe and Mwenezi just to mention a few"* [CIT 9]. *"Even in town there are continuous electricity/power cuts, this makes services not available on time"* [CIT 7]. "*Electricity power outages and lack of the ICT infrastructure make e-government a difficult goal to achieve"* [CIT 4].

The analysis of results from the interviews showed that the lack of required infrastructure is one of the most important factors that significantly enhance e-government service gaps in Zimbabwe. It revealed that almost all the interviewees agreed that infrastructure has a critical role in the deployment of e-government.

6.4.2 Lack of interoperability

This theme comprises of two sub-themes: lack of compatible devices and lack of systems integration. It should be observed that lack of systems integration had more raw codes (7) than lack of compatible devices which had 2 raw codes. The following excerpts support the development of these two sub-themes:

> *"E-government systems in Zimbabwe hardly share data; they are designed to serve the purpose of the department. This makes each department collect and use the information they need only and not allowed sharing it"* [CIT 4]. *"E-government systems in Zimbabwe fail partly because they have been designed in such a way that they do not communicate with other systems deployed across ministries. Most government departments use legacy systems that cannot easily integrate with other systems"* [CIT 8]. *"More often than not, one would realise that e-government systems in Zimbabwe rarely share critical data; each government unit prefers to operate autonomously"* [CIT 5]. *"Some of our gadgets hinder the electronic exchange or transfer of information as they are not compatible with the technology used in e-government systems"* [CIT 2].

This finding reveals three important aspects of the lack of interoperability factor in e-government systems in Zimbabwe. Firstly, e-government systems hardly share data because its design is constricted to the purpose of the department. Secondly, the systems are designed in a manner that does not promote system integration. Lastly, some of the computing devices used by citizens are not compatible with e-government the technology used in e-government. Given this context, interoperability is difficult to attain due to constricted design purpose, lack system integration and lack of compatibility of devices.

6.4.3 Lack of access

Various reasons have made it difficult for certain communities to access e-government services in Zimbabwe. These include the following sub-themes: lack of access to the internet, inadequate network coverage and unaffordable devices. The three sub-themes were derived from the following excerpts:

> *"In Zimbabwe, approximately 70% of the population lives in rural areas and those areas are not adequately covered in terms of the distribution of electricity and*

network coverage as compared to towns. Therefore, people in rural areas may face challenges in accessing e-government services as a result of the lack of the internet to connect to e-government platforms" [CIT 3]. *''Access to e-government is a challenge in Zimbabwe and other developing countries,''* [CIT 7]. *"Several communities in rural areas are still underserved as far as internet connectivity is concerned; hence, they do not have access to the internet*" [CIT 4]. *"Most people in rural areas are poor and lag in terms of digitisation. Some of them could not afford a Smartphone, not even talking about the data bundles"* [CIT 8].

From the above narratives, it can be seen that the citizens are concerned that it seems e-government belongs to those who have access to the internet and not for those who have no access. Therefore, if the issues influencing lack of access are not addressed, marginalised communities will always be left behind in the adoption and usage of e-government. Thus, those who do not have access to the internet will be unable to benefit from e-government services.

6.4.4 Design-reality gap

This theme includes two sub-themes, lack of experience in e-government design and lack of expertise in e-government design. The following excerpts were used to develop the sub-themes under the design-reality gap:

"In Zimbabwe, I think e-government service gaps exist because of skill gaps among e-government designers. Most of the e-government designers have limited knowledge and experience; hence, developing systems that are not perfect and which do not meet the needs and expectations of the users" [CIT 9]. *"Skills gap will always be there by virtue of our maturity in terms of e-government and poor remuneration"* [CIT 4]. *"Zimbabwe is not in drought of skilled personnel in the ICT field to design e-government schemes. Some are not even employed; therefore, there is a pool of skilled personnel to dwell into the system development. However, the challenge is that government departments do not offer motivating remuneration and working conditions that are conducive to drive the implementation of e-government to success. Most skilled employees end up leaving for greener pastures in the private sector and abroad"* [CIT 3]. *"Lack of ICT skilled personnel who are competent in designing e-*

government systems" [CIT 8]. *"Government departments do not have adequate ICT skilled manpower to keep up with technological developments"* [CIT 5]. *"There is a lack of knowledge on the development of e-governance systems"* [CIT 6]. *"Zimbabwe has very good e-government systems on paper, but the country lacks the expertise and experience when it comes to the practical implementation of e-government"* [CIT 2].

The excerpts presented above shows that the theme design-reality gap in e-government is influenced by the lack of experience and expertise among e-government designers. In addition, the citizens are concerned that the design-reality gap will continue to exist in Zimbabwe because of continual poor remunerations in government departments.

6.4.5 Lack of citizen involvement

This factor comprises of two sub-themes; design assumptions and lack of consultations. Accordingly, these sub-themes were derived from the following excerpts:

"There is an assumption that the designers of e-government systems know all the needs and expectations of the users in advance" [CIT 4]. *"The end users are not consulted during the design phase; hence, at times they resist the adoption of e-government schemes"* [CIT 7]. *"The other challenges with most e-government schemes are that they are developed at the national level and lack of engagement of the users who are supposed to benefit from such schemes. The users are not engaged; hence the failure of the users to embrace these schemes"* [CIT 2]. "*The e-government design phase is not engaging with the citizens; that is why it is not easily accepted"* [CIT 5]. *"The cornerstone of successful implementation of e-government is to ensure that citizens are part of the design phase. E-government design should be equally driven by the users; otherwise, e-government projects will be deployed with service gaps. Even so, the opinions of citizens in the design of e-government are not incorporated"* [CIT 3].

From the narratives presented above, citizens seem to be concerned with the lack of their involvement in the design of e-government systems. As a consequence, an e-government design approach which does not engage with the users of the system is likely to develop schemes that do not result in user satisfaction.

6.5 Cross-case analyses: divergence and convergence of views

In the previous sections, the researcher presented the within-case analysis in which diverse factors enhancing e-government service gaps in Zimbabwe were discussed. In this section, the study compares the themes that emerged across the three cases. The study used multiple data sources and multiple methods to uncover multiple realities obtaining on the ground. From the onset, the researcher assumed that using a single data source would not reveal other factors. During the analysis, the findings from the government employees were classified into seven (7) categories: lack of requisite infrastructure; lack of e-government funding; budget disparity; lack of interoperability; lack of access; lack of will and the desire to coordinate and support; and policy inconsistency. Similarly, the findings from the business were classified into five (5) clusters: lack of infrastructure investment; design-reality gap; lack of interoperability; and lack of access. In the same vein, five (5) categories were developed from the citizen data as follows: lack of infrastructure; design-reality gap; lack of interoperability; lack of access; and lack of user involvement. From this categorisation, it can be noted that there were three (3) common categories across the cases. These are as follows: lack of requisite infrastructure; lack of interoperability; and lack of access. Thus, these elements can be regarded as the baseline factors in the implementation and utilisation of e-government.

Further, the analysis shows that the design-reality gap was only common in business and citizens. This shows that only businesses and citizens are concerned about the existence of the design-reality gap in e-government development. Notably, among the three units of analysis, only citizens were concerned about the lack of user involvement in the design of e-government systems. Furthermore, it can be observed that only government employees seemed to be knowledgeable about the budget disparity, policy inconsistency and lack of desire to coordinate and support e-government projects. This could be attributed to the fact that these elements appear to be internal factors with direct impact on government departments and their employees in their effort to drive e-government. Table 6.4 gives a summary of the cross-case analysis.

Table 6.4: Summary of cross-case analysis

Theme	Sub-theme	Government	Business	Citizens
Lack of requisite	Lack of government-owned ICT infrastructure	x	x	x

infrastructure	Lack of robust ICT Infrastructure	x	x	x
	Outdated ICT infrastructure		x	
	Lack of ICT infrastructure investment		x	
	Unreliable electricity supply	x	x	
	Lack of electricity infrastructure			x
Lack of interoperability	Lack of compatible infrastructure	x		
	Systems operate independently	x	x	
	Lack of systems integration			x
	Lack of compatible devices	x	x	x
Lack of access	Lack of access to the internet	x	x	x
	Lack of access to e-government services	x		
	Inadequate network coverage	x	x	x
	Unaffordable computing devices		x	x
	Lack of access to computing devices	x		
Lack of e-government funding	Lack of financial support	x		
	Funding dilemma	x		
Budget disparity	Overburdened budget	x		
	Budget politics	x		
Design-reality gap	Lack of experience in e-government design		x	x
	Lack of expertise in e-government design		x	x
Lack of user involvement	Design assumptions			x
	Lack of consultations			x
Lack of the desire to support and coordinate e-government	Lack of coordination			
	lack of top management support			
Policy inconsistency	Rhetoric policy	x		
	Unclearly defined policy	x		

(Source: Primary data, 2020)

6.6 Chapter summary

The findings reported in this chapter are a continuation and an addition to the quantitative analysis presented in the previous chapter. This chapter has reported the findings from three (3) units of analysis on factors enhancing e-government service gaps in Zimbabwe. The findings from units of the analysis revealed that lack of requisite infrastructure; lack of interoperability; access; e-government funding; budget disparity; design-reality gap; lack of user involvement; the desire to support and coordinate e-government; and policy inconsistency are the key factors that affect the effective design, development, deployment and utilisation of e-government services in Zimbabwe.

However, it should be noted that while the aforesaid factors were derived from the government employees, businesses and citizens’ strata others were derived solely from each stratum or two strata. For instance, budget disparity; lack of will and the desire to support and coordinate; and policy inconsistency were derived from the government stratum only. Also, the lack of infrastructure investments was extrapolated from the business stratum while the lack of user involvement was deduced from the citizen stratum. In contrast, the design-reality gap was derived from business and citizen strata whereas lack of requisite infrastructure were derived from government and citizen strata; thus, showing differences in the discernment on factors enhancing e-government service gaps among the strata. Likewise, the differences in the discernment of factors were expected since stakeholders of e-government have diverse concerns, needs and expectations.

CHAPTER SEVEN

MODEL VALIDATION AND REDESIGN

> "Re-evaluating and customising the [measurement dimensions], establishing which ones are important and suitable for a typical African e-government service based on empirical data and [putting these together produces a multi-dimensional model for assessing e-government service gaps in the context of a developing country]" (Sigwejo & Pather, 2016: 3).

7.1 Introduction

Chapter Three proposed a conceptual model for assessing e-government service gaps which were constructed following a comprehensive literature review on e-government assessment typologies. The model was an attempt to determine dimensions suitable for assessing a typical African e-government service and recognise factors enhancing e-government service gaps. This chapter provides a detailed qualitative analysis used to validate the multi-dimensional model proposed for use in assessing e-government service gaps in the context of a developing country.

This chapter which represents the final phase of the study undertakes a validation and redesigning of the conceptual model to produce a multi-dimensional model for assessing e-government service gaps in the context of a developing country. It involves the validation of constructs and their measurement dimensions proposed in Chapter Three using feedback from four (4) experts. The final model is presented graphically after incorporating the findings from the interviews and feedback from experts. The outline of the chapter is presented in Figure 7.1.

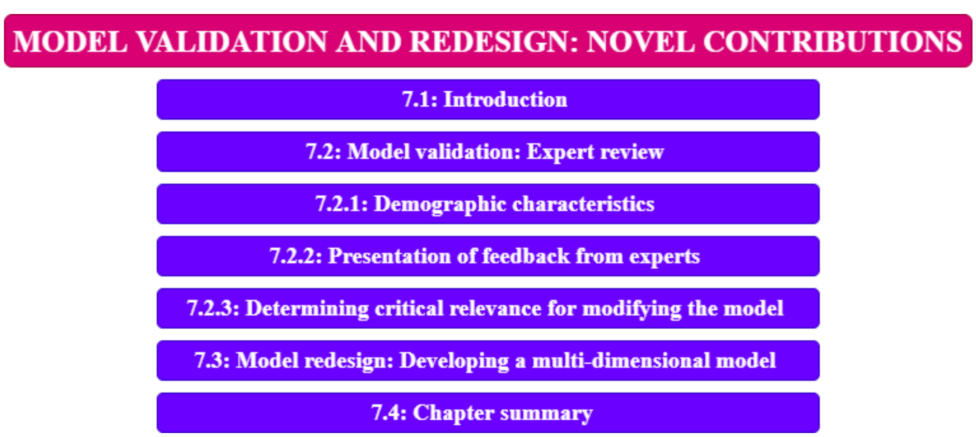


Figure 7.1: Chapter outline

7.2 Model validation: Expert review

The initial model for assessing e-government service gaps was developed based on dimensions derived from various e-government assessment typologies and barriers to successful e-government. However, to strengthen the development of the model, this study applied an expert review to validate the quality attributes of the model. As mentioned in Chapter Three, model validation ensured that the aspect of developmental evidence in theory building was achieved. Accordingly, the model was validated qualitatively using feedback obtained from experts. The reasons for choosing the experts and the purpose of the validation practice were explained to the reviewers as follows:

> *You have been chosen to participate in this study as an expert reviewer because of your involvement either in the design; development; implementation; monitoring or evaluation of e-government projects in Zimbabwe. The researcher is interested in your contributions because it is believed that you can enlighten on the quality attributes of a comprehensive model for assessing e-government service gaps in the context of a developing country.*

Thus, based on the above clarifications, expert reviewers were asked to comment on the quality attributes of the model presented on the model validation template.

7.2.1 Demographic profiles of experts

The study sought to examine the demographic profiles of the expert. This was because the researcher anticipated that the demographic profiles could determine the quality of feedback required to refine the proposed model. The profiles of the experts are presented in Table 7.1.

Table 7.1: Demographic profiles of experts

Item	Gender	Organisation	Highest qualification	Position	Role/responsibilities	Experience in e-government
Expert 1	Male	TTCS	PhD	Public Sector Programme Director	Coordination of e-government implementation	6 years
Expert 2	Female	ZIMRA	Masters	Director of IT department	Coordinating e-government implementation	5 years
Expert 3	Female	MICTPCS	PhD	Director of ICT services	Implementing ICT solutions in government	7 years
Expert 4	Male	OPC	Masters	Deputy Director e-Services	E-government monitoring and evaluation	5 years

Note: TTCS= Twenty-Third Century Systems; ZIMRA=Zimbabwe Revenue Authority; MICTPCS= Ministry of ICT Postal and Courier Services; OPC= Office of the President and Cabinet

As can be seen from Table 7.1, there was gender balance among the experts (2 males and 2 females); thus, this finding suggests that there was no gender bias in choosing the expert reviewers. The profiles also showed that the experts were highly educated; two had attained Masters Qualifications while the other two had Doctorate degrees. Furthermore, the experts held high positions in their organisations; three were at Director Level while only one was a Deputy Director. In terms of roles/responsibilities, three experts were responsible for the implementation of e-government while one was responsible for e-government monitoring and evaluation. The roles of the experts thus made them relevant and useful in the validation of the model. In terms of e-government experience, the experts had between five (5) and (7) seven years of experience; this profile denotes a significant experience on which the results of the feedback were grounded. Thus, experts had adequate knowledge and experience about the implementation of e-government in Zimbabwe.

7.2.2 Presentation of feedback from expert review

The study sought for feedback concerning the relevance, usefulness and usability of the model in the context of a developing country like Zimbabwe and its completeness and systematic construction. As discussed in Chapter Three, the experts were guided by these five quality parameters for validating the conceptual model. The presentation of the feedback is in the triad: a) insights of the quality parameters; b) strengths; and c) weaknesses observed/items for further improvement.

7.2.2.1 Insights of the quality parameters

Relevance insights

The first quality attribute for validation comprised of the relevance of the model. Accordingly, relevance validation was intended to determine the extent to which the measurement dimensions/concepts/constructs included are appropriate for the model in assessing e-government service gaps. The feedback and analyses concerning the relevance quality parameter are presented below:

> *"The multi-dimensional model is a true representation of the real-world from the viewpoint of the intended use and the model is relevant to the Zimbabwean context. In*

addition, the measurement dimensions included are appropriate for the model to assess e-government service gaps in the context of a developing country" [Expert 1].

"The ... model is relevant to develop countries. In fact, I would say it is relevant for all countries irrespective of their developmental status because it provides attributes that can be used to assess e-government projects at different levels of maturity. Thus, the fact that developed countries have attained higher levels of e-government maturity does not imply that e-government service gaps do not exist in these countries" [Expert 2].

"The model is very much relevant as it seeks to provide measurement parameters for ascertaining the existence of e-government service gaps" [Expert 4]. *"In both theory and practice, I would say that the measurement parameters defined in the model are relevant in determining service gaps within an e-government system, more so, in a developing context in which most systems are in emergent phases"* [Expert 3].

From the feedback given by experts, the model is perceived to be relevant in assessing e-government service gaps in both developing and developed context because it is capable of assessing e-government systems at different levels of design and maturity. Therefore, the study concludes that, if utilised as an assessment tool, the model is relevant to facilitate the design and development of user-centric e-government projects in Zimbabwe and other developing countries. In addition, the model will enable developing countries to provide comprehensive e-government services; thereby, closing e-government service gaps. In turn, this will enhance user satisfaction.

Usefulness insights

The second quality attribute for validation comprised of the usefulness of the model. Accordingly, usefulness validation was intended to determine the extent to which the model is suitable for accomplishing a specified purpose (assessing e-government service gaps). The detailed feedback concerning the usefulness quality parameter is presented below:

"The highlighted moderating variables namely; infrastructure, interoperability, digital divide, human capacity and policy issues are some of the factors that seriously

enhance e-government service gaps; therefore, they inhibit the smooth deployment of e-government projects" [Expert 1]. *"I found the model useful in the developing context as it aims to provide the basis for designing and deploying e-government systems that are responsive, integrated, easy to use, reliable, efficient, sufficient and accessible; making it useful for improving user satisfaction. In addition, the model included all the measurement dimensions and concepts to provide an understanding of e-government service gaps on part of the policymakers, coordinators and implementers"* [Expert 3].

According to the feedback provided by the experts, it was observed that the model is useful in the context of a developing country in all the phases of implementing e-government projects. Furthermore, the model is considered to be useful to policymakers, coordinators, implementers and users of e-government systems. The conceptual model thus would be important in evaluating e-government projects as well as improving the design and development of e-government services. Thus, the narratives show that the experts found the model to be very useful in e-government assessment.

Usability insights

The third quality attribute for validation concerned the usability of the model. Accordingly, usability validation was intended to determine the extent to which a model is perceived as usable by particular users to achieve specific goals (testing e-government service gaps). The feedback concerning the usability quality parameter is presented below:

"The model is usable in all phases of e-government implementation; that is, design phase; scaling up e-government projects; and in the post-implementation phase. This makes it ideal for developing countries like Zimbabwe which is still behind in implementing e-government projects" [Expert 4]. *"What I can say is that the model will be usable in testing e-government service gaps in a developing context where ICT literacy is still very low since it is easy to understand and apply"* [Expert 2].

The experts noted that the model is usable at all phases of e-government implementation from the design phase right through to post-implementation phase.

Completeness

Completeness is concerned with ensuring that dimensions/concepts which make a model comprehensive for accomplishing a specific purpose are all specified.

> *"The proposed model comprises of most of the appropriate dimensions which make it nearly comprehensive for assessing e-government service gaps in developing countries like Zimbabwe"* [Expert 2]. "*It also takes a holistic approach to assessing e-government services gaps by including measurement dimensions for testing e-government service gaps while taking into consideration factors enhancing service gaps in developing contexts"* [Expert 3].

Systematic construction

The last quality parameter intended to determine if the model was constructed logically by arranging variables in good sequence. The feedback is presented below:

> *"The model is logically constructed and it combines dimensions that are drawn from different e-government assessment typologies. Besides, the constructs of the model are arranged sequentially starting from independent variables, followed by moderating variables and then dependent variables"* [Expert 1]. *"The model is systematically constructed showing how unobservable variables such as system functionality, service delivery, service gaps, factors enhancing service gaps and user satisfaction will be measured"* [Expert 4].

7.2.2.2 Strength of the model

Though not perfect, a model should demonstrate some relative strength towards achieving its purpose. Thus, the following narratives reflect on the strength of the proposed model in the experts' opinions:

> *"The proposed model managed to identify factors enhancing e-government service gaps which are consistent with the political (policy), socio-economic (digital divide) and technological (infrastructure, interoperability) status of the country. The multi-dimensional approach adopted by the researcher also takes into consideration human capacity, policy issues at the national level as well as ICT infrastructure which are common problems affecting the successful implementation of e-government projects in most developing countries"* [Expert 4].

"Dimensions that relate to system functionality and service delivery are clearly defined. The model also highlights the factors that can enhance e-government service gaps and these are common in developing contexts, hence, Zimbabwe is not an exception. Again, the model captures most of the parameters required for the successful implementation and evaluation of e-government projects in different phases of maturity. In addition, The inclusion of the digital divide as one of the moderating variables is commendable because it would not be possible to assess and address e-government service gaps without giving due attention to lack of access to the internet, especially in the context of a developing country" [Expert 2].

"The policy issues will focus on the vision, strategy and leadership which are all essential elements in the implementation, scaling up and evaluation of e-government projects. Just like any ICT system, the ultimate goal of the e-government is user satisfaction and the model is very explicit on the metrics for determining e-government system performance i.e. the mismatch between actual performance and expected performance of e-government system makes it easy in the identification of e-government service gaps. The performance metrics will also assist in coming up with e-government systems that reflect on users' needs" [Expert 3].

According to the narratives given above, the experts observed that the major strength of the model is the identification of factors militating against the smooth design and deployment of e-government projects in the developing context. Thus, the experts showed consistent views on the factors enhancing e-government service gaps. Secondly, the experts observed that the measurement elements that relate to system functionality and service delivery are clearly defined. Thus, it is perceived that the model captures most of the parameters required for the successful implementation and evaluation of e-government projects.

7.2.2.3 Weaknesses of the model: uncovering the areas of improvement

Furthermore, the validation procedure sought to establish experts' opinions on the weaknesses of the model to identify dimensions and constructs for improvement. The narratives from experts are presented below:

"The other factors enhancing e-government services gaps are not explicit e.g. institutional and financial capacity may also be considered as moderating variables as well. In my view, the lack of funding is also significant in enhancing e-government service gaps. The availability of sufficient funding is a significant factor towards the successful implementation of e-government because there is a strong correlation between funding and ICT infrastructure development, addressing the digital divide and human capacity development" [Expert 1].

"You may have to recheck if the model will pick up services that have not yet been provided. It is important to know quantitatively that out of the total number of services that can be provided online, what per cent has been availed. We may call that completeness or adequacy of the services. In addition, on the factors enhancing e-government service gaps, I am of the opinion that human factor should be modified to "human capacity development" because the design and usage of e-government also depend on developed human capacities, which in any case seems to be lacking in developing countries like Zimbabwe" [Expert 4].

"The digital divide in the context of a developing country can be unpacked to include factors such as, among others, limited access to internet infrastructure and connectivity, low income, lack of digital literacy etc. Also, I have noted with concern that on the independent variables that feed into system functionality security is missing. The model cannot be comprehensive without including the security element. Generally, for users to be satisfied with an e-service they should be assured that the information they provide to the system will be used only for the intended purpose especially in developing countries where privacy concerns are very high. Again, compatibility is another issue that needs to be included in this model. Users of e-government use different gadgets; so there is a need for assurance that they may be able to have access to the system using their different gadgets anywhere" [Expert 2].

"On the moderating variables; funding is a major issue in my opinion. Can I take it that it is included under infrastructure? My view is that as a developing country, funding is the basis of the entity automation to enable system integrations. While

other government departments are automated, to what extent are the other key entities automated to allow for integrations to take place? It might mean that some might have to start from scratch. What does this mean for the system integration because, in my opinion, this is a major area for e-government interoperability" [Expert 3]?

From the narratives presented above, it can be observed that the model does not explicitly define the measurement dimensions for assessing e-government service gaps; hence, the need for modification and addition of the constructs.

7.2.3 Determining critical relevance for modifying the model

This section presents the justification for modifying the conceptual model. This stage was important to minimise response bias from the experts. The first suggestion for improving the design of the model was concerned with the need to include funding so that government departments are placed at the same level of preparedness in the implementation of e-government projects. This was considered a valuable suggestion since lack of funding is likely to affect automation and integration of e-services, which is one of the major areas in e-government; thereby, creating e-government service gaps. Similarly, funding in a developing country is the basis of the entity automation to enable integrations (Abraheem & Adams, 2016; Danish, 2006; Dhillon & Laxmi, 2015; Dhonju & Shakya, 2019; Dibie & Quadri, 2018; Hassan et al., 2011; Muhammad, 2013; Nakakawa & Namagembe, 2019; Rehman et al., 2012; Sulehat & Taib, 2016; Wamoto, 2015).

Besides, the experts advised that the model should be able to identify services that have not yet been provided electronically using a quantitative analysis procedure. However, while this suggestion is valuable in determining completeness or adequacy of the services, the researcher felt that the undertaking was beyond the scope of this study; hence, it could be considered for future research. Also, the experts opined that the construct human factor should be modified to "IT human capacity development" because the design and usage of e-government also depend on developed human capacities, which in any case seems to be lacking in developing countries like Zimbabwe. Likewise, previous studies have shown that human capacity problems are among the factors in the implementation of e-government in developing countries (Aneke, 2019; Atef & Al Mutawkkil, 2019; Dewa & Zlotnikova, 2014; Lupilya & Jung, 2015; Owusu-Ansah, 2014; Sharma et al., 2014; Zaied et al., 2007).

Furthermore, experts proposed that an accurate diagnosis of causes of the digital divide is imperative if developing countries such as Zimbabwe are to discern and implement appropriate e-government solutions. Specifically, the experts suggested that the digital divide in the context of a developing country can be unpacked to include factors such as, among others, limited access to internet infrastructure and connectivity, low income, lack of digital literacy. This stance was supported by the interview participants who split the digital divide into the following factors: lack of access and connectivity. Correspondingly, previous studies have reported that lack of access in developing countries is one of the factors that prevent effective utilisation of e-government services (Alakpodia, 2014; Baeuo et al., 2016; Furuholt & Sæbø, 2018; Hamner et al., 2010; Leach & Turner, 2015; Solvak et al., 2019).

Still, it was suggested that the element of compatibility should be included in the model since users of e-government use different gadgets; so there is a need for assurance that users will be able to access e-government services irrespective of the device being used. Similarly, in reviewing the literature, several studies observed that some devices are not capable of accessing e-government services (Abu-Shanab & Khasawneh, 2014; Ahmad & Campbell, 2015; Dhillon & Laxmi, 2015; Kumar et al., 2007; Layne & Lee, 2001; Muhammad, 2013; Zautashvili, 2018); hence, implementers of e-government should balance between service sophistication and compatibility of devices. Lastly, it was hinted that the security dimension should be part of the latent variables of system functionality. The experts argued that the model cannot be comprehensive without including the security element since this has remained a cause for concern in developing countries (Abu-Shanab & Khasawneh, 2014; Atef & Al Mutawkkil, 2019; Jacob et al., 2019; Le Blanc & Settecasi, 2020; Ramdan et al., 2014; Rana & Dwivedi, 2015; Twizeyimana & Andersson, 2019; Verkijika & De Wet, 2018; Weerakkody et al., 2016). Thus, the issue of security needs to be addressed to inspire confidence among potential users of e-government services.

So, based on the above justifications, the following five dimensions/constructs were considered for the model redesign: funding; IT human capacity development; lack of access;

compatibility; and security. Although the validation process confirmed that the model was relevant, useful and usable in the context of a developing country like Zimbabwe and systematically constructed, there appears that the model was not complete and comprehensive. Therefore, there was a need to redesign it, a process that was fulfilled in the following section.

7.3 Model redesign: Developing a multi-dimensional model

A multi-dimensional model for assessing e-government service gaps presented in this chapter is a product of a triangulated travail from the survey data, interview findings and expert feedback (Figure 7.2). As shown in Figure 7.2, system functionality and service delivery act as independent variables to e-government performance and user satisfaction. Besides, the model comprises of ten factors that are believed to enhance e-government service gaps in the developing context. It should be noted that the four arrows on the model (1 solid and 3 dotted) which run from bottom to up show the moderating effects of factors enhancing e-government service gaps on system functionality, service delivery, expected and actual performance of the e-government system.

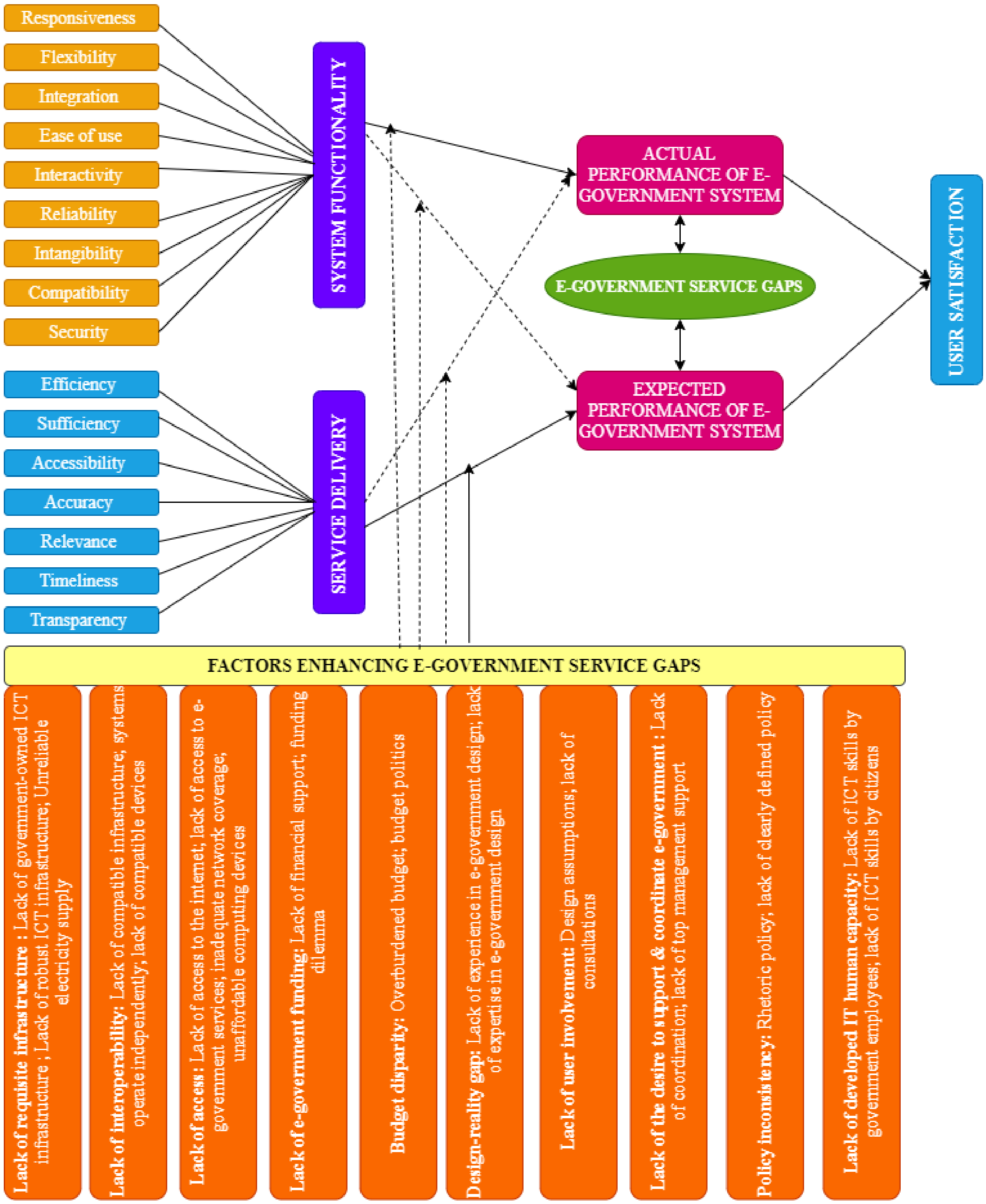


Figure 7.2: A Multi-dimensional model for assessing e-government service gaps

7.4 Chapter summary

In this chapter, the researcher presented feedback from experts and redesigned the model to reflect the findings of a developing country. The experts were asked to comment on the quality parameters, strength and weaknesses of the conceptual model. Their comments on the weaknesses led to the modification and addition of certain dimensions/constructs that were not included in the design of the conceptual model. Also, the interview data resulted in the modification and addition of new dimensions/constructs. All the same, it should be noted that the model retained the entire dimensions/constructs of the conceptual model since the test statistics conducted in Chapter Five showed that they were all significant in measuring e-government service gaps.

However, not all the factors enhancing e-government service gaps represent the views of the entire participants since some were derived solely from one unit of analysis. Nevertheless, even though there were differences in the discernment of factors among the units of analysis, collectively all the factors included in the model represent the views of government employees, businesses, citizens and expert reviewers. The next chapter presents the discussion of both quantitative and qualitative findings based on the connections with previous research.

CHAPTER EIGHT

DISCUSSION OF THE FINDINGS

> "The challenge for every thesis writer is to hold the detail of the data in focus without losing sight of the big picture of the research. This is why reporting data analysis is not enough; hence, the need to relate connections of the findings (data) and theory (existing research) to make lucid contributions to knowledge in the field" (https://www.monash.edu)

8.1 Introduction

The literature review in Chapter Two highlighted that no studies have explicitly focused on exploring factors that enhance e-government service gaps in the context of a developing country. Furthermore, the literature reveals that there is a lack of theoretical models concerning the assessment of e-government service gaps. This study examined the factors enhancing e-government service gaps and the significant dimensions for measuring the service gaps in the context of a developing country. Chapters Five and Six presented quantitative and qualitative data based on the perceptions of government employees, business and citizens while Chapter Seven presented feedback from expert review and revised model. This chapter seeks to synthesise the empirical findings (Chapters Five, Six and Seven) with the existing body of knowledge on factors enhancing e-government service gaps and assessment of e-government projects.

In the previous chapter, the researcher presented feedback from experts and redesigned the model to reflect the findings of a developing country. This chapter presents the discussion of the findings reflecting on the convergence and divergence of views of different cases as well as reflecting prior literature where applicable. Mainly, the chapter attempt to answer the research objectives of the study by discussing the following two major components and their supporting elements: (a) factors enhancing e-government service gaps; and (b) dimensions for measuring e-government service gaps. The discussion of these factors is presented in the sections and subsections below.

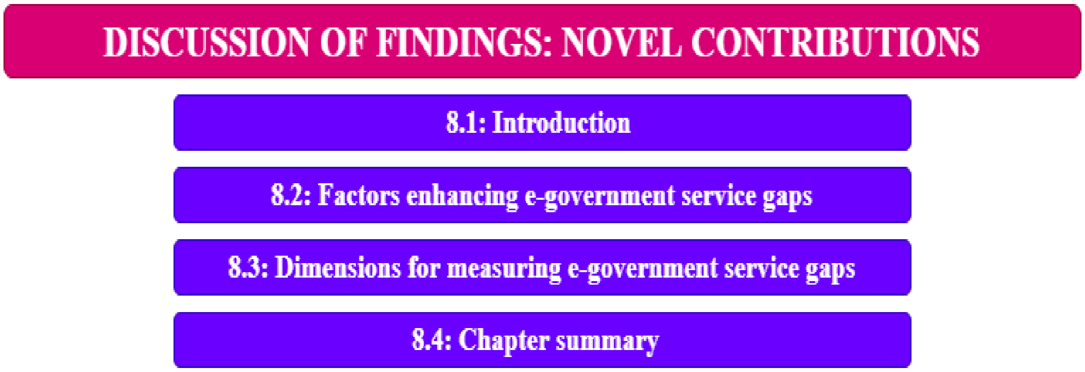


Figure 8.1: Chapter outline

8.2 Factors enhancing e-government service gaps

The first objective of the study was to investigate the factors that enhance e-government service gaps in the context of a developing country. The study revealed that these factors are multi-dimensional and consist of 10 constructs: (a) lack of requisite infrastructure; (b) lack of interoperability; (c) lack of access; (d) lack of e-government funding; (e) budget disparity; (f) design-reality gap; (g) lack of citizen involvement; (h) lack of the desire to support and coordinate; (i) policy inconsistency; and (j) lack of developed IT human capacity. The following subsections discuss each of these constructs:

8.2.1 Lack of requisite infrastructure

The quantitative data based on the principal component analysis reveals that each factor loading on items measuring the infrastructure factor was more than 0.50 (see Tables 5.16) which is the minimum acceptable level. This shows that respondents confirmed that lack of requisite infrastructure is a significant predictor variable of e-government service gaps. Similarly, during the interviews, participants across cases indicated that the country lacks requisite infrastructures to champion the deployment of e-government projects. Specifically, the elements that pose a significant challenge in the implementation of e-government in Zimbabwe are lack of government-owned ICT infrastructure; lack of robust ICT infrastructure; and lack of reliable electricity supply.

It is worth mentioning that the single most striking observation to emerge from the empirical data compared to previous studies was the lack of government-owned infrastructure. Participants were among other factors concerned with the lack of government-owned infrastructure; as a consequence, the government is relying largely on infrastructure from the private players which could be expensive and unaffordable for the government to sustainably run e-government schemes. The government is still lacking in basic infrastructure; the high cost of ICT infrastructure is making it difficult for the government to deploy its infrastructure. Still, in cases where the government owns the infrastructure, it is dilapidated and not able to match the needs of the modern-day e-government service provision such that due to large traffic the infrastructure glitch and crash. Thus, the lack of government-owned infrastructure coupled with dilapidated setups is no good for the performance of e-government and could lead to many end-users ditching these schemes and opting for manual ways of interacting with the government, which is likely to be expensive. Therefore, in the absence of government-owned infrastructure, it becomes difficult for a country to implement sustainable e-government projects countrywide.

In the same vein, respondents across cases noted with great concern the lack of robust ICT infrastructure in the country. Accordingly, a robust ICT infrastructure provides for rapid deployment of e-government projects; hence, any inadequacies will negatively affect the successful implementation of these projects. Again, the respondents were concerned with the lack of reliable electricity supply which could inhibit the continuous delivery of e-government services. The country lacks adequate electricity supply; electricity load shedding is very high in Zimbabwe, resulting in citizens failing to access the internet and other online services such as e-government. This claim seems to be plausible in the context of a developing country where electricity supply has remained a challenge for decades (Richardson, 2011; Ud Din et al., 2017). In fact, without stable electricity supply, e-government systems cannot run smoothly and user satisfaction is likely to be minified since the system might tend to be ordinarily offline. Thus, this gives credence to the fact that electricity is fundamental in the implementation of e-government.

Certainly, it follows that a lack of requisite infrastructure hinders the successful deployment of e-government projects. Thus, the study’s finding that lack of requisite infrastructure is one of the major barriers in the successful implementation and utilisation of e-government in developing countries agrees with the literature that indicates lack of infrastructure hinders the delivery and access to e-government services (Albar et al., 2017; Danish, 2006; Khaemba et al., 2017; Rowley, 2011; Twizeyimana & Andersson, 2019; Venkatesh et al., 2014). Furthermore, this finding is supported by Twizeyimana, Larsson and Grönlund (2018) who mentioned that many developing countries do not have the necessary infrastructure to instantaneously deploy e-government services. Consequently, without adequate infrastructure, it is difficult to deploy e-government projects and let alone adequately utilise e-government services.

8.2.2 Lack of interoperability

Interoperability is one of the issues within the e-government domain that need to be managed by any government intending to achieve seamless integration and derive added value from e-government initiatives (Gianluca et al., 2011; Nakakawa & Namagembe, 2019; Sulehat & Taib, 2016). Seamless integration is critical; time is wasted creating bridging interfaces, hence, the deployment of e-government projects is delayed. Actually, without interoperability MDAs that support each other will find it difficult to share critical data and information.

The findings in Chapter Six also indicate that interoperability among MDAs, in terms of their different back-office applications, databases and interfaces, is one of the key factors for the successful implementation of e-government projects. The participants across cases mentioned that ICT infrastructure and e-government systems that have been deployed in government departments are not interoperable. There is a lack of systems integration either horizontally or vertically; every government department has its ICT infrastructure and system which is not integrated with other departments. In reality, in most cases, MDAs are content in running silo systems and tend to 'own' e-government systems; thus, creating e-government service gaps. Likewise, the result of regression analysis in Chapter Five (see Table 5.47) shows that the lack of interoperability has a significant influence on e-government service gaps with a beta weight of (β=-0.659). This finding corroborates the ideas of (Nakakawa & Namagembe, 2019), who suggested that the benefits of e-government are very rare to achieve in developing countries due to lack of interoperability of ICT infrastructure and e-government systems.

8.2.3 Lack of access

Research has shown that lack of access to the internet and technology is a cause for concern in the utilisation of e-government services in developing countries (Abu-Shanab &

Khasawneh, 2014; Ohemeng & Ofosu-Adarkwa, 2014; Regmi, 2017). The majority of the population, particularly in developing countries, still have limited or no access to e-government services even though these countries have moved a great stride in e-government adoption. Similarly, the findings across cases revealed that the majority of citizens in Zimbabwe do not have access to the internet, e-government services and computing devices due to poverty, low levels of income and inadequate network coverage. There are still some marginalised communities in Zimbabwe, especially the rural and semi-urban communities. Many of these communities suffer from network coverage and internet connectivity; thus, citizens in these communities are not able to access e-government services. In rural areas where significant numbers of citizens have inadequate access to the internet and electricity, providing e-government services is even more difficult. This suggests that there is an interlocked relationship between requisite infrastructure and access to e-government services. Lack of requisite infrastructure results in lack of access because it deprives citizen to benefit from the implementation of e-government; hence, creating the e-government service gap phenomenon. Even, in urban areas where there is connectivity, the issue of high bandwidth costs is prohibitive. These results match those observed in earlier studies that lack of access is certainly the hindering factor in the utilisation of e-government services in developing countries (Abu-Shanab & Khasawneh, 2014; Ohemeng & Ofosu-Adarkwa, 2014; Regmi, 2017).

8.2.4 Lack of e-government funding

It is a widely held view that adequate funding is the factor which promotes the success of e-government (Alabdallat, 2020; Alanezi et al., 2012; Khadaroo et al., 2013). Therefore, any e-government scheme requires funding to commence the implementation of and sustain e-government projects. The findings in Chapter Six from the government stratum revealed that funding of e-government projects is a challenge in Zimbabwe due to lack of financial support and funding dilemma. The empirical data reveals that Zimbabwe is facing difficulties in financing e-government projects due to competing priorities to finance; for instance, funding the everyday needs of the citizens in which the majority survive on government hand-outs. There is limited budget dedicated to fund e-government projects. The country has no financial ability to fund large scale e-government projects; even if the government has an effective plan for the digitisation of public services and is willing to accelerate the deployment of e-government projects, the funding dilemma will likely delay the commencement or completion of these projects.

The findings of the current study are consistent with those of Alabdallat (2020) who reported that there is a lack of funding for e-government projects in developing countries due to many competing priorities to finance from constrained budgets. Furthermore, the findings from the government stratum confirmed the literature findings of Heeks (2003) and Khadaroo et al. (2013) that highlight the challenges of obtaining required funding for e-government. Thus, it can be observed that e-government funding is one of the critical factors which are holding back the effective implementation of e-government projects in developing countries. E-government development and implementation need considerable funding in the developing countries given the lack of connectivity infrastructure in most of these countries (Furuholt & Sæbø, 2018). The reliance on donor support for e-government implementation often results in untenable funding in the event donor support is terminated; thus, impeding progress in the implementation of e-government (Khadaroo et al., 2013).

8.3.5 Budget disparity

The budget disparity is a new factor which emerged from qualitative data, more specifically from the government stratum. Previous studies on challenges in the implementation of e-government services and other related studies have not considered the effect of budget disparity on e-government implementation. This study defines budget disparity as a discrepancy in the allocation of budget among the government departments; as a result, some departments are receiving lesser budgets than others. The case study findings point that successful implementation of e-government requires sufficient budget across government departments; otherwise, other departments will lag in the implementation of e-government projects; hence, resulting in e-government service gaps. In particular, overburdened budgets and budget politics were the two major theme factors inferred under budget disparity.

The abilities of government departments to place services online and use technology for automating processes are hampered by budget politics. Some MDAs are favoured when it comes to budget allocation. For that reason, some government departments are less likely to get sufficient budget because they are neither preferred nor favoured. Indeed, the issue of budget politics appears to defeat the digitisation effort in MDAs since the budget is not evenly distributed. As a result, some of the MDAs are lagging in the implementation of e-government. Thus, due to budget politics, MDAs cannot be at the same level in the implementation of e-government; eventually, different levels of e-government implementation by MDAs lead to service gaps. This means that government departments will always be at different levels of e-government maturity. This study is consistent with the literature that discusses the impact of budget on e-government implementation in general (Dhonju & Shakya, 2019), but not necessarily specific to budget politics.

8.2.6 Design-reality gap

This issue requires a great deal of focus, especially in terms of retaining ICT personnel with required experience and expertise to design and deploy 'perfect' e-government systems. The case study findings revealed that one of the challenges in e-government design is the lack of ICT skills and experience in government departments due to poor remunerations for IT personnel. There is also relatively high staff-turnover of IT staff in the public sector due to lower remuneration levels and this makes it difficult to retain suitably qualified and competent employees whom will be capable to spearhead the implementation of comprehensive e-government programs. The majority of skilled and experienced IT personnel are either employed in the private sector or other countries. Hence, government departments lack top-notch skilled and experienced employees to drive e-government schemes. Most of the e-government designers have limited knowledge and experience; as a result, developing systems that are not perfect and which do not meet the needs and expectations of the users.

All interviewees except government employees shared similar views regarding the design-reality gap. In practical terms, it appears that incompetent employees are appointed to develop and maintain e-government systems in Zimbabwe. As a consequence, e-government projects are outsourced from developed countries which according to Heeks (2003) fuels design-reality gap if the project is adopted in its entirety by a developing country. So, e-government cannot be successfully deployed if government employees do not have adequate ICT skills and experience. The findings observed in this study mirror those of the previous studies in developing counties that have investigated the effects of ICT skills and experience on the success of e-government projects (Le Blanc & Settecasi, 2020; Lindgren et al., 2019; Van Deursen & Van Dijk, 2010; Zaied et al., 2007).

8.2.7 Lack of citizen involvement

The scoping of any information systems project requires the involvement of users. The main consideration of citizen involvement is to incorporate their opinions in the design of e-government projects. The findings from the citizen stratum, however, revealed that the e-government design phase is not engaging with the citizens; that is, why e-government systems are not easily accepted by many users in Zimbabwe. The challenge with most e-government schemes is that they are developed at the national level and lack of engagement of the citizens who are supposed to benefit from such schemes. There is an assumption that the designers of e-government systems know all the needs and expectations of the users in advance. As a consequence, designers are likely to develop e-government schemes that do not result in user acceptance and satisfaction. Thus, e-government services in developing countries are not always designed to meet user requirements.

The present findings seem to be consistent with other research which found out that user involvement is not prioritised in current e-government development projects (Abu-Shanab & Khasawneh, 2014). Similarly, Verkijika (2018) declared that e-government projects fail because of lack of engagement with the users to capture their needs and wants in the design of e-government. This emerging concern in developing countries can be addressed by increasingly involving citizens in the design of e-government systems. Nevertheless, the lack of user involvement in developing countries may be attributed to the lack of budget for e-government implementation.

8.2.8 Lack of the desire to support and coordinate e-government

Literature has reported that the desire to support and coordinate e-government has become important issues in harmonising the many stakeholders that support the implementation of e-government projects (Nurdin et al., 2014). Regardless of a rising realising of the need for support and coordination in the implementation e-government, these items are often ignored in the developing context. In this study, the participants indicated that there is a lack of top management support and coordination in the deployment of e-government projects. Each ministry or government department concentrates on developing its system and deploying individual infrastructure without considering the need to coordinate such activities with other departments or even the private sector.

Furthermore, the top management lacks the desire to lobby for adequate resources to facilitate the deployment of robust infrastructure. In addition, the lack of coordination in systems development is likely to lead to MDAs competing in putting up ICT infrastructure while lack of coordination can restrain the establishment of appropriate e-government development networks. Thus, the implementation of e-government in Zimbabwe is among factors hindered by the lack of the desire by the top management to support and coordinate the design and deployment of e-services. These findings confirm prior research by Apleni and Smuts (2020), Heeks (2003), Ojha and Pandey (2017) which suggest that top management in government should fully support and coordinate the implementation of e-government projects. Thus, top management support plays a significant role in the adoption and implementation of e-government by ensuring that the design and deployment of e-government projects are well-resourced and coordinated.

8.2.9 Policy inconsistency

Another drawback in the successful implementation of e-government in a developing context is policy inconsistency. This is one of the factors which emerged from the qualitative findings. During the interviews, participants from the government stratum noted that the government of Zimbabwe always grapples with policy inconsistency. Although the country strives to digitise the public sector by coming up with e-government implementation policies, this aspiration has remained a mere declaration of the intent; in that respect, the obligatory vigour to drive the implementation of e-government in Zimbabwe is still missing at all levels. There is too much rhetoric and very little traction on the factors obtaining on the ground in the implementation of e-government projects. Besides, it is noted that in most cases, governments take more than a decade talking about implementing e-government flagship projects which do not take off as expected.

Furthermore, it appears that the policies that support the development and deployment of e-government are not the stumbling blocks of implementing e-government. Most developing countries that have attempted implementing e-government were mindful of formulating e-government strategies and policies before they embarked on implementing e-government. The guidelines and e-government frameworks exist in all developing countries even though the implementation of e-government is failing to take off. However, the tendency is to jump from policy to policy such that policy pronunciation becomes inconsistency with the goals and aspirations of e-government. Thus, it is certain that policy inconsistency will hinder the smooth implementation of e-government projects, resulting in either incomplete or abandoned projects.

8.2.10 Lack of developed IT human capacity

Lack of developed IT human capacity is a persistent problem in developing countries, particularly in the public sector (Dewa & Zlotnikova, 2014; Farzianpour et al., 2015; A. Zaied et al., 2007). The successful implementation of e-government projects demands the fusion of IT human capacities for designing, installing, maintaining and utilising e-of government systems. Developed IT human capacity, thus, is a requirement for sustainable e-government in developing countries. In the same vein, feedback from expert review suggested that the design and usage of e-government depend on developed IT human capacities, which in any case seems to be lacking in developing countries like Zimbabwe. Once the infrastructure has been established, there is a need for IT skills to enhance the effective design and utilisation of online services. The deployment of infrastructure alone will not help developing countries to scale-up the implementation of e-government; there is a need for developed IT human capacity. Nevertheless, e-government has continued to fail in developing countries due to inadequate IT capacities within government employees and Zimbabwe is no exception. This is the reality that the Zimbabwean government is also facing in the implementation and utilisation of e-government in which government departments lack top-notch skilled and experienced employees to drive the implementation of e-government schemes. Thus, e-government initiatives require a serious commitment to IT human capacity.

Zimbabwe is not in drought of skilled personnel in the ICT field to tackle the e-government implementation. The country has skilled and competent digital transformation human capital; the problem is about skills retention due to poor remuneration in the public sector. Even government employees who have been trained in India under the IT human capacity development programme have not been able to remain in the public sector due to poor remuneration; they are either attracted to the private sector or outside the country. The present findings seem to be consistent with other research which found a significant failure rate of e-government projects, especially in developing countries, due to inadequate IT human capacity to champion the implementation of e-government (Hamner et al., 2010; Owusu-Ansah, 2014). The findings are consistent with Ruhode (2016: 2) who reported that "there is high human resource turn over in Zimbabwe than any other country in the region".

8.3 Dimensions for measuring e-government service gaps

The previous section offered a discussion and reflection of the case study findings and survey results on factors enhancing e-government service gaps in a developing context from the Zimbabwean perspective. This section discusses the dimensions/constructs for measuring e-government service gaps that were identified in the survey results (see Chapter Five) concerning literature. The conceptual model in Chapter Three identified seven (7) dimensions for scoping system functionality as well as 7 dimensions for quantifying service delivery. During the model redesign, compatibility and security dimensions were added under the system functionality construct based on the suggestions of expert reviewers (see Figure 7.2). Nevertheless, all other dimensions of the conceptual model were retained since they were found to be statistically significant in developing the model. The following subsections provide a discussion of each dimension:

8.3.1 Responsiveness

This encompasses the quickness of an e-government system in responding to services and/or information requested by citizens (Adulalem & Ali, 2016; Ali et al., 2017). Therefore, the extent to which an e-government system responds to citizens' requests will have a foremost influence on how citizens assess and perceive service quality. Accordingly, responsiveness has been widely viewed as one of the most important indicators to benchmark the performance of e-services (Ahmad et al., 2019; Ali et al., 2017; Li & Shang, 2020; Madariaga et al., 2019). Similarly, the statistical results of this study indicate that there is a significant relationship between responsiveness and e-government service gaps ($\beta = 0.695$, $p=0.000$). This finding agrees with Adulalem and Ali's (2016) findings which reported that responsiveness is an important factor in the performance of e-government system, in which almost every evaluation metric of e-government include the element of responsiveness. Similarly, Li and Shang (2020) considered responsiveness as an important factor that drives e-government user satisfaction. Thus, governments should endeavour to make use of advanced technologies to deploy e-government systems that have a high response rate to user' requests.

8.3.2 Flexibility

The existing government processes in developing countries are often not able to cope-up with the dynamic context of e-government due to their rigid disposition as reflected in the dismal performance of e-government projects (Suri, 2014). The expectations of users keep expanding as they progressively become familiar with the usage of e-government and its benefits. Thus, the aims and scope ideated before implementing the e-government project may not cope with the rising levels of user expectations; hence, the need for a flexible e-government system. Flexibility is the ability of the e-government system to adapt to the emerging requirements of the citizens (Karokola, 2012). It enables the e-government system to continue serving the needs of the users by ensuring that the new demands of the users are incorporated into the system. The results in Chapter Five (see Table 5.48) reveal that flexibility of an e-government system has a positive impact on e-government service gaps and indicated a beta coefficient value of $\beta = 0.572$ and a p-value of 0.000.

In the same vein, a study by Suri (2014: 241) found a beta value of flexibility to be 0.527, which fairly represented its impact on the performance of e-government system. This suggests that there is a connection between flexibility and the actual performance of e-government systems. Thus, it can be conceived that the performance of e-government is shaped by the flexibility of government processes. The present findings seem to be consistent with other research which found that there is a causal relationship between flexibility and e-government performance (Alabdallat, 2020; Faizan & Zaidi, 2017; Solli-Sæther, 2011). Nevertheless, several previous studies (Al-rawahna et al., 2018; Al Mudawi et al., 2020; Alabdallat, 2020; Casalino, 2014) reported that the existing government processes in developing countries are failing to cope-up with the dynamic context of e-government due to their inflexible disposition as reflected in the poor performance of e-governance projects. As a result, many e-governments systems deployed in developing countries find it difficult to respond to emergent demands of citizens.

8.3.3 Integration

Integration refers to the extent to which e-government systems can share information to enable citizens to access services from various departments and agencies using a single access point (Dias, 2020). It is an agreement that enables multiple e-government systems to corroborate in providing accurate and real-time services in a single platform. In the literature, integration is identified as a key challenge for enabling fully functional and higher maturity level of e-government in developing countries (Bayona & Morales, 2017; Owusu-Ansah, 2014). Likewise, Dias (2020) reported that lack of integration is one of the performance constraints of e-government systems in developing countries. Similarly, the results of this study show that integration is one of the predictor variables of e-government service gaps with a beta coefficient value of 0.665 and p-value of 0.000. The results agree with the findings of other studies, in which many countries in the developing context still struggle to provide citizens with "one-stop" service due to lack of integration (Abu-Shanab & Khasawneh, 2014; Al-Balushi et al., 2016; Dhonju & Shakya, 2019).

Furthermore, Khanra and Joseph (2019) reported that e-government systems in developing countries are less transactional compared to those in developed countries due to lack of integration; the integration of e-government systems to provide a single platform is still far to be achieved. As a result, the utilisation of e-government services is still problematic in many developing countries. Some of the services are still provided through non-electronic means; that is, paper-based and parallel to electronic services. Eventually, this has created e-government service gaps. Thus, integration of e-government systems is of utmost importance for attaining a seamless government as it is strongly linked with interoperability and e-government performance. Therefore, the results of this study are consistent with previous studies and suggest that the implementers of e-government can enhance transactional capabilities of e-government systems by focusing on the integration and interoperability.

8.3.4 Ease of use

Ease of use has consistently been found to be significant in the adoption and effective utilisation of e-government services (Alanezi et al., 2012; Rehman et al., 2012; Sebetci, 2015). Indeed, e-government systems should be easy to use because citizens expect to obtain services effortlessly. In terms of this research, the results (see Table 5.48) show that the dimension of ease of use has a significant influence on e-government service gaps and indicated a beta coefficient value of $\beta = .774$ and a p-value of 0.000. This suggests that e-government systems that are free of complication are effectively utilised. Therefore, it is likely that users will not accept and/or adopt an e-government system that is not user-friendly. The results support the findings of Jacob et al. (2019), which assert that ease of use significantly influences the citizen's acceptance and adoption of e-government services. Eventually, citizens do not make use of e-government services that are not user-friendly; the more complex the e-government services are the fewer users will accept it. Thus, ease of use is one of the significant predictors in the utilisation of e-government services.

8.3.5 Interactivity

The purpose of any e-government system is to provide digital interactions between governments and citizens. Specifically, interactive e-government facilitates two-way communication and information exchange as well as instantaneous service delivery. However, studies that have assessed the level of interactivity of e-government systems in developing countries reported relatively limited interactive services (Atef & Al Mutawkkil, 2019; Bayona & Morales, 2017; Lindgren et al., 2019). This may be attributed to the fact that the interactive functionality of e-government requires IT expertise to design, which in any case this expertise is still limited in these countries. This study found that there is a significant relationship between interactivity and e-government service gaps ($\beta = .508$, $p=0.000$) towards the functionality of e-government. This result is consistent with prior studies in e-government assessment which links interactivity and e-government performance (Atef & Al Mutawkkil, 2019; Bayona & Morales, 2017; Wadie & Hasan, 2015). Therefore, e-government systems should provide the utmost level of interactivity so that users can define and receive information and services in real-time. For that reason, a high degree of interactivity of e-government can exert a positive impact on citizens' attitudes towards the use of government system compared to traditional methods.

8.3.6 Reliability

Reliability is a key aspect to guarantee the success of an e-government initiative (Gebremichael & Singh, 2019; Yousfani et al., 2019). Literature reports that e-government users expect to get the service in the perfect performance and good timeliness. Pena et al.

(2013) believe that reliability contributes essentially to the service quality of an e-government system because proper delivery functioning of the system will avoid disruption of e-services. System reliability creates the need for a quality perspective in the development and provision of e-government services. The results of this study show that the reliability dimension (β=.524, p=0.000) is significant in measuring e-government service gaps towards system performance. This result was expected since a system which is not reliable will disrupt service delivery and is consistent with those of Gebremichael and Singh (2019), who found that reliability is a very significant factor that determines the actual performance quality of an e-government system. Likewise, reliability has also been observed as the most important dimension in measuring e-service quality (Yousfani et al., 2019). Thus, reliability should be considered as a 'must-have' feature in deploying e-government projects.

8.3.7 Intangibility

Generally, intangibility is the degree to which a service cannot be touched or seen, lacks a physical presence, and has attributes with which the user is unable to physically interact (Patsioura, 2014). It represents the value of e-government systems that has no physical form; that is, not perceptible by touch. This element has been widely used in measuring the quality attributes of e-services. In the context of e-government evaluation, previous studies have reported that an e-government system should provide an effective intangible feature which makes the system appealing for continuous use (Ayoung et al., 2016; Gupta & Jana, 2003; Patsioura, 2014). This suggests that citizens will not effectively engage electronically with the government if the system is not attractive. The statistical results of this study indicate that the intangibility element (β= .305, p=0.000) is significant in measuring e-government service gaps. This implies that the performance of e-government system will also depend on its attractiveness. Thus, effective intangible features will encourage greater use of an e-government system.

8.3.8 Efficiency

Previous studies have mentioned the importance of efficiency in explaining the performance of e-government system (Alabdallat, 2020; Almutairi et al., 2020; Dhillon & Laxmi, 2015; Nakakawa & Namagembe, 2019). The deployment of e-government should simplify government procedures and deliver services faster and cost-effective. Citizens expect efficiency with regards to public service delivery. In developed countries, almost all interactions between the government and citizens are done in a single 'electronic window' with minimum to no waiting time. Nevertheless, achieving the same level of e-government efficiency in developing countries has been difficult due to the lack of interoperability among other factors (Nakakawa & Namagembe, 2019). As a result, e-government in developing countries performs poorly compared to those deployed in developed countries. This study found that there is a significant relationship between efficiency and e-government service gaps (β=.624, p=0.000) towards e-government performance. This means that sufficient dimension in the e-government assessment model has strong influence towards the performance of e-government system.

8.3.9 Sufficiency

Sufficiency has a high degree of influence in the adoption of e-government systems because e-government users expect that government should commit most the services online. Sufficiency indicates satisfactory on e-government services. However, Sarrayrih and Sriram (2015) reported that e-government adoption by citizens (G2C) remains very low due to limited services provided online. This study found that there is a significant relationship between sufficiency and e-government service gaps (β=.660, p= 0.001) towards the performance of e-government system and user satisfaction. This shows that sufficiency has a significant impact on closing e-government service gaps. Thus, e-government services should be comprehensive; otherwise, e-government service gaps will continue to exist.

8.3.10 Accessibility

Research has shown that accessibility is one of the key elements that can augment e-government performance (Abu-Shanab & Khasawneh, 2014; Li & Shang, 2020). Citizens expect e-government services to be intrinsically accessible to meet its primary goal of ensuring that all citizens have equal access to e-government services. E-government is, therefore, expected to be inherently accessible as to meet its primary goal of ensuring that e-government is accessible by all citizens. However, lack of accessibility of e-government services in developing countries has emerged as one of the major setbacks of e-government in achieving this goal (Li & Shang, 2020) since the majority of the population in these countries have limited access to the internet and computing devices. In this study, the accessibility dimension was found to be a good predictor (β=.667, p= 0.001) of e-government service gaps in the developing context. The result of this study together with previous research suggests that lack of accessibility of e-government to the citizens will result in e-government service gaps. Thus, governments in developing countries should ensure that e-government is accessible unremittingly to business and citizens in various communities.

8.3.11 Accuracy

Many authors have reported that accuracy is one of the critical factors in the adoption of e-government (Shuib et al., 2019; Yera et al., 2020). Normally, citizens expect e-government systems to provide information and services free of errors. Nevertheless, literature reports that information and services provided by e-government in developing countries do not meet the needs and wants of the users; thereby, creating service gaps in e-government service delivery. The statistical result in this study indicated that there is a significant relationship between accuracy and e-government service gaps (β=.663, p= 0.001). This suggests that users will hesitate to use an e-government system that is full of errors. As well, Yera et al. (2020) found that e-government systems in developing countries have limitations in providing accurate information and services.

8.3.12 Relevance

E-government facilitates the provision of relevant government information in the electronic form to the citizens on time and better service delivery to citizens. The statistical results of this study indicate that there is a significant relationship between the relevance and e-government service gaps (β=.307, p= 0.001) towards e-government performance. This means the findings of this factor support the prior study and reports (Ahmad et al., 2019; DeLone & McLean, 2016) which claimed that relevance will explain the performance of information systems. Therefore, the results of this study have supported previous studies. Thus, it is expected that more relevant information and service will enhance e-government performance.

8.3.13 Timeliness

Timeliness is one of the e-service dimensions that affect user satisfaction. Previous studies have also mentioned the importance of timeliness in explaining the adoption of e-government (Palvia & Sharma, 2007; Zahid & Din, 2019). However, one of the constraints of e-government in developing countries is to maintain timeliness service delivery (Shuib et al., 2019); as a result, there is low user satisfaction in developing countries compared to developed countries. This study found that there is a significant relationship between timeliness and service gaps towards user satisfaction (β=.367, p=0.000). This finding is in agreement with Zahid and Din's (2019) findings which showed that e-government should provide quick service with proper timelines. Thus, by implementing e-government, governments in developing countries should ensure that information and services are delivered to avoid information and service gaps.

8.3.14 Transparency

Transparency has been identified as one of the major dimensions for successful e-government and the fundamental value in the adoption of e-government (Ahmad et al., 2019; Bayona & Morales, 2017; MácHová et al., 2018; Sharma et al., 2014). Indeed, many governments envisage the implementation of e-government as a means to promote transparency in engaging with citizens. Similarly, the adoption and acceptance of e-government systems are influenced by the citizens' perceptions of the transparency of the government in the use of e-services in public service delivery (MácHová et al., 2018). Citizens expect transparency and accountability regarding the delivery of e-government services. This study found that there is a significant relationship between transparency and e-government service gaps (β=.302, p= 0.001) towards user satisfaction. This finding corroborates the ideas of Ahmad et al. (2019) who suggested that transparency and interactivity are important factors that directly affect e-government satisfaction and indirectly affect trust.

8.3.15 Actual performance and expected performance

Actual performance and expected performance dimensions are important in e-government assessment since they are meant to ascertain if users are getting the expected value of the service or not. The Actual performance of the e-government system pertains to the real and tangible services offered to users by a particular e-government system (Lu & Nguyen, 2016). It reflects the service currently experienced by the users of e-government system. The expected performance of the e-government system is a metric of how the system should perform from the perspective of the users. It is what the users perceive will meet their needs and eventually make them satisfied with using the e-government system. Accordingly, actual and expected performance provides a baseline for determining user satisfaction (Ronchi & Ronchi, 2019; Zhou et al., 2019). Satisfaction in e-government is based on closing the gap between the actual performance and expected performance. These dimensions have a significant effect on user satisfaction. This study found that there is a significant relationship between actual performance and service gaps (β=.686, p= 0.001) towards user satisfaction. Similarly, the expected performance showed a significant influence on service gaps (β=.667, p= 0.001).

8.3.16 Compatibility

Most research on compatibility has focused on measuring the degree to which technology is consistent with the present values, demands and previous experiences of the prospective users (Abu-Shanab & Khasawneh, 2014; Ahmad & Campbell, 2015; Dhillon & Laxmi, 2015; Kumar et al., 2007; Layne & Lee, 2001; Muhammad, 2013; Zautashvili, 2018). This implies that technology that is compatible with expectations of the users will increase the chances of adoption while decreasing the probabilities of rejection. However, a technology that is not compatible with the existing values of citizens, businesses and employees will face resistance. This shows that e-government services should be provided in a way that is consistent with the values, needs and experiences of the users. This study provides a new understanding of the compatibility dimension in which it refers to the ability of different computing devices to access e-government systems. This is because users of e-government use different gadgets; so there is a need for assurance that they may be able to have access to the system despite using different computing devices. Therefore, compatibility of computing devices should be significantly considered in the development and deployment of e-government systems to provide user-centric services. Thus, e-government should be compatible with the computing devices of the users.

8.3.17 Security

Many studies have found that the security of e-services is one of the most significant challenges for implementing e-government initiatives in developing countries (Abu-Shanab & Khasawneh, 2014; Atef & Al Mutawkkil, 2019; Jacob et al., 2019; Le Blanc & Settecasi, 2020; Ramdan et al., 2014; Rana & Dwivedi, 2015; Twizeyimana & Andersson, 2019; Verkijika & De Wet, 2018; Weerakkody et al., 2016). According to Jacob et al. (2019), security should be considered as a priority in the deployment of e-government. Similarly, in this study, one of the experts reported that the proposed model cannot be comprehensive without including the security dimension. Usually, for users to be satisfied with an e-service they should be assured that the information they provide to the system will be used only for the intended purpose. This is common especially in developing countries where privacy concerns are very high (Atef & Al Mutawkkil, 2019; Jacob et al., 2019). The findings suggest that security in e-government is critical in enhancing online transactional services. Nevertheless, in many developing countries, security is considered as an element for post-e-government implementation. Developing countries lack suitable online security measures assure e-government users that online transactions have the same or higher degree of security with traditional transitions (Atef & Al Mutawkkil, 2019). Consequently, users of e-government in developing countries have little confidence in electronic transactions. Thus, governments in developing countries should formulate appropriate measures that enhance secure e-government to encourage online transactions.

8.3.18 User satisfaction

User satisfaction refers to the degree to which users believe that the e-government system meets their service requirement (Ives, Olson & Baroudi, 1983); that is, there is no gap between users' expectation and the services provided. It defines the state in which the e-government users are satisfied with the following elements: system functionality (for example, responsiveness, integration, ease of use, interactivity, flexibility, reliability, intangibility, compatibility, and security); service delivery (efficiency, sufficiency, accessibility, accuracy, relevance, timeliness and transparency) and system performance. More often than not, the factor of satisfaction is used in many studies to ascertain how the degree of satisfaction in e-services will impact citizens' adoption rates (Ali, 2017; Mohamed et al., 2009; Patsioura, 2014; Ramdan, Azizan, & Saadan, 2014). It is worth noting that improved e-government performance increases citizens' satisfaction, which, in turn, increases the utilisation of e-government services.

8.4 Chapter summary

This chapter discussed and reflected on the results and findings obtained in Chapter Five, Six and Seven. The discussion of the findings enhanced data triangulation by ensuring that the quantitative and qualitative data obtained in this study are synthesised with the existing studies. Thus, this chapter created a coherent relationship between empirical findings (data) and theory (existing research). The next chapter presents the summary, conclusions, contributions and limitations of the study as well as recommendations for further research.

CHAPTER NINE

SUMMARY, CONCLUSIONS, CONTRIBUTIONS, LIMITATIONS & RECOMMENDATIONS

> “A critical realist model development must provide comprehensible conclusions and verifiable contributions in the areas of everyday life (pragmatic world); science (knowledge domain) and Meta-science (Philosophy of science)”.

9.1 Introduction

The previous chapter offered connections to the findings (data) and theory (existing research) through a comprehensive discussion. This chapter seeks to provide a summary of the entire study. Furthermore, the chapter offers several conclusions of the study based on the discussion of the results and findings. The chapter also presents novel contributions of the study in three folds: pragmatic world; knowledge domain and philosophy of science. Lastly, the most important limitations encountered in this study are outlined followed by the suggestions for further research. Lastly, the last section presents a summary of the chapter. Figure 9.1 shows the outline of the chapter.

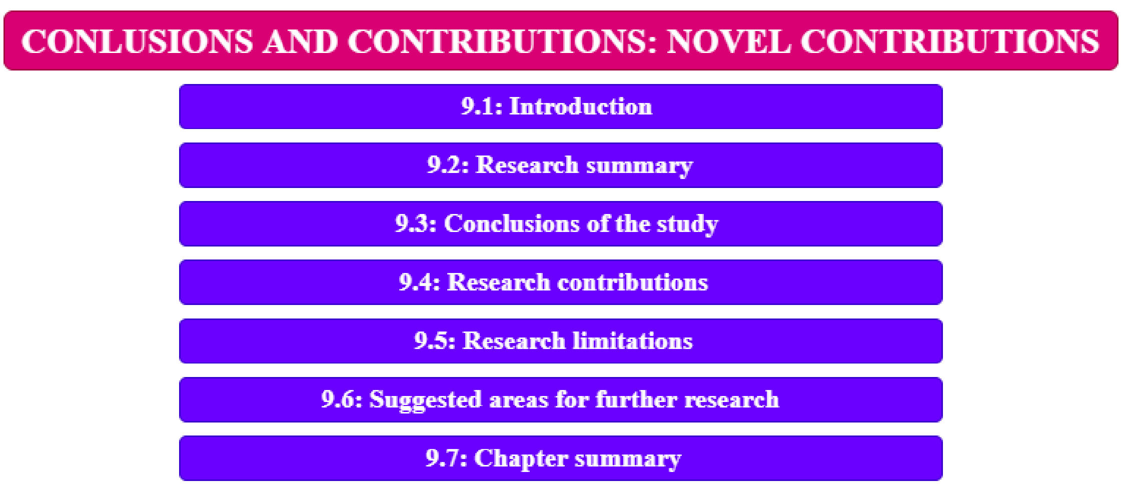


Figure 9.1: Chapter outline

9.2 Research summary

This section presents the research summary and a table that demonstrates the coherence of research objectives and the chapters that attempted to answer the defined objectives.

Globally, the deployment of e-government has remained one of the key objectives for government departments. Given that, no country has been left untouched in the implementation of e-government projects. Indeed, the deployment of e-government has been undertaken by a majority of government departments and many government services are now provided electronically. However, government departments in developing countries are yet to provide comprehensive e-government services due to several impeding factors; thus, creating a phenomenon of e-government service gaps.

Also, since the emergence of e-government in developing countries, several different measurement metrics in the form of models and frameworks have been utilised to evaluate e-government projects. Nonetheless, while e-government assessment typologies have developed over time, no measurement metrics exist to assess e-government service gaps. Failure to assess e-government service gaps makes it difficult to take tenable improvement actions since these gaps are not obvious to the designers and developers of e-government systems. Hence, the pragmatic research question of the study as defined in Chapter One was as follows:

> *Why do e-government service gaps exist in developing countries despite intensive efforts into the design, development and deployment of e-government projects?*

In the quest to answering the central research question, this study was based on the following four (4) objectives;

a. investigate the factors enhancing e-government service gaps in a developing country context (Zimbabwe);
b. explore dimensions and constructs that could contribute to the development of a multi-dimensional model for assessing e-government service gaps;
c. synthesise measurement dimensions from e-government assessment typologies into a multi-dimensional conceptual model; and
d. validate the conceptual model and modify it to become a theoretical model for assessing e-government service gaps in the context of a developing country.

Chapter One introduced the topic and provided several motivations for conducting this study. Furthermore, the chapter presented the following items: background to the study; statement of the problem; main research question; research objectives; the significance of the study;

assumptions and delineations as well as the definitions of key terms. Lastly, the study presented a conceptual structure (organisation) of the entire study.

Chapter Two which falls under the background theory in the conceptual structure of the study fleshed out the background of the study through a comprehensive appraisal and critical analysis of extant literature on factors impeding the implementation and adoption of e-government as well as e-government assessment typologies. The purpose of this critical examination of literature was to mount an argument towards the claim that significant gaps in e-government services exist in developing countries and no measurement metric has been developed to assess e-government service gaps. The chapter discussed the concept and various definitions of e-government. In addition, four (4) e-government service delivery models (G2G, G2B, G2E and G2C) were presented. Furthermore, the chapter presented an overview of e-government in developing countries, particularly in Africa and Zimbabwe. In an attempt to provide preliminary answers to research objective one of the studies, the literature discussed various factors that obstruct the implementation and adoption of e-government in the developing context.

However, since no studies have explicitly focused on exploring factors enhancing e-government service gaps, this objective was pursued by drawing from the literature on challenges in the implementation of e-government services; challenges to the successful implementation of e-government initiatives; success factors on e-government implementation; the failure of e-government in developing countries; e-government development issues and challenges; human factors in implementing e-government in developing countries; success and failure factors for e-government projects; factors for successful e-government adoption; e-government and developing countries; digital governance success factors and barriers to success; and critical success factors for e-government service delivery in developing countries. Based on literature review, five (5) factors drawn from the aforementioned studies were partly considered as factors enhancing e-government service gaps. These are infrastructure, interoperability, digital divide, human factor and policy.

To contribute to the on-going research in e-government assessment as well as attempting to answer the second research objective, there was a need for a comprehensive understanding of the current e-government assessment typologies and their associated dimensions or constructs. The corpus of literature on assessment of e-government projects revealed that fundamentally there are six (6) broad assessment typologies as follows: e-government readiness or e-readiness; service quality gap models; information systems success models; information systems adoption/acceptance models; e-government maturity models; and e-government evaluation models and frameworks. Whilst models and frameworks have developed over time, no metrics exist to assess e-government service gaps, let alone a model informed by a critical realist perspective. The evaluation of e-government service gaps is still missing and requires particular attention.

In Chapter Three (Focal theory), the study focused on exploring and synthesising dimensions and constructs from various e-government assessment typologies that could contribute to the development of a multi-dimensional model for assessing e-government service gaps. Thus, the synthesis of measurement dimensions from various assessment typologies was expected to result in a comprehensive model. Accordingly, Chapter Three aimed at answering the second and third research objectives of the study; as a result, providing a conceptual model for guiding further inquiry. The use of thematic analysis, constant-comparative analysis and evaluation function on e-government assessment typologies resulted in the development of the taxonomy for organising constructs and dimensions (see, Table 3.4, Chapter Three). Afterwards, a conceptual model was developed based on the laws of interactions among constructs and dimensions. The model comprised of the following multi-dimensional constructs: system functionality; service delivery; service gaps; and user satisfaction. Dimensions whose definition or description were related to the technical attributes of the system were grouped under the system functionality construct while those that related to the delivery capabilities of the system were grouped under the service delivery construct. On the other hand, dimensions measuring service performance were grouped under the service gaps construct while dimension measuring satisfaction was grouped under user satisfaction. In addition, factors enhancing e-government service gaps were included to act as moderating variables. Thus, dimensions and constructs from e-government assessment typologies together with factors that obstruct the effective implementation and utilisation of e-government were synthesised to develop the conceptual model of the study. The conceptual model was examined in Chapters Five and Six while the validation and redesign took place in Chapter

Seven.

Chapter Four (Data theory) constituted two central components; research philosophy and research methodology. Firstly, the chapter looked at various research philosophies applicable in information systems research before justifying the selection of critical realism and its underlying tenets. Secondly, the chapter looked at the use of the multi-methodology together with its research methods and techniques. The case study and survey strategies were used with an in-depth interview and web-based questionnaires respectively. In-depth interviews were used to gain a comprehensive understanding of factors enhancing e-government service gaps in a developing context, a purpose that could not be achieved through the use of structured research methods. Questionnaire surveys were used to examine the factors enhancing e-government service gaps and evaluate dimensions for measuring service gaps. In-depth interviews and web-based questionnaires together with feedback from expert reviews were used to validate the conceptual model presented in Chapter Three.

In Chapter Five (Data theory), factors enhancing e-government service gaps and constructs for measuring e-government service gaps were presented using descriptive statistics (mean and standard deviation) and validated using PCA, correlation and regression analysis. All the dimensions and constructs presented in the conceptual model were found to be significant; hence, there were considered for inclusion on the final model in Chapter Seven (see Figure 7.1). However, a quantitative study could not offer an in-depth understanding and reflection of these factors in the context of a developing country since it was guided by the findings of previous research. Therefore, it is worthwhile noting that a qualitative study was necessary to reveal new insights about these factors.

Chapter Six (Data theory) presented the findings obtained from the analysis of interview data that investigated the factors enhancing e-government service gaps in the context of a developing country. Based on the findings from interview data the following modifications were made: infrastructure to lack of requisite infrastructure; interoperability to lack of interoperability; digital divide to lack of access; and policy to policy inconsistency. Furthermore, the following new factors that were not included in the conceptual model in Chapter Three emerged from the interview data: lack of e-government funding; budget disparity; lack of the desire to support and coordinate e-government; design reality gap; and lack of user involvement. These findings were considered in the modification of the conceptual model (see Figure 7.2).

In Chapter Seven (Novel contribution), feedback from the expert reviewers were presented and analysed based on quality parameters, strength and weaknesses of the model. During the validation of the model, several weaknesses were observed by experts and this led to model redesign. However, weaknesses of the model that uncovered the areas of improvement were checked with literature to justify the inclusion of the suggested elements. Based on the suggestions of the expert reviewers, two dimensions (compatibility and security) were added under system functionality while one factor (lack of developed IT human capacity) was added under factors enhancing e-government service gaps (see Figure 7.2).

Chapter Eight (Novel contribution) presented the discussion of the results presented in Chapter Five and the findings from interview data presented in Chapter Six by reflecting on the convergence and divergence of views of different cases as well as reflecting on prior literature where applicable. Mainly, the chapter attempted to answer the research objectives of the study by discussing the following two major components and their supporting elements: (a) factors enhancing e-government service gaps, and (b) dimensions for measuring e-government service gaps.

Table 9.1: Coherence between research objectives and the chapters of the study

Research objective	Chapter(s)	Key research output
Investigate the factors enhancing e-government service gaps in a developing country context (Zimbabwe).	Chapter Two	General factors impeding e-government implementation, adoption and utilisation in developing countries.
	Chapter Five	Significant factors enhancing e-government service gaps in a developing context.
	Chapter Six	Universal and emerging factors enhancing e-government service gaps in the context of a developing country.
Explore dimensions and constructs that could contribute to the development of a multi-dimensional model for assessing e-government service gaps.	Chapter Two	The knowledge gap; that is, the absence of explicit studies on factors that enhance e-government service gaps and lack of models/frameworks for assessing e-government service gaps.
	Chapter Three	Taxonomy of dimensions and constructs for assessing e-government (see Table 3.5).
Synthesise dimensions and constructs from e-government assessment typologies into a multi-dimensional conceptual model.	Chapter Three	A conceptual model for assessing e-government service gaps (see Figure 3.9).
Validate the conceptual model and modify it to become a theoretical model for assessing e-government service gaps in the context of a developing country.	Chapter Three	A synthesis of quality parameters for validating a conceptual model (see Table 3.6).
	Chapter Four	Multi-methodology research design; questionnaire survey; semi-structured interview guide; and model validation template.
	Chapter Five	A theoretical model for assessing e-government service gaps based on regression results (see Figure 5.5).
	Chapter Six	Taxonomy of factors enhancing e-government service gaps based on cross-case analyses (see Table 6.4).
	Chapter Seven	A multi-dimensional model for assessing e-government service gaps in the context of a developing country (see Figure 7.2)

9.3 Conclusions of the study

Globally, users of e-government systems are looking forward to accessing comprehensive e-government services. The adoption and implementation of e-government projects by the government to improve the delivery of public service to citizens and business would be of limited use if e-government systems do not provide sufficient services. Nevertheless, the provision of comprehensive government services in developing countries has not been met due to several militating factors. Thus, the deployment of e-government projects that provide comprehensive e-government services lies in the identification of e-government service gaps and addressing factors that enhance them.

This is one of the few studies that looked at the assessment of e-government in the context of a developing country and the first according to the best knowledge of the researcher to propose a metric for assessing e-government service gaps in a developing context, Zimbabwe in particular. This study has revealed several factors that can explain why e-government service gaps exist in the context of a developing county. The factors include lack of requisite infrastructure; lack of interoperability; lack of access; lack of e-government funding; policy inconsistency; budget disparity; the design-reality gap; lack of user involvement; lack of the desire to support and coordinate e-government. These factors act as underlying mechanisms for successful implementation and utilisation of e-government in the developing context. For instance, electrical power outages and lack of the ICT infrastructure make e-government a difficult goal to achieve. Thus, it can be concluded that the successful implementation and effective utilisation of e-government are influenced by a combination of factors.

Several factors enhancing e-government service gaps appear to be greatly related to socio-economic conditions prevailing in many developing countries. Most of the citizens in developing countries are poor and cannot afford to buy smartphones and/ or purchase data bundles to connect to the internet. The realisation of e-government benefits is nearly impossible in communities that experience a lack of access to the internet and technology. Lack of connectivity slows the deployment of e-government projects in developing countries. Citizens should have access to the internet and technology to fully benefit from the implementation of e-government initiatives.

Furthermore, due to income inequality, many citizens do not have access to devices that can connect to the internet. On the same note, many governments in developing countries function with constrained budgets; as a result, they are failing to deploy requisite infrastructure and fund e-government projects. Thus, without adequate infrastructure and access to the internet, it is difficult to deploy e-government projects and let alone adequately utilise e-government services. Moreover, e-government projects are implemented in 'silo' and disintegrated manner; thus, making it difficult for the citizens to access the services since there is no single portal. Interoperability is one of the issues within the e-government domain that need to be managed by any government intending to derive added value from e-government initiatives. Without interoperability, MDAs that support each other will find it difficult to share critical data and information.

Furthermore, the successful diffusion of e-government requires government employees who are skilled and competent in ICT. Nevertheless, in developing countries, government departments lack top-notch skilled and experienced employees to drive e-government schemes. The top-notch ICT skilled employees are usually snatched by the private sector or find their way out of the country. This is why in developing countries there are better e-services in the private sector compared to the public sector. Therefore, developing countries need to compete in the ICT job market and offer better remuneration and working conditions that keep the best ICT employees working for their governments and drive e-government services. The government should consider reviewing the remuneration for IT personnel in line with the salaries paid by the private sector.

Again, the cornerstone of the successful implementation of e-government is to ensure that citizens are part of the design phase. There is a need to involve users in the design of e-government systems since the designers of e-government alone cannot fully comprehend the needs and expectations of the users. User satisfaction should be used as a yardstick to determine if government service gaps exist or not. This is because users are the main determent of e-government success; therefore, fulfilling their satisfaction is crucial in the design, development and deployment of e-government projects. Thus, e-government design should be equally driven by the users; otherwise, e-government projects will fail to meet the needs and expectations of the users.

In addition, e-government funding in Zimbabwe continues to be a barrier in the successful deployment of e-government projects since the country faces other competing demands such as food security and healthcare to be financed from a constraint budget; hence, e-government funding is not a priority in the country.

Also, the study concludes that the factors presented in Figure 7.2 contribute to e-government service gaps because they act as barriers for governments to successfully implement e-government and prevent users to engage with e-government services. Practically, these factors can have a significant effect on the implementation and effective utilisation of e-government services. However, it should be noted that the existence of these factors holds both negative and positive outcomes; mostly because apiece, the factors have generative mechanisms to make a divergence of either enabling or constricting e-government service gaps. Therefore, there is a need to convert factors enhancing e-government service gaps to enabling factors.

Besides, the findings have led this study to stress the need to focus on the factors that work behind the scenes in the satisfactory provisioning of e-government service. Government and e-government practitioners in developing countries should accommodate these factors in designing, developing and deploying e-government projects. Accordingly, the deployment of e-government services in developing countries with a focus on these underlying factors will to some extent reduce e-government service gaps and increase the utilisation of e-government services and user satisfaction. Thus, this study also concluded that until factors enhancing e-government service gaps are converted into enablers (enabling factors) for providing comprehensive services, e-government service gaps will continue to exist in developing countries.

Governments in developing countries must pay more attention to factors enhancing e-government service gaps to ensure the provision of comprehensive services to the users. Priority should be raised in the following areas: deploying government-owned infrastructure; e-government funding; and IT human capacity development. This is because the implementation of e-government projects requires sufficient funding to deploy adequate ICT infrastructure and develop IT human capacity. Therefore, through acknowledging funding gaps, governments in developing countries could drive the improvement of e-government services by increasing funding of e-government projects.

Furthermore, the study argues that the evaluation of e-government in developing countries have perpetually ignored the assessment of e-government service gaps. Whilst models and frameworks for assessing and evaluating e-government have been developed, metrics that cover the assessment of e-government service gaps are non-existent from the extant literature. As a consequence, e-government service gaps are not closing to reflect the intensive design, development and deployment of e-government projects in developing countries. Therefore, e-government service gaps should be regarded as one of the most essential elements in e-government implementation. Besides, the assessment of e-government service gaps should become an integral part of e-government evaluation.

Therefore, the model is useful for policymakers in e-government design and evaluation, particularly the Office of the President and Cabinet (OPC) and e-government coordinators (Ministry of ICT, Postal and Courier Services, line ministries, state-owned enterprises and other government agencies). Furthermore, the model will allow proper intervention measures based on moderating variables.

9.4 Research contributions

Generally, any scientific research is expected to accomplish two purposes: contributing to scientific knowledge and solving everyday problems. Nevertheless, this study claims to provide novel contributions in a stratified fashion which is informed by the Three Worlds Framework as follows: (a) pragmatic world; (b) knowledge domain; and (c) philosophy of science.

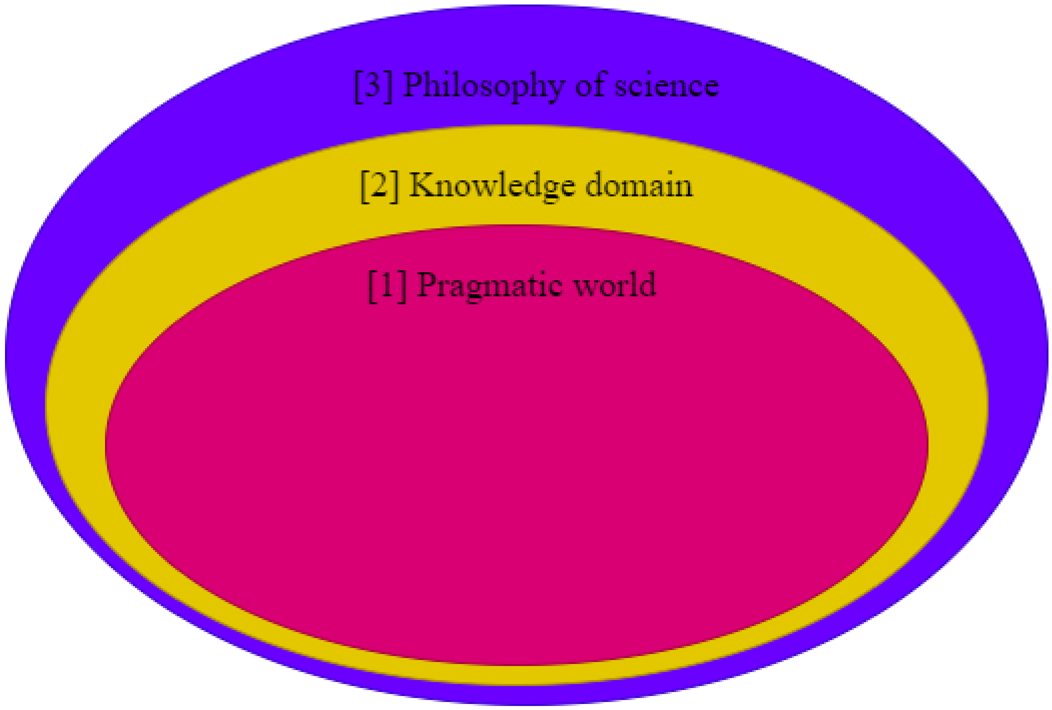


Figure 9.2: Stratified research contributions of the study informed by the Three Worlds Framework

Note: [1]: World 1; [2] World 2; [3] World 3

9.4.1 Pragmatic world: Practical contributions

E-government is regarded as an everyday experience since citizens interact with government departments on daily basis. The problem identified in the pragmatic world was the existence of e-government service gaps in the developing context despite intensive efforts in the design, development and implementation of e-government projects. Therefore, considering the persistence of e-government service gaps, the rationale of this study to investigate factors enhancing e-government service gaps and develop a model to assess these gaps was apparent. Based on this rationale, the following constitute the pragmatic contributions of the study:

Contribution 1: The provision of comprehensive government services in developing countries has not been met due to several militating factors. Therefore, the deployment of e-government projects that provide comprehensive e-government services lies in the identification of e-government service gaps and addressing factors that enhance them. This study proposes a new way to evaluate e-government which proposes that instead of focusing on user satisfaction, service gaps and their underlying mechanisms should be assessed. Thus, this study will enlighten the implementers and funders of e-government projects on factors that obstruct the successful implementation and utilisation of e-government services in a developing context which is known for highly failed e-government projects.

Contribution 2: The notion of e-government service gaps is a reality in developing countries, and Zimbabwe is not an exception. Therefore, based on this reality, the proposed model is useful for assessing e-government service gaps in the context of a developing country in all the phases of implementing e-government projects. Thus, the model can be used as a prescriptive tool during the design phase (pre-implementation) or in scaling up e-government projects and as an evaluation tool in the post-implementation phase. In addition, the model will allow for the identification of service gaps that could be otherwise unnoticed during the design phase of e-government projects; thereby, contributing to the continuous improvement of e-government services.

Contribution 3: E-government service gaps are not obvious to the designers, developers and implementers of e-government systems. Hence, failure to assess e-government service gaps makes it difficult to take well-founded improvement actions. Therefore, the model can be used during the design phase, pilot phase and post-implementation evaluation of e-government projects to elicit emerging needs from the users since it is almost impossible to specify the user needs well-ahead; thus, helping e-government implementers to redesign e-government systems to suit user requirements. Thus, the model could provide designers and developers of e-government projects with insights aimed towards improving the design and deployment of e-government systems and take necessary corrective actions.

Contribution 4: An understanding of the factors that enhance e-government service gaps is crucial to policymakers and for the formulation of intervention mechanisms to improve the deployment of e-government.

Contribution 5: The adoption and implementation of e-government projects by the government to improve the delivery of public service to citizens and business would be of limited use if e-government systems do not provide comprehensive services. Therefore, the model is useful in the developing context as it aims to provide the basis for designing and deploying responsive e-government systems, integrated, interoperable, easy to use, reliable, efficient, sufficient and accessible; making it practical for providing comprehensive e-services and improving user satisfaction.

9.4.2 Knowledge domain: Theoretical and methodological contributions

The knowledge gaps identified in this study were the absence of explicit studies on factors that enhance e-government service gaps and model/framework for assessing e-government service gaps. This section presents several significant contributions to the existing literature and the growing body of knowledge related to factors enhancing e-government service gaps and e-government assessment.

Contribution 1: From the extant literature, no studies have explicitly focused on exploring factors that enhance e-government service gaps in the context of a developing country. To fill this gap, the study proposed a conceptual model in Chapter Three for better understanding these factors and themed them into five categories as follows: infrastructure, interoperability, digital divide, human factor and policy. Furthermore, the study investigated these factors in Zimbabwe (developing context) and presented the results and findings in Chapters Five and Six, respectively. Chapters Six and Seven then contributed to extending these factors by identifying six more elements: budget disparity; the design-reality gap; lack of user involvement; lack of e-government funding; lack of the desire to support and coordinate e-government; and lack of developed IT human capacity. In addition, the existing factors were modified to reflect the experiences of a developing context. Thus, the findings provide theoretical knowledge to the body of literature concerning the factors that contribute to e-government service gaps.

Contribution 2: The evaluation of e-government in developing countries has perpetually ignored the assessment of e-government service gaps. Whilst models and frameworks for assessing and evaluating e-government have developed over time, metrics that cover the assessment of e-government service gaps are non-existent from the extant literature. As a consequence, e-government service gaps are not closing to reflect the intensive design, development and deployment of e-government projects in developing countries. The multi-dimensional model presented in Chapter Seven (see Figure 7.2) contributes to the e-government research community by combining two aspects in the assessment of e-government projects: (a) factors enhancing e-government service gaps, and (b) constructs/dimensions for measuring these gaps. Furthermore, this study contributes to the existing e-government assessment typologies by presenting a multi-dimensional model for assessing e-government service gaps. Thus, building on corpus literature on e-government assessment typologies, this study proffers a theoretical model for assessing e-government in the context of a developing country.

Contribution 3: The existence of factors presented in Figure 7.2 holds both negative and positive outcomes; mostly because apiece, the factors have generative mechanisms to make a divergence of either enabling or constricting e-government service gaps. Therefore, there is a need to convert factors enhancing e-government service gaps to enabling factors. Thus, to achieve this purpose, the model in Figure 7.2 has been further re-designed and presented (Figure 9.3) as a house based on the suggestion provided by Grant and Osanloo (2014).

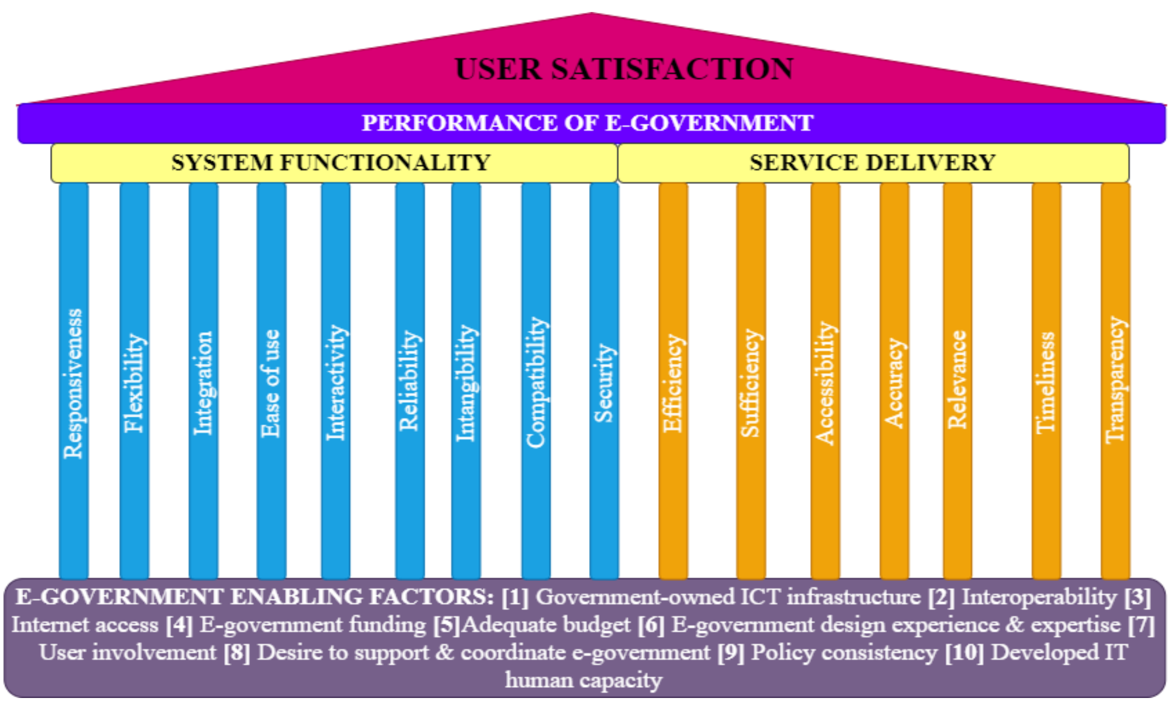


Figure 9.3: Enabling factors for e-government performance and user satisfaction

Contribution 4: Research is a scientific inquiry aimed at developing knowledge or contributing to the existing body of knowledge with the help of models and theories (Kivunja, 2018). However, there is a general lack of literature and guidelines on the process of theory development in information systems research. Whilst models and theories are comprehensible and explicit on what should be included in the theory, they do not specify how the theory should be developed. As a result, it can be argued that some theories and models are constructed based on a "*crash landing*" manner rather than a scientific and rigorous approach. Therefore, the seven-step theory building approach presented in Chapter Three (see Figure 3.5) will serve as a road map for theorists in developing models and theories in the field of information systems; thereby, demonstrating conceptual soundness and developmental evidence in theory building.

Contribution 5: Various studies have observed that e-government delivery models are widely used to demarcate e-government and form the basic models of assessing, evaluating and delivering e-government services (Bayona & Morales, 2017; Ramdan et al., 2014). However, Al-Balushi et al. (2016) argued that as e-government service delivery models mature, progressively, their services may enter into overlaps. Because of that, the study proposed a model that will focus on multiple e-government delivery models (G2G, G2B and G2C); thus, shifting from previous studies which have traditionally evaluated e-government in isolation by focusing their assessment effort on a single delivery model. Mostly, e-government assessment metrics have been centred on G2C even though the majority of e-government systems are designed with multiple delivery models (Ahmad et al., 2019). Hence, assessing e-government service gaps from multiple e-government delivery models is critical in determining service deficiencies from an e-government system in its entirety.

Contribution 6: In the DOI theory, compatibility measures the degree to which technology is consistent with the present values, demands and previous experiences of the prospective users. However, this study provides a new understanding of the compatibility dimension in which it refers to the ability of different computing devices to access e-government systems. This is because users of e-government use different gadgets; so there is a need for assurance that they may be able to have access to the system despite the computing device being used. Therefore, compatibility of computing devices should be significantly considered in the development and deployment of e-government systems to provide user-centric services.

Contribution 7: Trends in e-government research show that the most dominant methodology has been the quantitative research along with survey designs (Alanezi et al., 2012; Dwi & Aljoza, 2015; Haider et al., 2015; Makoza, 2016; Melamu, 2012; Munyoka & Maharaj, 2017; Voutinioti, 2014; Wirtz & Daiser, 2018) and few studies were found to use either qualitative or mixed methods research (Alanezi et al., 2012; Nurdin et al., 2014). However, this study is positioned within multi-methodology research in which a case study is employed along with a survey research design and template analysis technique to investigate factors enhancing e-government service gaps in the developing context. Thus, the use of multi-methodology design enabled the consistency of reality in the study of e-government service gaps in the developing context.

Contribution 8: The use of multi-methodology research along with Google meet, emails and WhatsApp to conduct online interviews and dispense the online questionnaires is considered as a contribution of this research taking into account that, according to the researcher, this is among the first studies of its type in Zimbabwe to be conducted during the COVID-19 in which physical interactions were restricted

Contribution 9: This study claims that currently, model validation is ordinarily conducted in a fragmented manner; there is a lack of guiding principles to ensure that the experts focus on validating the conceptual model to avoid raising unrelated debates. Therefore, this study provides a model validation template comprising of five quality parameters that can be used as a fabric for validating conceptual models developed by information systems researchers and other researchers in various domains.

Contribution 10: Hansen and Kræmmergard (2014) classify research assumptions into four categories: general methodological assumptions; theoretical assumptions; topic-specific assumptions; and assumptions about measures. However, this study proposes a fifth assumption, which is the researcher's assumption and then goes on to present research assumptions in a stratified manner (see Figure 9.4).

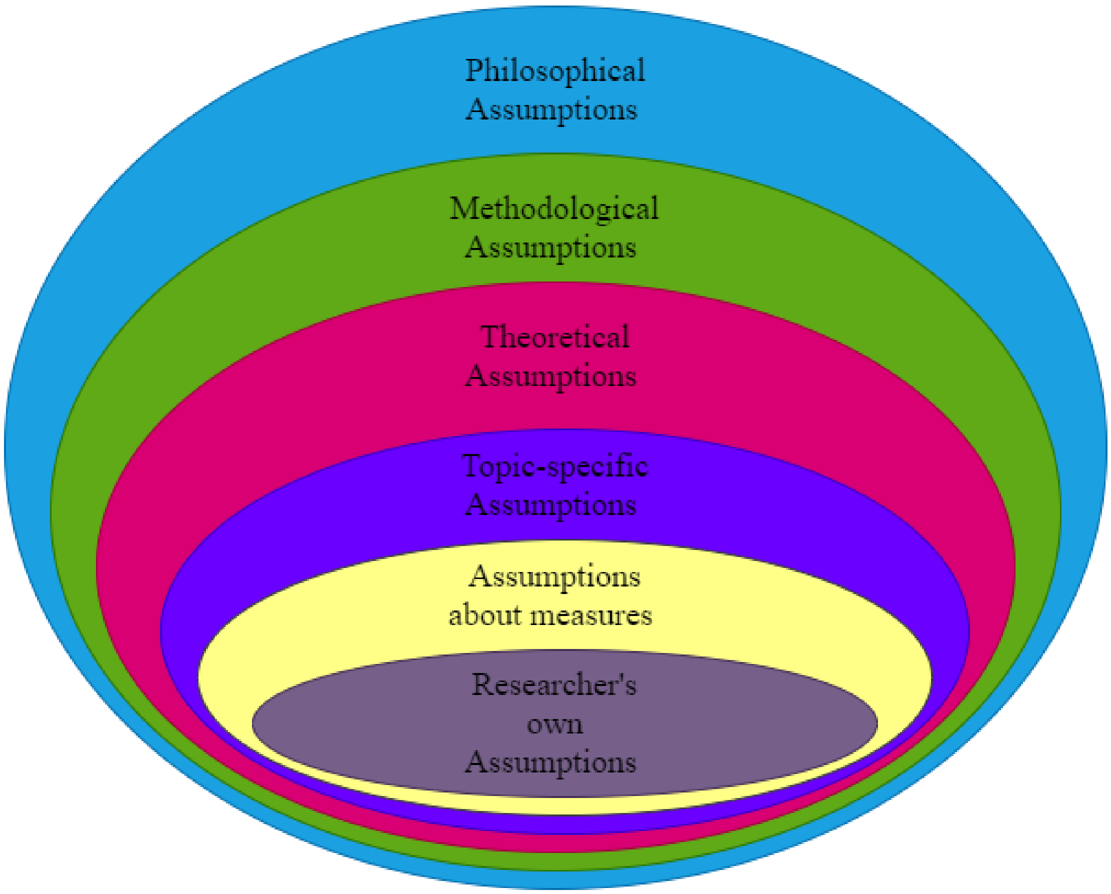


Figure 9.4: Research assumptions

9.4.3 Philosophy of science: Philosophical contributions

Broadly, the creation of knowledge is an action mechanism that is primarily guided by the philosophy of science; hence, this study provides the following contributions:

Contribution 1: It is undoubtedly that there is a strong connectedness between the philosophy of science, scientific research and everyday life (Parusnikova, 1990). Thus, this study enlightens researchers from different philosophical backgrounds on the use of the Three Worlds Framework in situating the problem statement of either an empirical study or theoretical research, as well as, using the same framework to develop scientific knowledge (Figure 4.2).

Contribution 2: The world is too rich and multi-layered to be captured adequately by any single perspective. “It requires a researcher to be reflexive and recognise his/her perspective, and to understand and bring together views of other [primal] stakeholders to identify rich features of the phenomenon being studied” (Van de Ven, 2016: 3). This study will possibly give insights for guiding theorists and researchers that have unified and dissenting views in developing comprehensive models for e-government evaluation.

Contribution 3: The creation of knowledge is an active mechanism that is primarily guided by research philosophy. “Research philosophies guide scientific discoveries through their assumptions and principles. [Therefore], understanding the specific assumptions of research philosophies help illuminate the quality of findings that support scientific studies and identify gaps in generating sound evidence” (Park, Konge & Artino, 2020: 690). This study thus contributes to the philosophy of science by synthesising four epistemological dimensions (see Table 4.2) and taxonomy of research paradigms applicable in information systems research and their underlying assumptions (Table 4.3) which can be used by information systems researchers to construct scientific knowledge.

Contribution 4: Increasingly, critical realism is becoming significant and a justifiable philosophy in information systems research because it enables researchers to provide profound and reflective causal explanations about the occurrence of particular events in a socio-technical phenomenon (Papachristos & Adamides, 2016). Critical realists postulate that events do not happen by chance (Mingers & Standing, 2017); hence, they are interested in explaining the causal mechanisms that generate those events. The explanatory power of a critical realist theory lies in the identification of generative mechanisms that explain how and why events occur in a given context (Eastwood et al., 2014; Mingers et al., 2013). Thus, this study informs critical realists on the use of statistical inferences to explain the causal mechanisms of a given phenomenon based on regression analysis and in-depth interviews.

Contribution 5: Critical realism acknowledges a three-level stratified ontology ordered hierarchically; that is, the empirical, the actual and the real worlds (Adler et al., 2015; Bergene, 2007; Easton, 2010; Heeks & Wall, 2018; Mingers, 2004; Mingers et al., 2013; Mungai, 2018; Sayer, 2002; Smith, 2006; Sorrell, 2018). While the stratified ontology clearly shows that events that are observed and experienced in the empirical world are generated by mechanisms and structures with enduring properties located in the real world, it does not reveal the manifestation of scientific inquiry. This leaves researchers guessing on how the observable events should be transformed into an object of inquiry; thus, giving an impression that researchers are just observers of the empirical world. Hence, this study modified the stratified ontology (see Figure 4.2) to show that events observed and experienced in the empirical world can further trigger the investigation of their causation; thereby, providing a reflective activity about pragmatic and epistemic nature of the phenomenon or object of inquiry.

Contribution 6: The existence of reality has for decades remained a contested and debatable subject among philosophers. Therefore, by giving a summary of the critical realism philosophy and its fundamental tenets (see Figure 4.3) the study will enrich novice researchers in information systems research and other research domains to quickly comprehend the existence of the reality from a critical realist perspective as well as the situatedness of critical realism within other research philosophies.

9.5 Research limitations

As with any other scientific inquiry, this study encountered the following limitations:

Limitation 1: The proposed model was developed based on the application of a theoretical lens from e-government adoption and success factors; assessment typologies and validated using empirical data. Nevertheless, the model was not tested to establish and determine the extent of e-government service gaps in any system deployed in Zimbabwe.

Limitation 2: Furthermore, the study did not identify and quantify the e-government services that have not yet been provided electronically to determine the completeness or adequacy of e-government services in the context of a developing country.

Limitation 3: The factors enhancing e-government service gaps were proposed based on the literature review; confirmed using a survey and explored using a single case study; hence, it is hard to conclude that the factors presented in Figure 7.2 are conclusive.

Limitation 4: This study was focused on urban population in Harare, Bulawayo and Gweru where the population has access to internet and e-government experience in the use of e-government services. Therefore, by focusing on urban population the study could not get the views of the non-users of e-government who are likely to experience more service gaps compared to the urban population.

9.6 Suggested areas for further research

Essentially, the tenet of critical realism makes researchers acknowledge that their knowledge is fallible (imperfect) and limited due to subjective interpretation of reality. Besides, critical realists dispel the principle of positivism which claims that reality can be knowable in its entirety. Otherwise, if that was the case, critical realists argue that there was no need in whatsoever to conduct scientific research (Nastar et al., 2018). In fact, according to Fletcher (2017: 182), "human knowledge captures only a small part of a deeper and vaster reality". Therefore, the world will never experience absolutist truth but only a glance or part of the world can be known; hence, the need for further research. Thus, the researcher acknowledges the assertions put across by critical realists and suggests the following areas for further research:

Suggestion 1: Although the development of the model included the views of the users of the e-Taxation system, the model has not been applied to test and establish the extent of e-government service gaps of this system and many more systems that have been deployed in Zimbabwe. Therefore, future studies could focus on the application of this model to test and determine the extent of e-government service gaps in Zimbabwe and other developing countries with similar context.

Suggestion 2: During model validation, the experts suggested that the model should be able to identify services that have not yet been provided electronically using a quantitative analysis procedure. This suggestion was considered valuable in determining the completeness or adequacy of e-government services in the context of a developing country; hence, this undertaking is considered pertinent for future research.

Suggestion 3: The factors enhancing e-government service gaps were proposed based on literature review; confirmed using a survey and explored using a single case study; hence, it is hard to conclude that the factors presented in Figure 7.1 are conclusive. Therefore, the study suggests that new insights on factors enhancing e-government service gaps could emerge if the research is undertaken again in more case studies.

Suggestion 4: This study was conducted in Harare, Bulawayo and Gweru where the population has access to internet and e-government experience in the use of e-government services. However, by focusing on urban population the study could not get the views of the marginalised communities who are likely to experience more service gaps compared to the urban population. Therefore, the study suggests that future research on e-government service gaps should include the marginalised communities.

Suggestion 5: The experts argued that the model cannot be comprehensive without including the security element since this has remained a cause for concern in developing countries. Thus, the issue of security needs to be addressed to inspire confidence among potential users of e-government services. Thus, the study suggests that future research should investigate the effect of trust on e-government service gaps.

9.7 Chapter summary

This chapter synthesised the entire study through the following: summary of the study; conclusions drawn from the findings; research contributions, limitations and areas for further research. To conclude, all the four research objectives defined in Chapter One have been successfully addressed. Thus, this study has been able to make some valuable contributions to practise, theory and meta-science.

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APPENDIX A: INTERVIEW GUIDE

PhD Title: *"A multi-dimensional model for assessing e-government service gaps in the context of a developing country: a critical realist perspective."*

Dear participant,

Thank you for taking part in this interview session. I greatly appreciate your participation in this study.

Introduction

My name is **Gilbert Mahlangu,** a Doctoral student at the Cape Peninsula University of Technology (South Africa) pursuing a Doctor of Information and Communication Technology (DICT) Degree in the Department of Information Technology, Faculty of Informatics and Design. I am conducting a study aimed at developing a model for assessing e-government service gaps in the context of a developing country.

You have been chosen to participate in this study because of your experience in Government. Therefore, the researchers are interested on your contributions because we believe that you can enlighten us on the reasons ***why e-government service gaps exist despite intensive efforts in the implementation of e-government projects in developing countries?*** Your contributions are sincerely and greatly appreciated and are of vital significance to the success of this research.

Purpose of the Study

As indicated above, the purpose of the study is to develop a model for assessing e-government service gaps in the context of a developing country. This study is solely for academic purposes. However, the results of this research will be shared with the Ministry of Information Communication Technology, Postal and Courier Services, Zimbabwe Revenue Authority and E-government Unit in the Office of the President and Cabinet (OPC) as well as the Twenty-Third Century Systems.

Procedures

During the research process, we wish to ask you for permission to ask you questions about the question highlighted in the introduction above. Your response will be analysed together with responses from other participants and will be used to refine and/ or redesign the conceptual model proposed herein.

Potential risks

There are no risks associated with this study. However, should any participant wish to withdraw from the study process, s/he will be free to do so.

Potential benefits to participants

It is anticipated that a model for assessing e-government service gaps is a significant intervention in providing comprehensive e-government services as well as improving user satisfaction.

Remuneration for participation

There are no remunerations for participating in this study.

Confidentiality

Any information that is obtained in connection with this study and that can be identified with participants will remain anonymous and confidential and will be disclosed only with permission. Confidentiality will be maintained by the use of pseudonyms in publications. Furthermore, any background information that will make identification possible will not be included in any research paper or public document. Thus, your personal details shall remain strictly confidential and anonymous, and the study does not intend to harm you in any way.

The right to withdraw and to remain in the study

Participation is voluntary. You may withdraw at any time without consequences of any kind. You can also refuse to answer any questions that you do not want to answer in the model validation instrument and still remain valued in the study.

Identification of the researcher and other member of the research team

The contact details of the principal researcher and the identities of the other designated member of the research team will be known to you and you may feel free to contact any of me or the supervisor directly at any time you wish to if you have questions relating to your participation in the study.

For Any Questions (FAQs)

If you have any questions feel free to contact me, the researcher on +263 776 339 580, email: gmahlangu.philosopher@gmail.com

If you have any questions that need direct university response pertaining this research study, please contact my supervisor Professor Ephias Ruhode on email: RuhodeE@cput.ac.za

Letter of Consent for interview guide

PhD Title: *"A multi-dimensional model for assessing e-government service gaps in the context of a developing country: a critical realist perspective."*

Researcher: Gilbert Mahlangu

By checking the box,		√
1	I agree to participate in this research study.	
2	I have read this consent form and the information it contains and had the opportunity to ask questions about them.	
3	I understand that I was selected to participate in this study due to my [expertise / position] (*delete as applicable.*)	
4	I agree to my responses being used for education and research on condition my privacy is respected. I understand that my responses will be used in aggregative form only, so that I will not be personally identifiable.	
5	I understand that I am under no mandatory obligation to take part in this study.	
6	I understand I have the right to withdraw from this study at any stage.	
7	I understand that this research might be published in a research journal and/or policy document. In the case of thesis, the document will be available to readers in a university library in printed form, and possibly in electronic form as well.	

Name of the Participant………………………..Signature…………..…..Date............

For Any Questions (FAQs)

If you have any questions feel free to contact me, the researcher on +263 776 339 580, email: gmahlangu.philosopher@gmail.com

If you have any questions that need direct university response pertaining this research study, please contact my supervisor Professor Ephias Ruhode on email: RuhodeE@cput.ac.za

Sample interview question

PhD Title: *"A multi-dimensional model for assessing e-government service gaps in the context of a developing country: a critical realist perspective."*

a) What hinders the government of Zimbabwe to successfully deploy e-government services?

b) What challenges are faced by government employees in designing and developing e-government systems?

c) What hinders citizens to access e-government services?

d) How would you describe the involvement of users in the implementation of e-government projects in Zimbabwe?

e) To what extent is the e-taxation system integrated with other e-government systems?

f) Are there any other issues that you would want to highlight about e-government service gaps?

APPENDIX B: QUESTIONNAIRE SURVEY

PhD Title: *"A multi-dimensional model for assessing e-government service gaps in the context of a developing country: a critical realist perspective."*

Dear respondent,

Thank you for taking part as a respondent to find out factors that could enhance e-government service gaps. I would greatly appreciate your participation in this study.

<u>Introduction</u>

My name is **Gilbert Mahlangu,** a Doctoral student at the Cape Peninsula University of Technology (South Africa) pursuing a Doctor of Information and Communications Technology (DICT) Degree in the Department of Information Technology, Faculty of Informatics and Design. I am conducting a study aimed at developing a multi-dimensional model for assessing e-government service gaps in the context of a developing country.

You have been chosen to participate in this study because as a business entity you are expected to benefit from the deployment of e-government projects. Therefore, the researchers are interested on your contributions because we believe that you can enlighten us on the factors that may hinder the successful deployment and/or effective utilisation of e-government. Your contributions are sincerely and greatly appreciated and are of vital significance to the success of this research.

<u>Purpose of the Study</u>

As indicated above, the purpose of the study is to develop a model for assessing e-government service gaps in the context of a developing country. This study is solely for academic purposes. However, the results of this research will be shared with the Ministry of Information Communication Technology, Postal and Courier Services, Zimbabwe Revenue Authority and E-government Unit in the Office of the President and Cabinet (OPC) as well as the Twenty-Third Century Systems.

<u>Procedures</u>

During the research process, we wish to ask you for permission to complete the questionnaire about factors that could enhance e-government service gaps. Furthermore, we may wish to interview you to seek clarity on your contributions. Data analysis will commence once your response has been received. Your response will be analysed together with responses from other respondents and will be used to refine and/ or redesign the conceptual model proposed herein.

<u>Potential risks</u>

There are no risks associated with this study. However, should any participant wish to withdraw from the study process, s/he will be free to do so.

Potential benefits to participants

It is anticipated that a model for assessing e-government service gaps is a significant intervention in providing comprehensive e-government services as well as improving user satisfaction.

Remuneration for participation

There are no remunerations for participating in this study.

Confidentiality

Any information that is obtained in connection with this study and that can be identified with participants will remain anonymous and confidential and will be disclosed only with permission. Confidentiality will be maintained by the use of pseudonyms in publications. Furthermore, any background information that will make identification possible will not be included in any research paper or public document. Thus, your personal details shall remain strictly confidential and anonymous, and the study does not intend to harm you in any way.

The right to withdraw and to remain in the study

Participation is voluntary. You may withdraw at any time without consequences of any kind. You can also refuse to answer any questions that you do not want to answer in the model validation instrument and still remain valued in the study.

Identification of the researcher and other member of the research team

The contact details of the principal researcher and the identities of the other designated member of the research team will be known to you and you may feel free to contact any of me or the supervisor directly at any time you wish to if you have questions relating to your participation in the study.

For Any Questions (FAQs)

If you have any questions feel free to contact me, the researcher on +263 776 339 580, email: gmahlangu.philosopher@gmail.com

If you have any questions that need direct university response pertaining this research study, please contact my supervisor Professor Ephias Ruhode on email: RuhodeE@cput.ac.za

Letter of Consent

PhD Title: *"A multi-dimensional model for assessing e-government service gaps in the context of a developing country: a critical realist perspective."*

Researcher: Gilbert Mahlangu

By checking the box,		√
1	I agree to participate in this research study.	
2	I have read this consent form and the information it contains and had the opportunity to ask questions about them.	
3	I understand that I was selected to participate in this study due to my [expertise / position] (*delete as applicable.*)	
4	I agree to my responses being used for education and research on condition my privacy is respected. I understand that my responses will be used in aggregative form only, so that I will not be personally identifiable.	
5	I understand that I am under no mandatory obligation to take part in this study.	
6	I understand I have the right to withdraw from this study at any stage.	
7	I understand that this research might be published in a research journal and/or policy document. In the case of thesis, the document will be available to readers in a university library in printed form, and possibly in electronic form as well.	

Name of the Participant…………………………….Signature……………..…..Date............

For Any Questions (FAQs)

If you have any questions feel free to contact me, the researcher on +263 776 339 580, email: gmahlangu.philosopher@gmail.com

If you have any questions that need direct university response pertaining this research study, please contact my supervisor Professor Ephias Ruhode on email: RuhodeE@cput.ac.za

Introduction

This questionnaire is intended obtain your validation concerning the factors enhancing e-government service gaps. The questionnaire was developed from previous studies pertaining to critical success factors in the adoption of e-services. The questionnaire is intended to ascertain the factors that enhance the e-government service gaps in the context of a developing country like Zimbabwe.

Structure

This questionnaire is divided into two sections (A and B). Section A is designed to obtain general demographic information. Section B is intended to ascertain the factors that enhance the e-government service gaps.

PLEASE NOTE:

a) E-government service gaps is the extent to which e-government services are not fulfilled to the intended beneficiary of the e-government system either because the system is constrained to deliver the required services or some of the expected services are not being provided.

b) E-government refers to the provision of government information and services through use of information technologies, Wide Area Networks, the Internet, and mobile computing- that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, efficiency, greater convenience, revenue growth, and/or cost reductions.

c) E-government service refers to a service that is offered online by the government which can help businesses, citizens, and other government agencies in carrying out and fulfilling their government transactions.

Also, the respondent should take note of the definition of constructs and dimensions provided together with this questionnaire. The purpose of the definitions is to ensure that the respondents have a shared understanding about the measurement elements used to assess e-government service gaps.

INSTRUCTIONS
Additional instructions are provided in italics.

SECTION A: DEMOGRAPHIC INFORMATION

Please tick (√) the appropriate box and select __ONLY__ one item per question, __EXCEPT__ for question number 8.

1. Kindly indicate your gender

Male	Female	Other

2. What is your age group

18 – 25	26- 32	33- 39	40 – 47	48 – 55	above 55

3. Indicate your highest level of education

‘O’ Level	‘A’ Level	Certificate	Diploma	First Degree	Masters	PhD

4. How do you describe your general computer knowledge?

Very poor	Poor	Moderate	Good	Very good

5. How would you rate your proficiency with internet

Poor	Fair	Good	Very Good	Excellent

6. What is your level of experience with the use of the e-government system

Very little experience	Little experience	Moderate experience	Good experience	Very good experience

7. Kindly indicate the method you use/used to access e-government services

Office computer	Mobile phone	Home computer	Tablet pc	Computer at cyber café	Community information centre

SECTION B: FACTORS ENHANCING E-GOVERNMENT SERVICE GAPS

8. Please indicate your level of agreement with the statements provided. **Choose 5** if you **strongly agree** with the statement and if you **strongly disagree** with the statement

then **choose 1**. There is no right or wrong answer and the main aim is to know your answer that best reflects your opinion and/or experience.

Scale item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Scale level	1	2	3	4	5

Infrastructure		1	2	3	4	5
INF1	Infrastructure is the foundation of e-government implementation.	1	2	3	4	5
INF2	The country still faces difficulties in the deployment of infrastructure due to lack of adequate resources.	1	2	3	4	5
INF3	A number of citizens do not have access to electronically enabled government services.	1	2	3	4	5
INF4	Unreliable infrastructure has a possibility to degrade the performance of e-government systems.	1	2	3	4	5
INF5	The lack of infrastructure has created a service gap in the access of e-government services.	1	2	3	4	5
Interoperability						
INT1	Interoperability is fundamental to the success of connected government.	1	2	3	4	5
INT2	There is lack of information sharing among the systems designed to provide e-government services.	1	2	3	4	5
INT3	E-government services are provided in a fragmented manner.	1	2	3	4	5
INT4	Due to lack interoperability, some of the services are still provided through non-electronic means.	1	2	3	4	5
INT5	Lack of interoperability results in the loss of entirely reaping the prospective benefits of e-government.	1	2	3	4	5
Digital divide		1	2	3	4	5
DIG DIV1	Digital divide creates service gaps particularly in the utilisation of e-government services.	1	2	3	4	5
DIG DIV2	Digital divide reflects the lack of and/or limited access to electronic services by citizens.	1	2	3	4	5
DIG DIV3	Digital divide prevents citizens from using e-government services.	1	2	3	4	5
DIG DIV4	Digital divide is certainly the prohibiting factor in the access of e-government services.	1	2	3	4	5
DIG DIV5	Digital divide makes it difficult for the effective utilisation of e-government systems.	1	2	3	4	5
Human factor		1	2	3	4	5
HUM FACT1	E-government cannot be successful utilised if citizens do not have adequate ICT skills.	1	2	3	4	5
HUM FACT2	E-government cannot successfully be deployed when there is lack of ICT skills.	1	2	3	4	5
HUM FACT3	E-government cannot be successfully deployed when there is lack of experience.	1	2	3	4	5
HUM FACT4	E-government cannot be successfully deployed when there is poor project management.	1	2	3	4	5
HUM FACT5	E-government cannot be successfully deployed when there is lack of collaboration among stakeholders.	1	2	3	4	5
Policy		1	2	3	4	5
POL1	There is slow pace of government reforms to promote the adoption and implementation of e-government.	1	2	3	4	5
POL2	The country lacks vision and strategy in the implementation of e-government.	1	2	3	4	5
POL3	The government agencies are reluctant to modify workflows that promote the adoption of e-government.	1	2	3	4	5
POL4	The lack of clearly defined e-government implementation policy results in lack of standardisation.	1	2	3	4	5
POL5	Without clear vision and strategy the adoption and implementation of e-government will remain low.	1	2	3	4	5

SECTION C: VALIDATION OF MEASUREMENT DIMENSIONS

9. On a rating scale of 1-5, please indicate the extent to which the dimensions presented in the following table can be applied to determine e-government service gaps based on the following scale level:

Scale item	**Not at all**	**Some extent**	**Moderate extent**	**Great extent**	**Very great extent**
Scale level	1	2	3	4	5

	MEASUREMENT DIMENSION	**EXTENT**				
SYSTEM FUNCTIONALITY	Responsiveness	1	2	3	4	5
	Flexibility	1	2	3	4	5
	Integration	1	2	3	4	5
	Ease of use	1	2	3	4	5
	Interactivity	1	2	3	4	5
	Reliability	1	2	3	4	5
	Intangibility	1	2	3	4	5
SERVICE DELIVERY						
	Efficiency	1	2	3	4	5
	Sufficiency	1	2	3	4	5
	Accessibility	1	2	3	4	5
	Accuracy	1	2	3	4	5
	Relevance	1	2	3	4	5
	Timeliness	1	2	3	4	5
	Transparency	1	2	3	4	5
SERVICE GAPS	Actual performance	1	2	3	4	5
	Expected performance	1	2	3	4	5
USER SATISFACTION	Satisfaction	1	2	3	4	5

END OF SURVEY, THANK YOU FOR PARTICIPATING!

APPENDIX C: MODEL VALIDATION TEMPLATE

PhD Title: *"A multi-dimensional model for assessing e-government service gaps in the context of a developing country: a critical realist perspective."*

Dear expert reviewer,

Thank you for taking part as an expert to validate the model: *A model for assessing e-government service gaps in the context of a developing country.* I would greatly appreciate your participation in this study.

<u>Introduction</u>

My name is **Gilbert Mahlangu,** a Doctoral student at the Cape Peninsula University of Technology (South Africa) pursuing a Doctor of Information and Communications Technology (DICT) Degree in the Department of Information Technology, Faculty of Informatics and Design. I am conducting a study aimed at developing a model for assessing e-government service gaps in the context of a developing country.

You have been chosen to participate in this study as an expert reviewer because of your involvement in the design; development; implementation; monitoring or evaluation of e-government projects in Zimbabwe. The researcher is interested on your contributions because it is believed that you can enlighten on the quality attributes of a comprehensive model for assessing e-government service gaps in the context of a developing country. Your contributions are sincerely and greatly appreciated and are of vital significance to the success of this research.

<u>Purpose of the Study</u>

As indicated above, the purpose of the study is to develop a model for assessing e-government service gaps in the context of a developing country. This study is solely for academic purposes. However, the results of this research will be shared with the Ministry of Information Communication Technology, Postal and Courier Services, Zimbabwe Revenue Authority (ZIMRA), E-government Unit in the Office of the President and Cabinet (OPC) as well as the Twenty-Third Century Systems.

<u>Procedures</u>

During the research process, we wish to ask you for permission to validate the proposed model by completing the questionnaire attached in this guide. Furthermore, we may wish to interview you to seek clarity on your contributions. Data analysis will **ONLY** commence once your contributions have been received. Your contributions will be analysed together with contributions from other reviewers and will be used to refine and/ or redesign the conceptual model.

Potential risks

There are no risks associated with this study. However, should any participant wish to withdraw from the study process, s/he will be free to do so.

Potential benefits to participants

It is anticipated that a multi-dimensional model for assessing e-government service gaps is a significant intervention in providing comprehensive e-government services as well as improving user satisfaction.

Remuneration for participation

There are no remunerations for participating in this study.

Confidentiality

Any information that is obtained in connection with this study and that can be identified with participants will remain anonymous and confidential and will be disclosed only with permission. Confidentiality will be maintained by the use of pseudonyms in publications. Furthermore, any background information that will make identification possible will not be included in any research paper or public document. Thus, your personal details shall remain strictly confidential and anonymous, and the study does not intend to harm you in any way.

The right to withdraw and to remain in the study

Participation is voluntary. You may withdraw at any time without consequences of any kind. You can also refuse to answer any questions that you do not want to answer in the model validation instrument and still remain valued in the study.

Identification of the researcher and other member of the research team

The contact details of the principal researcher and the identities of the other designated member of the research team will be known to you and you may feel free to contact any of me or the supervisor directly at any time you wish to if you have questions relating to your participation in the study.

For Any Questions (FAQs)

If you have any questions feel free to contact me, the researcher on +263 776 339 580, email: gmahlangu.philosopher@gmail.com

If you have any questions that need direct university response pertaining this research study, please contact my supervisor Professor Ephias Ruhode on email: RuhodeE@cput.ac.za

Letter of Consent for model validation

PhD Title: *"A multi-dimensional model for assessing e-government service gaps in the context of a developing country: a critical realist perspective."*

Researcher: Gilbert Mahlangu

By checking the box,		√
1	I agree to participate in this research study.	
2	I have read this consent form and the information it contains and had the opportunity to ask questions about them.	
3	I understand that I was selected to participate in this study due to my [expertise / position] (*delete as applicable.*)	
4	I agree to my responses being used for education and research on condition my privacy is respected. I understand that my responses will be used in aggregative form only, so that I will not be personally identifiable.	
5	I understand that I am under no mandatory obligation to take part in this study.	
6	I understand I have the right to withdraw from this study at any stage.	
7	I understand that this research might be published in a research journal and/or policy document. In the case of thesis, the document will be available to readers in a university library in printed form, and possibly in electronic form as well.	

Name of the Participant………………………………..Signature………….…..Date............

For Any Questions (FAQs)

If you have any questions feel free to contact me, the researcher on +263 776 339 580, email: gmahlangu.philosopher@gmail.com

If you have any questions that need direct university response pertaining this research study, please contact my supervisor Professor Ephias Ruhode on email: RuhodeE@cput.ac.za

Model validation template

Introduction

This questionnaire is intended obtain your validation concerning the conceptual model for assessing e-government service gaps. The conceptual model was developed from constructs/themes/measurement dimensions and indicators obtained from various fragmented e-government assessment typologies. The model is intended to assess e-government services deployed or deployable in the context of a developing country like Zimbabwe.

Structure

This questionnaire is divided into three (3) sections (A, B and C). Section A is designed to obtain general demographic information. Section B is intended to provide definitions of quality parameters for validating a model. The purpose is to ensure that experts have a shared understanding about the quality requirements of the model. Section C presents the qualitative information needs of the model.

Section A: Demographic information

Item	Response
Gender	
Organisation	
Highest qualification	
Designation and/ or position	
Duties and responsibilities	
Years of experience in the position	
Years of experience in the design/development/implementation/evaluation or monitoring of e-government	

Section B: Quality parameters for validating a model

NOTE: Kindly refer to the definitions provided below when commenting on quality parameters provided in section C.

Quality parameters for model validation

Parameter	Description	Reference
Relevance	Relevance refers to the extent to which the measurement dimensions/concepts included are appropriate for the model to achieve specific goals.	Hevner, March & Park (2004)
Usefulness	Usefulness refers to the extent to which a model is suitable for accomplishing a specified purpose.	Davis (1989)
Usability	Usability refers to the extent to which a model is perceived as usable by particular users to achieve specific goals.	Shawgi & Noureldien (2015)
Completeness	Completeness is concerned with ensuring that the measurement dimensions/concepts which make a model comprehensive for accomplishing a specific purpose are all specified.	Arora, Sabetzadeh & Briand (2019)
Systematic construction	Systematic construction refers to the manner in which the model is perceived as constructed logically; that is, the concepts of the model are arranged sequentially starting from independent variables, followed by moderating variables, then, lastly dependent variables.	Mendling et al. (2019)

<u>Section C: Qualitative information needs for model validation</u>

The researcher is seeking for feedback concerning the relevance, usefulness and usability of the model in the context of a developing country like Zimbabwe and its completeness and systematic construction. Kindly provide your expert comments in the table below.

<u>NOTE</u>: You may use a separate document; however, commenting in the spaces provided will enable easy filing and referencing of responses.

Quality parameter	Comments
Relevance	
Usefulness	
Usability	
Completeness	
Systematic construction	
Strength of the model	
Weaknesses of the model	
Is there anything that you expected from the conceptual model but was not included? If yes, indicate and justify the suggested addition.	
Is there anything that is supposed to be removed from the model? If yes, justify your suggestion.	

END OF MODEL VALIDATION

APPENDIX D: TEMPLATE ANALYSIS

Template 1: Government employees

Super code	Code family
Requisite infrastructure	Robust ICT infrastructure
	Government-owned infrastructure
	Electricity supply
Interoperability	Compatibility of devices
	Independent e-government systems
	Compatible infrastructure
Digital divide	Access to the internet
	Access to e-government services
	Access to computing devices
E-government funding	Financial support
	Funding dilemma
Budget	Over burdened budgets
	Budget politics
Support and coordination	Coordination
	Top management support
Policy inconsistency	Rhetoric policy
	Unclearly defined policy

Template 2: Businesses

Super code	Code family
Infrastructure investments	Government-owned infrastructure
	Outdated ICT infrastructure
	Unreliable power supply
Interoperability	Compatibility of devices
	Systems operate independently
Digital divide	Access to the internet
	Network coverage
	Unaffordable devices
E-government design	Experience in e-government design
	Expertise in e-government design

Template 3: Citizens

Super code	Code family
Requisite infrastructure	Government-owned infrastructure
	Electricity infrastructure
Interoperability	Compatibility of devices
	Systems integration
Digital divide	Access to the internet
	Inadequate network coverage
	Unaffordable devices

E-government design	Experience in e-government design
	Expertise in e-government design
User involvement	Design assumptions
	Lack of consultations