



**User interactive service provisioning framework for enhancing  
citizens' adoption of mobile enabled government services in  
Tanzania**

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# **DEDICATION**

A dedication to:

My late parents, my father the late Capt. Jua Joel Goyayi and my mother Fortunata  
Edward Goyayi, continue resting my guardian angels

My Husband, John Mzee Saburi, thank you for always believing in me

My Sons Sean, Collins and Ethan-Ivan, I love you very much



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Lastly, I alone remain entirely responsible for expressed views and shortcomings, such as errors, omissions and mistakes in this report.

## **ABSTRACT**

Mobile enabled government (m-government) services are trending due to the envisaged efficiencies in time, access, and freedom of movement that mobile and wireless technology accords public administration and service provision. These benefits are only attainable if citizens adopt m-government services. However, adoption of m-government services has persistently continued to be a challenge worldwide. Consequently, this study investigates the challenges associated with citizens' adoption of m-government services and recommends a service-provisioning framework to mitigate the identified challenges. The framework is informed by a holistic examination of both provision and consumption perspectives towards m-government service adoption. The provision perspective focuses on unveiling the provisioning practices, while the consumption perspective focuses on identifying factors that influence citizens' adoption decisions for m-government services. The study applied a mixed-methods approach in a two-phased research process, that is, the adoption challenges identification and the framework evaluation. It employed a questionnaire and interview approach to collect data in the adoption challenges identification phase, and a mix of open- and closed-ended questions for the framework evaluation phase. A total of 396 citizens constituted the sample for the quantitative part, and 16 employees from four participating government organisations constituted the sample for the qualitative part of the challenge identification phase. In the framework evaluation phase, a sample of 12 experts was consulted to assess the viability of the developed service-provisioning framework to mitigate the citizens' adoption challenges for m-government services.

The study used the structured equation modeling (SEM) technique for quantitative data analysis and a thematic analysis technique for the qualitative data. Findings indicate that while emotional and cognitive factors significantly affect citizens' adoption decisions, they are negligibly addressed in the current provisioning practices for m-government services. Hence, the developed service-provisioning framework advocates for an interactive citizen-centric provisioning practice to facilitate mitigating the adoption challenge. Findings for the framework evaluation divulge that the framework is suitable in addressing citizens' challenges in adopting m-government services. Thus, the constructed framework will assist government organisations in Tanzania to develop and provide highly adoptable m-government services. This study recommends ongoing IT skills building trainings for both citizens and public officers to facilitate awareness and acceptance of m-government services.

## DERIVED PUBLICATIONS

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## **LIST OF ABBREVIATIONS**

AI	Attitudinal Influences
ASV	Average Shared Variance
AVE	Average Variance Extracted
BC	Behaviour Control
BI	Behaviour Intention
BYOD	Bring Your Own Device
CC	Citizen Centric
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CR	Composite Reliability
DAWASCO	Dar es Salaam Water and Sewage Company
DF	Degrees of Freedom
DOI	Diffusion of Innovation
DSR	Design Science Research
eGA	e-Government Agency
EGDI	e-Government Development Index
EPOCA	Electronic and Postal Communication Act
FC	Facilitating Condition
FI	Financial Influence
GePG	Government electronic Payment Gateway
HV	Hedonic Value
IAP	Infrastructure Access Provider
ICT	Information Communication Technology
IFI	Incremental Fit Index
ISP	Internet Service Provider
IT	Information Technology
ITU	International Telecommunication Union
KMO	Kaiser-Meyer-Olkin
MDAs	Ministry, Department and Agencies

MDI	Mobile Development Intelligence
MDS	Mobile Data Service
mG2B	Mobile Government to Business
mG2C	Mobile Government to Citizen
mG2E	Mobile Government to Employee
mG2G	Mobile Government to Government
MGAUM	Mobile Government Adoption and Utilization Model
MoICT	Ministry of Information and Communications Technology
MPAIS	Market Place for Information and Services
MSP	Mobile Service Provider
MSV	Maximum Shared Variance
NBS	National Bureau of Statistics
NECTA	National Examination Council of Tanzania
NFI	Normed Fit Index
NPA	New Public Administration
NPG	New Public Governance
NPM	New Public Management
NPS	New Public Service
OECD	Organisation for Economic Cooperation and Development
PC	Personal Computer
PDA	Personal Digital Assistance
PE	Performance Expectancy
PO-RALG	President's Office - Regional Administration and Local Government Authority
PSP	Public Service Provider
PSRP	Public Service Reform Programme
PV	Public Value
PVM	Public Value Management
RMSEA	Root Mean Square Error Approximation
RO	Research Objectives
RQ	Research Question

RWD	Responsive Web Design
SARS	South Africa Revenue Services
SE	Self-Efficacy
SEM	Structured Equation Modelling
SMS	Short Message Service
SN	Subjective Norms
SSR	Social Science Research
TAM	Technology Acceptance Model
TANESCO	Tanzania Electricity Supply Company
TCRA	Tanzania Communication Regulatory Authority
TI	Technology Influence
TLI	Tucker Lewis Index
TOE	Technology-Organisation-Environment
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TS	Trust and Security
TSP	Telecommunication Service Provider
TTCL	Tanzania Telecommunication Company Limited
UMEGA	Unified Model of Electronic Government Adoption
UMTAMES	Unified Model of Technology Adoption for Mobile Enabled Services
UN	United Nations
URT	United Republic of Tanzania
USE	Use Behaviour
USSD	Unstructured Supplementary Service Data
UTAUT	Unified Theory of Acceptance and Use of Technology
WiFi	Wireless Fidelity



# CHAPTER ONE

## PROBLEM SETTING

### 1.1 Introduction

The high diffusion of mobile phones in the world has unleashed several opportunities for their application in various fields. Simple mobile phone functions like voice calling, text messaging, and image exchange have become powerful tools, constantly re-defining interactions between citizens, government, and businesses, thus amplifying democracy through increased citizen awareness and participation in state affairs (Hellström, 2008). Mobile services are thus referred to with a prefix "m", for example, m-commerce for mobile commerce, m-banking for mobile banking, and so m-government for mobile-enabled government services. The concept of m-government has been defined differently according to different perspectives and backgrounds. While some definitions have focused on the technological aspect being utilized (Munyoka & Manzira, 2014; Somani, 2012; Kushchu & Kuscu, 2003), others have focused on the impact it has on the society at large (Hellström, 2008). This study considers both perspectives to investigate and understand the dynamics in decision making for m-government service adoption. Thus, m-government is defined as the use of wireless and mobile technologies in governance and public service delivery, not only encompassing a series of initiatives for public service-provisioning of mobile platforms but a radical change in the society-government interaction.

However, for m-government to exist, an e-government strategy and structure must be in place (Munyoka & Manzira, 2014), meaning it merely extends e-government services and implements other applications that are only possible through wireless and mobile technologies. The recent high diffusion of mobile phones has made mobile multimedia applications such as voices, images, and text messages, either supported through sim cards or via the Internet, a powerful tool for communication. Correspondingly, increasing citizen demand for quality public services is exerting pressure on governments to seek innovative transformations, that is, to evolve from traditional e-government services to more streamlined solutions that utilize existing synergies for impactful public service provisioning. Due to its ability to deliver public services without restrictions on time,

location, distance, and motion, Munyoka & Manzira (2014) regard m-government as a better alternative to e-government. However, Pandey & Sekhar (2013) affirm m-government not be a substitute but a service that only extends and offers an alternative channel to delivering e-government services. Consequently, various governments, in acknowledging the need for an integrated multichannel service delivery, strive to find ways to utilize mobile technology for better public service provisioning.

Hellström (2008) provides an account of numerous m-government initiatives taken at the global level. In Tanzania, the mGov platform is one among many m-government initiatives, however different in that it attempts to offer a one-stop infrastructure center for all m-government services (URT, 2017). However, Gupta, Bhaskar & Singh (2016) and Zhao, Shen & Collier (2014) attest that citizens' adoption is critical for successful provisioning, arguing that end-users must first accept and utilize such initiatives for the government to realize any impactful results. Despite supply efforts, m-government service adoption has remained a challenge with lower adoption rates, especially in developing countries (Almuraqab, 2016). Gupta, Bhaskar & Singh (2016) further note factors challenging adoption such as administration, infrastructure, technology, security and trust, income, and lack of awareness to be unique and peculiar to context. For example, Tanzania, in addition to globally acknowledged challenges, is also affected by accountability and ownership of initiatives within government structures (Lupilya & Jung 2015). Thus, the greatest iniquity would be to transpose adoption knowledge from one context to another (Heeks, 2003).

Furthermore, the peculiar nature of m-government adds a contextual difference with e-government. The customer pay-per-use nature of m-government services which is typical to all mobile data services, is contrary to e-government services whose costs are mostly a once-off charge per an array of services, or subsidized within organisational costs. Hence, despite the existence of adoption literature from various countries and on various technological innovations, it does not adequately provide a contextual understanding of the citizens' adoption problem concerning m-government services in Tanzania. It is thus, imperative to investigate factors influencing citizens adoption decisions and the corresponding m-government service provision practice to generate context-specific knowledge for developing nations and, more specifically, for Tanzania. The context-

specific knowledge generated informs policy and practice on m-government service provisioning in Tanzania in that it provides foundational knowledge to understand the problem of adoption as well as suggest both policy and implementation guidelines to facilitate m-government provisioning. Furthermore, the context-specific knowledge generated regarding influences of citizens' adoption is then used to develop an m-government provisioning framework, a tool to aid m-government service provision in Tanzania with a citizen (consumer) experience focus.

## **1.2 Background Information**

Recent evidence on the impact of mobile technology in everyday life is ever more vivid on the strategic and revolutionary role in the public sector. Enabled mobility through mobile solutions and applications offers opportunities for a more responsive public sector (OECD/ITU, 2011). Mobile technologies include mobile phones, personal digital assistants (PDAs), laptops, netbook computers and tablets to mention a few. However, mobile phones have out-diffused other technological advancements; with over 80% of the world's population as subscribers and over 600 million users in Africa alone, mobile phones have surpassed other mobile technologies (MDI, 2013). According to International Telecommunication Union (ITU) published statistics, in 2018 Tanzania had approximately 43 million mobile-cellular subscribers with a tele-density penetration rate of 77% (ITU, 2019). Such high penetration rates give mobile networks the potential to provide the much-desired inexpensive alternative infrastructural access to the Internet through wireless interconnectivity (Zmijewska, Lawrence & Steele, 2004; Abdelghaffar & Magdy, 2012), especially for people in developing countries like Tanzania.

The implementation of m-government service in developing countries is highly pegged on the promises of greater efficiency, transparency, and accountability for the public sector (Al-Hujran et al., 2015; Chen et al., 2015; Hamadi, 2018). In Tanzania, mGov aims to improve efficiency and effectiveness in delivering public services amidst unreliable infrastructure, low Internet penetration, high Internet service costs and unreliable power supply, typical ingredients for the digital divide (URT, 2015; 2017). m-Government offers an inherent strategic way of conducting government businesses, with transformative capabilities over both, the government and its stakeholders (Valk, Rashid & Elder, 2010; van Belle & Cupido, 2013). This transformation is expected to cut down

costly physical visits, red tape bureaucracies, and possibly corruption, and to increase public participation in public sector governance.

According to Zhao, Shen & Collier (2014), m-government impacts and benefits are only realizable if adopted by citizens. Also, Hu et al. (2011) argue that despite its promises, m-government does not have any effect unless the potential users utilize it to access public services. Similarly, Ooi & Tan (2016) demonstrated that without adoption, governments and other funding stakeholders are discouraged from investing further in necessary infrastructure. Also, Margetts (2006), as supported by Yonazi (2010), accounts for adoption by masses as an essential pre-condition for impactful provisioning. Thus, for success, it is paramount to encourage adoption by masses, and for that understanding, adoption is critical. Adoption has been defined differently based on different perspectives. Two extant perspectives are organisational and individual adoption. The organisational perspective defines adoption as the acquisition and deployment of mobile technologies within organisational structures (Kalokola, 2012; Yonazi, 2010) while the individual perspective defines it as the individuals' intentions and willingness to engage and use m-government services (Warkentin et al., 2002; Gilbert, Balestrini & Littleboy 2004; Carter & Belanger, 2005; Shareef et al., 2016). However, Kumar et al. (2007) view adoption as multifaceted, encompassing frequency of use, the scope of usage, and preference of medium to transact, applicable to both individual and organisational perspectives. This thesis thus adapts the individual perspective, defining adoption as citizens' intention, willingness, acceptance, choice, and usage of medium to engage with a public organisation.

In Tanzania, numerous evidences indicate that access to government information and services involves costly physical visits, bureaucracy, corruption, and inefficient processes, sometimes across several government organisations (Tepani & Mushi, 2016). Responding to these challenges, Tanzania undertook several reforms with ICT at its center (Therkildsen, 2000; URT, 2008). These include the government portal, organisational websites, online tax processing, and the educational management information system (Hellström, 2008; Tepani & Mushi, 2016; Wicander, 2011). Major initiatives towards ICT application in the public sector included the approval of the National Information and Communication Technology Policy in 2003, the establishment

of the e-Government Agency (eGA) mandated to coordinate and oversee e-government initiatives and the 2012 National e-Government strategy aiming to ensure an all access to government services. m-Government is a recent phenomenon in Tanzania, mostly implemented at an organisational level (Hellström, 2008; Mengistu, Zo & Rho, 2009; Wicander, 2011). Recently, efforts to consolidate m-government initiatives at a national level have been taken with the launching of an integrated government mobile platform, mGov, for delivering government service. The mGov currently connects several services, including the voters' register, national health fund, government recruitment services, and utility payment portals. The mGov uses simple text messaging (SMS) consisting of two sub-systems; SMS gateway and the Unstructured Supplementary Services Data (USSD) gateway accessible via shortcode (\*152\*00#) to access the service menu. The SMS gateway is implemented either as a push SMS originating from government to citizens or a pull SMS that is citizens' SMS requests to a specific government organisation. Using the push SMS allows public organisations to send SMSs to a single person, a group, or broadcast (URT, 2017).

However, adoption is a challenge in Tanzania as it is elsewhere (Al-Hujran & Migdadi, 2013; Lubua, 2017; Rana & Dwivedi, 2015). In Tanzania, despite investments and potential benefits, the mGov platform remains unpopular, unlike similar initiatives from the private sector, for example, the popular Vodacom mobile money, MPESA (Kimeli, 2016). Also, Lubua (2017) attests, while it remains common to complete online business transactions over the phone, it is hardly the case in accessing government organisations. Reports on the voters' information verification exercise for the 2015 general election corroborates this. Various newspapers, for instance, The Citizen Tanzania (Machumu, 2015) and Habari Leo (Wandi, 2015), reported long queues in designated offices despite the availability of the same service on the mGov platform that afforded people the luxury of convenience, time and space. In attempting to explain the limited adoptability, several reasons exist; for instance Yonazi (2010) and OECD/ITU (2011) claim that in part it is associated with the lack of understanding of the complexities linked with decision making towards acceptance and use of technology, while others, including Abdelghaffar & Magdy (2012), Yfantis et al. (2013) and Reddick (2014), indicate it is the context-specific nature of adoption that inhibits transposition of best practice, thus calling for further research to generate context-specific knowledge.

Moreover, a dominant portion of the existing knowledge on m-government service adoption reflects developed contexts with sporadic accounts of developing contexts. Furthermore, as adoption is a context-specific phenomenon, applying available knowledge in the context of Tanzania may yield undesired outcomes. Moreover, m-government is a resource-intensive initiative prone to high failure rates if contextual factors are not considered (Heeks, 2003). Given the resource limitations, developing and underdeveloped countries like Tanzania cannot afford experimentation and frequent failures. Therefore, there is an urgent and vital need to generate context-specific knowledge on m-government service adoption in order to inform the development of an m-government service-provisioning framework to guide and enhance citizens' adoption.

### **1.3 Research Problem**

Citizens' adoption is imperative for any successful m-government service provisioning. A lack of adoption by the masses hinders the realisation of the envisioned m-government benefits (Margetts, 2006; Yonanzi, 2010; Ooi & Tan, 2016). m-Government benefits such as accessibility, scalability, efficiency, responsiveness, and reduced costs (OECD/ITU, 2011) increases citizen's participation and enforces accountability in public sector administration (van Belle & Cupido, 2013). Correspondingly, as m-government implementation requires significant investments, a lack of adoption renders the investments irrelevant, discouraging funding in ICT infrastructure (Ooi & Tan, 2016). Thus, developing states like Tanzania, struggling with funding, cannot afford failed initiatives.

However, adoption has persistently remained a challenge globally, and in Tanzania (Ibrahim & Mohammed, 2008; Yonazi, 2010; Ooi & Tan, 2016; Talukder et al., 2019). At a global level, Savoldelli, Codagnone & Misuraca (2014) and Capgemini (2012) indicate a high electronic service supply (75%) yet lower consumption rates, slacking below 30% in most countries. In Tanzania, despite numerous m-government initiatives (Therkildsen, 2000; Hellström, 2008; Yonazi, 2010), the adoption of m-government services among citizens is low (Lubua, 2017). Schuppan (2009) demonstrates that poverty, illiteracy, inadequate infrastructure, and high access costs contribute to low adoption. Conversely, certain provisioning practices are noted to improve mass adoption. For instance, Canada's lead for four consecutive years on the e-Government

Development Index (EGDI) is associated with its regular citizen survey (UN, 2016), a practice noted contrary to most governments that rely on assumed citizen need (Ibrahim & Mohammed, 2008).

Additionally, Akman & Rehan (2016) note scarcity on specific knowledge regarding m-government in developing nations. Generally, most studies contribute knowledge on e-government in Tanzania (for example, Yonazi, Sol & Boonstra, 2010; Yonazi, 2010; Sæbø, 2012; Komba, 2016; Lubua, 2014; Hamadi, 2018), while very few have focused on m-government (for example Wicander, 2011; Susanto & Godwin, 2011; Ishengoma, Mselle & Mongi, 2019). However, the peculiar nature of m-government services, specifically the direct costs incurred per transaction and the mobility it affords government services, makes it unique from other e-government services (Teo et al., 2012). Correspondingly, Garbacz & Thompson (2005) revealed differences in the applicability of mobile service usage models between developed and developing contexts. The scarcity in context-specific knowledge implies that m-government service provisioning in Tanzania is less informed with relevant knowledge. Consequently, according to Heek's (2003) design-reality model, transposing non-contextual knowledge on m-government service provisioning runs a high risk of failure. Moreover, the few studies that investigate m-government service adoption lack practical recommendations that incorporate the knowledge to guide practice in provisioning m-government services.

Moreover, setting up and provisioning m-government services, just like other ICT implementation, is resource intensive. Amid the unrealised benefits due to lack of citizens' adoption, not only the continual funding for m-government service implementation declines but also investments in the much needed public ICT infrastructure gets discouraged (Ooi & Tan, 2016). This defeats the purpose of reducing cost of access to public services as it increases expenses for service handling either through the use of private ICT infrastructure or through the use of personnel on top of m-government services.

Consequently, with poor citizens' adoption, high transaction costs, ineffectiveness and inefficiencies in accessing government services prevail. Investments made, undeniable potentials and the limited citizen adoption of the m-government services obliges governments, researchers, and practitioners to investigate adoption further, to understand

factors and challenges that hinder citizen's uptake of such initiatives, thus avoid further failure. This research responds to the eminent problem faced by the government of Tanzania by addressing the main research question:

"How can citizens' adoption of m-government services be enhanced in Tanzania?"

#### **1.4 Research Questions**

In responding to the central research question stated above, five specific questions were investigated, which are:

- RQ1.** What is the status of citizens' adoption of m-government services in Tanzania?
- RQ2.** How are m-government services provided in Tanzania?
- RQ3.** What factors influence citizens' adoption of m-government services in Tanzania?
- RQ4.** How are the identified citizens' adoption factors and the provisioning practices challenging the adoption of m-government services in Tanzania?
- RQ5.** How can the identified challenges be addressed for increased citizens' adoption of m-government services in Tanzania?

#### **1.5 Research Objectives**

The research questions stated above aimed to achieve the following specific objectives:

- RO1.** To assess the status of citizens' adoption of m-government services in Tanzania.
- RO2.** To examine the m-government services provisioning practice in Tanzania.
- RO3.** To identify factors influencing citizens' adoption of m-government services in Tanzania.
- RO4.** To examine the influence of the identified citizens' adoption factors and the provisioning practice on the adoption of m-government service in Tanzania.
- RO5.** To develop a service-provisioning framework that addresses the identified challenges for increased citizens' adoption of m-government services in Tanzania.



## **1.6 Research Justification**

The Tanzania Vision 2025 acknowledges that over time, the nation has developed the propensity to prepare and pronounce ambitious public service-provisioning programs and plans that lack effective mechanisms to implement, monitor, and evaluate (URT, 2000a). This practice has resulted in weak implementation, limited adoption, and erosion of confidence and trust among citizens and funding organs. Consequently, people are becoming less eager to participate in national undertakings compared to their participation in similar services from the private sector (Lubua, 2017; Talukder et al., 2019). It is critical to rethink the provisioning of public services in order to sustain a competitive socio-economic transformation, citizen's interests in national endeavors, and attraction of funding from various sources within and outside the country. Currently, the provisioning strategies further perpetuate the adoption problem (URT, 2000; 2012). Furthermore, the lack of research on e-government and its subsequent forms is one among many significant issues affecting provisioning, as noted by the e-government strategy (URT, 2012). Correspondingly, with the scarcity of context-specific knowledge on citizens' adoption of m-government service (Akman & Rehan, 2016), it is paramount to generate context-specific knowledge to inform the envisioned public service reforms.

Consequently, this research supports the Tanzania Vision 2025 to ensure sustainable implementation and provisioning of public services through adoptable m-government services. Also, it aspires to address the e-government strategy 2012 concerns on limited relevant research and innovations on e-government in Tanzania (URT, 2012). The research contributes to the much needed empirical knowledge on citizens' adoption of m-government services in Tanzania. Additionally, its application of a holistic approach to understanding factors inhibiting citizens' adoption of m-government services in Tanzania warrants the research the opportunity to recommend a provisioning strategy to entice citizens to use it.

## **1.7 Significance of the Study**

This research is vital in the generation of knowledge around citizens' adoption of ICT innovations by the government, particularly m-government, in several ways. First, prior studies in Africa and Tanzania specifically focused either on general ICT adoption and government reforms (Therkildsen, 2000; Mayingu, 2004; Lwoga, 2014), organisational

level e-government adoption (Ndou, 2004; Ngulube, 2007; Yonazi, 2010; Wicander, 2011; Komba & Ngulube, 2012) and a few on citizens' perspectives on e-government adoption (Komba, 2012). Very few studies have focused on citizens' adoption of m-government services, including Susanto & Godwin (2011) that explored global perspective with a minor (3.47%) representation of Tanzanians with access to Internet, and Ishengoma, Mselle & Mongi (2019) who focused on the identification of critical success factors for implementation. This study fills this empirical knowledge gap by assessing the determinants of m-government service adoption by Tanzanians.

Second, the existing frameworks for assessing adoption are inadequate to capture the 'mobility' phenomenon that m-government service offers. For instance, the technology adoption model (TAM), diffusion of innovation theory (DOI), and the unified theory of acceptance and use of technology (UTAUT) do not capture the effect of the technology itself, that is, the mobility that mobile technologies introduce on government services. Thus, this research advances theoretical knowledge in general and generates contextualized knowledge on citizens' adoption in Tanzania to inform provisioning and, thus, enhance adoption for m-government services.

Finally, the results of this study have socio-economic value to both the private and public sectors in Tanzania. The study applies a holistic approach that explores both citizens' perceptions and provisioning practice to understand the adoption problem and, consequently, provides practical recommendations in the form of a service provisioning framework for both m-government and m-commerce services alike.

## **1.8 Report Organisation**

This report is organized into nine chapters as presented below.

**Chapter one** introduces the research by presenting the background, the problem, research questions and objectives, significance, and contributions that the research makes to policy, body of knowledge, and practice in general.

**Chapter two** reviews relevant literature to define concepts, and the discourses or debates around technology adoption. It also provides an overview of the adoption of m-government service from theoretical and empirical perspectives.

**Chapter three** models the conceptual framework guiding this research, providing a discussion and justification on its relevance, applicability, and the variables that guide data collection.

**Chapter four** identifies the methodology that guided the field exercise. It elaborates and justifies the research design, study area, population, research sample and sampling techniques, data collection tools, data quality issues, and analysis methods.

**Chapter five** presents the analysis and results from both quantitative and qualitative data collected from the field. Specifically, it presents both quantitative and qualitative results, which is citizens' perception of factors influencing adoption decision-making and the practice around m-government service provisioning in Tanzania, respectively.

**Chapter six** presents an in-depth discussion of the results corresponding to research objective four, which aims to determine the influence of both citizens' perceptions and provisioning practice on the adoption of m-government services in Tanzania, thus integrating quantitative and qualitative results.

**Chapter seven** focuses on incorporating the findings in response to research objective five. Specifically, the chapter presents the modeling and contextualisation of the m-government adoption problem, a candidate solution for the identified gap, and the service-provisioning framework.

**Chapter eight** justifies the recommended service-provisioning framework by presenting results assessing its relevance, usefulness, applicability, and flexibility. It also captures any modifications as recommended by the experts that examined the framework.

**Chapter nine** provides the summarisation and concluding remarks on the research. It presents the recommendations made to policy and practice, and also accounts for the limitations encountered and the recommendations made for future research.

## **1.9 Summary**

This chapter provides the foundation for this research. It introduces the research by highlighting the importance and revolutionary aspect of mobile technology in public sector service provision. The information provided acknowledges the wide spread and acceptance of mobile phones and how this is shaping the government-citizen interaction.

Also, the information provided highlights how wireless and mobile technologies serve as a solution to the developing countries' Internet connectivity infrastructural problem by providing alternative low-cost connectivity via widely available mobile and wireless infrastructures. Consequently, numerous efforts to integrate mobile and wireless technology in public service provision are noted in the discussion. Despite several benefits arising from the utilisation of mobile technologies in the public sector, especially in developing countries, this chapter highlights that the adoption of m-government service remains a challenge in Tanzania, as elsewhere. Moreover, while organisational adoption of m-government service is high, citizens' adoption is very low, as depicted by the e-Government Development Index in the discussion. Thus, researchers, policymakers, and practitioners are urged to investigate and recommend practical solutions that will enhance citizens' adoption of m-government services. This chapter therefore establishes the research problem that is investigated.

# CHAPTER TWO

## LITERATURE REVIEW

### 2.1 Introduction

Creswell (2013) defines a review of literature as a critical analysis of prior knowledge from scholarly materials, including books, articles and relevant reports regarding a topic, to highlight the results of related studies, and position the study within the debate to extend knowledge. It provides a comprehensive summary, indicating what is known and what is unknown about the study, therefore setting the rationale warranting the research. Thus, this chapter provides a critical synthesis of literature related to m-government service provisioning and adoption.

The exponential diffusion of mobile technologies, more specifically, mobile phones, has significantly changed how people related to each other and how they expect to relate with organisations like the government in everyday life. Mobile phones have spread widely, more than other technological advancements; in 2019, over 80% of the world's population were recorded as subscribers, of which 836 million people were in Africa alone (ITU, 2019). The enabled mobility through mobile solutions and applications is claimed to provide opportunities for a more responsive public sector (OECD/ITU, 2011); thus, many governments have embarked on provisioning mobile government service (i.e., m-governments). However, citizens' assimilation and use of the resulting m-government initiatives is noted globally to be a challenge (Lupilya & Jung, 2015; Almuraqab, 2016; Gupta, Bhaskar, & Singh, 2016). Moreover, with the success of m-government service provisioning's reliance on its adoption by citizens being an acknowledged challenge, then it is essential to review existing knowledge to understand further the dynamics within m-government service adoption in order to inform improvements in provisioning. Hence, this chapter reviews the literature to establish a gap in existing knowledge and provide justification for this research.

## **2.2 The m-Governance Concept**

The EOCD/ITU (2011) argues that the evermore-evident impact of mobile phones has found its way into public service delivery through its facilitation of mobility and access to public services beyond the Internet and wired phones' reach. This practice has given rise to the mobile government (m-government) concept, whereby government information and services are delivered anywhere and anytime through wireless and mobile technologies including phones, portable computers, personal digital assistants (PDAs) and other WiFi enabled devices (Palka et al., 2013; Wang, 2014). Several researchers have defined m-government differently depending on the context of their research (Kushchu & Kuscu, 2003; Al-Hadidi, 2010; Raja et al., 2012; Sareen, Punia & Chanana, 2013; Althunibat, Alrawashdeh & Muhairat, 2014; Alotaibi, Houghton & Sandhu, 2016). Prevailing definitions either focus on mobile and wireless technology exclusively as a channel for public service delivery, or both public administration and service delivery (Shareef et al., 2016; Naidoo & Nzimakwe, 2019). For instance, Kushchu & Kuscu (2003), pioneers of m-government research, considered m-government as a strategy and its implementation utilizing all kinds of wireless and mobile technologies, services, applications, and devices for improving benefits to all stakeholders. Similarly, Oui-Suk (2010) adapts this definition and modifies it to imply an intricate business strategy to facilitate efficiency in using wireless and mobile technologies, to provide immediate access to both service and information to citizens.

Sareen, Punia & Chanana (2013), adopting an exclusive for public service delivery context, portray m-government as a functional subset of comprehensive e-government for the provision of location-based services and information using mobile and wireless platforms via wireless networks. Likewise, Alotaibi, Houghton & Sandhu (2016) align with this context by defining m-government as merely the use of wireless technology to deliver government information and services to users. Thus, m-Government, in this case, is viewed as a vehicle or media for delivering e-government services. However, Raja et al. (2012) argue that m-government is beyond just a vehicle for e-government services, but a transformational strategy affecting government processes and governments' interaction with its stakeholders. Researchers supporting this context include Al-Hadidi (2010), Althunibat, Alrawashdeh & Muhairat (2014), and the

OECD/ITU (2011). For instance, Althunibat, Alrawashdeh & Muhairat (2014) define m-government as a method by which governments exploit the benefits of wireless and mobile technologies to derive and deliver public value to users within the government and its citizens.

Drawing on these perspectives, m-government in this research is defined as the use of mobile platforms such as mobile phones, palm-tops and Personal Digital Assistants (PDAs) to transform the creation of public value through interaction between government and its stakeholders (including citizens, businesses or other government agencies) for public service delivery. Therefore, it implies the strategy, its implementation, and, consequently, the transformative effect of using mobile technologies (i.e., the mobility effect) to both citizens and the government. This attestation is consistent with Al-Hadidi's (2010) attestation of the inevitability of the natural transformative power of m-government in public service provision by extending e-government.

### **2.2.1 Evolution of m-Government Services**

m-Government, although a modern concept, has attracted considerable research attention (Hellström, 2008; Mengistu, Zo & Rho, 2009; Oui-Suk, 2010; OECD/ITU, 2011; Maranny, 2011; Abdelghaffar & Magdy, 2012; Raja et al., 2012; Yfantis et al., 2013; Dlamini & Mpekoa, 2018). Several debates exist in literature regarding the evolution of m-government services; some have explained evolution through the maturity model lens (Maranny, 2011; Dlamini & Mpekoa, 2018) while others explain it through intentions and manner for implementing m-government initiatives (Oui-Suk, 2010; OECD/ITU, 2011; Raja et al., 2012).

According to Lee & Kwak (2012), maturity models are designed to facilitate the evaluation of development in process, people, technology, and objectives based on set principles. In m-government, maturity models have been widely used to analyse the development of m-government services (Dlamini & Mpekoa, 2018). Table 2.1 shows various types of maturity models describing the development of m-government services. Table 2.1 indicates the authors of the maturity model, the number of stages, and a brief description of the maturity model stages. Important to note is that progress from one stage to the next indicates an increased level of sophistication and complexity in process and technology applied. Maturity models allow researchers and governments to assess

and measure progress in the implementation of m-government services. Maturity models are useful in explaining the achievement and the different features associated with each stage. Therefore, the m-government maturity model prevents ineffective practices and facilitates governments to keep track and direct m-government initiatives to maturity (Maranny, 2011; Valdés et al. 2011).

However, maturity models are only useful for monitoring and evaluating progress; they do not capture the why or how m-government services evolve in the manner explained. The models are simply an enumeration of attributes within a sequence of maturity levels without explanation on what triggers the progression from one stage to another. Likewise, the conceptualisation of evolution as distinct stages, which progresses continuously from one stage to another, is argued to be unrealistic (Joshi & Isalm, 2018). Moreover, the different stages in the maturity model are neither mutually exclusive from each other nor do they progress sequentially as depicted in most maturity models; in most cases, overlapping of stages occurs during implementation (Sandoval & Gil-Garcia, 2005; Goyayi, 2007; Joshi & Isalm, 2018). Despite the weakness, maturity models' ability to capture characteristics, technological sophistication and complexities at each stage (Goyayi, 2007), significantly contributes to the body of knowledge on m-government service development. The maturity model discourse does not necessarily suggest correctness in explaining m-government evolution but recognizes aggregate levels of technological sophistication, security, privacy controls and knowledge creation are continuously adding from one stage to a higher one (Maranny, 2011).

In contrast, emergent literature describes m-government evolution based on intentions for applying wireless and mobile technologies in the public sector (OECD/ITU, 2011; Raja et al., 2012). There are three categories of intentions for progressing m-government services from one stage to another, which include supplementary, expansionary, and innovation intentions. The supplementary phase involves applying mobile and wireless technologies as an alternative delivery channel to existing e-government infrastructures to overcome limitations of time and location (Raja et al., 2012). It has marginal implications for government, as it is limited to providing "physical" service at the needed location and time.



**Table 2.1: Review of Some m-Government Maturity Models**

Author	Number of Stages	Names and a brief description of the maturity model stages
Tozsa & Budai (2005)	Six levels	Information stage (communicating using SMS), interactive stage (prompt responses via SMS or MMS), transactional stage (variety of transactions over the mobile phones), transformation stage (systems with back end functionalities for administrative service processing via mobile phones)
Sandy & McMillan (2005)	Five stages	Initial stage (non-interactive wireless services and responses), enhanced stage (displaying regularly updated information), interactive, transactional or mature interface stage (financial transactions via mobile phones) and fully interactive stage (secure access, i.e., authorisation and identification through trusted secure networks to access government systems and facilitate personalized services)
Fasanghari & Samimi (2009)	Six stages	e-Government stage (services accessible through electronic infrastructures), migration stage (transition from e-service to m-service), primary interaction stage (interaction with government websites via mobile phones), full interaction stage (full scale interaction with citizens directly through mobile phones), transaction stage (financial transactions via mobile phones) and the ubiquity stage (services personalisation and availability in an ad-hoc manner)
Alijerban & Saghafi (2010)	Five stages	Presence and dissemination of information stage, interaction stage, transactional stage, vertical and horizontal integration stage (integration of machinery of communication only made possible through the integration of e-government across government organisations), and finally the portal and personalisation stage (facilitation of service customisation and single interface access to government services)
Maranny (2011)	Five stages	Initial (publishing) stage, enhanced (interaction) stage, reforming (transactional) stage, enriching (integration) stage and the governance (transformation) stage.
Dlamini & Mpekoa (2018)	Five stages	Augmentation (informational) stage, elementary (browsing ability via mobile phones) stage, interaction stage, transactional stage and the involvement stage (total transformation, greater convenience, and social media incorporated)

The expansionary stage applies mobile tools to expand the outreach of conventional government services to the un-served or underserved populations where personal computers and the Internet is not accessible. This phase expounds the use of mobile tool characteristics such as coverage, familiarity, and ease of use to serve those excluded due to infrastructure limitations (OECD/ITU, 2011). It has moderate to significant implications as it pioneers growth in capacity and process re-engineering to serve excluded citizens. The innovation stage applies mobile tools to develop new services and governance processes to transform the government to citizen interaction significantly. Innovative m-governments revamp not only the technology part but also the design and nature of service delivery and governance processes (Oui-Suk, 2010). It has significant implications for governance, as it requires changes in technology, processes, and culture to create a response capacity.

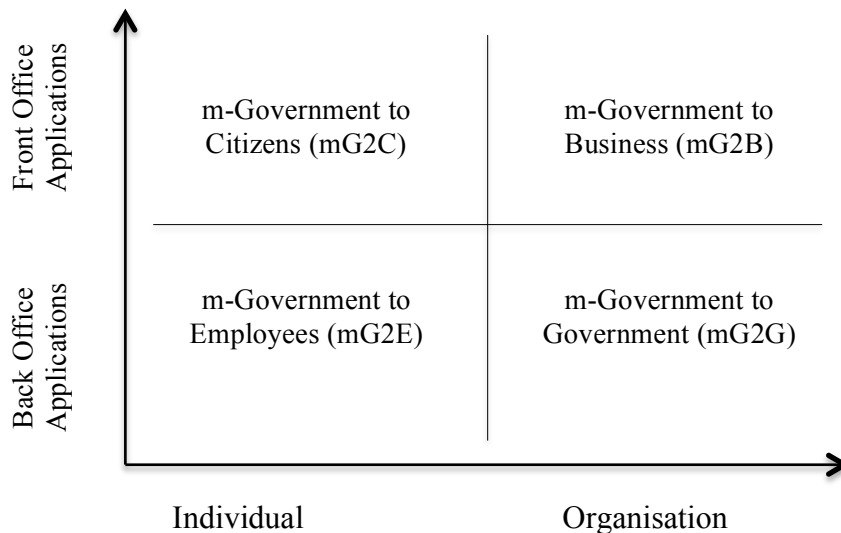
Similar to the maturity model, this discourse is also limited in terms of capturing the realities of evolution. The three phases are not as distinct and mutually exclusive from each other. The intentions for implementing m-government initiatives span more than one category. If anything, the discourse succeeds in portraying various forms of m-government based on the intention of implementation, together with the level of transformational complexities and implications in reforming the public sector. Furthermore, with the design of mobile applications ever evolving, robust m-government initiatives are anticipated in the future that might be beyond these simple conceptions of m-government evolution (OECD/ITU, 2011).

Consequently, a knowledge gap exists in providing a better realistic way to capture and explain the development of m-government services from one step to another. However, while this may not be the focus of this research, it is paramount to understand how m-government progresses and the various driving intentions for its evolution in order to understand its provisioning and, eventually, how these principles and practices may affect citizens' decision to adopt m-government services.

### 2.2.2 m-Government Stakeholders and Modes of Interaction

According to Nica (2015), a stakeholder is any person or group or organisation with interest or concerns relative to an outcome. Isagah & Wimmer (2018) attest that it is essential to identify all stakeholders related to m-government services, as they are critical for requirement elicitation as well as in proposing appropriate measures for provisioning. The literature identifies four key stakeholders to m-government, which include citizens, businesses, employees, and government (OECD/ITU, 2011; Mtingwi, 2015).

The identified stakeholders constitute a different relationship or interaction mode with m-government services. There are four types of m-government services with respect to the targeted audience (Oui-Suk, 2010; OECD/ITU, 2011; Qina, 2015). Figure 2.1 presents these four modes of interaction along types of applications involved (Back Office or Front Office) against the level of interaction, either individual or organisational level interaction.



**Figure 2.1:** Delivery Modes of m-Government Services (Oui-Suk, 2010)

**m-Government-to-citizen (mG2C):** These are m-government services or initiatives that facilitate interaction between citizens and their government. It constitutes the government to citizen and citizen to government interaction mode (OECD/ITU, 2011). These may include mobile polling services, government informational services through mobile phones, and mobile forums for citizens (Qina, 2015). According to EOCED/ITU's (2011) report and Nguyen et al. (2015), these services can be categorized into four main clusters;

informative services (one to many or one way information push services), interactive services (one-to-one communication or personalized services), transactional services (two-way communications with ability to facilitate payment online) and engagement services (connected and collaborative public sector and society services including e-voting, e-policy formulation to name but a few).

**m-Government-to-business (mG2B):** These are m-government services which aim to connect government organisations with the business community. It represents the government to business and the business to government interaction mode (OECD/ITU, 2011). These services may include tax services via mobile portals, mobile business registration portals (Oui-Suk, 2010).

**m-Government-to-government (mG2G):** These are services facilitating inter-governmental collaboration and cooperation. It constitutes the interaction between government organisations through the interconnection of applications to facilitate efficiency and effectiveness in public administration and public service provision (OECD/ITU, 2011).

**m-Government-to-employee (mG2E):** These are m-government services that aim to facilitate employee access to government systems for administrative purposes, also referred to as m-administration services (OECD/ITU, 2011). These services constitute the government to employee and the employee to government interaction mode.

Two modes, mG2G and mG2E, relate to the interaction within the government, either between the one government organisation and another, or with the employees. The mG2G and mG2E mostly facilitate public sector administration, while mG2C and mG2B are for public information and service delivery (Oui-Suk, 2010; OECD/ITU, 2011). The other two, that is mG2B and mG2C, relate to interaction between the government and stakeholders outside the government. While mG2G, mG2E, and mG2B are essential modes of m-government, this research focuses on the mG2C mode to examine citizen's behavior towards m-government service adoption and thus inform its provisioning practices in Tanzania.

### 2.2.3 Benefits of m-Government Services

A summary of the transition of public sector governance from the conventional government to a mobile government (m-government) by Oui-Suk (2010) provides a synthesis of various benefits associated with the ultimate m-government. Table 2.2 captures various characteristics across the three forms of government: that is, conventional government, electronic government, and the mobile government. The undeniable transformational impact of m-government services in the public sector is more so in developing countries, with mobile and wireless technologies providing inexpensive alternative interconnectivity to the constrained, limited telecommunication infrastructures and Internet connectivity (OECD/ITU, 2011).

**Table 2.2:** Form of Governments (Oui-Suk, 2010)

	Conventional Government (Service)	Electronic Government (e-services)	Mobile Government (m-service)
Principle	Bureaucratic Processes (Phone, Fax)	Process Re-engineering using IT (PC, Internet)	Seamless Integration and Linkages through Wireless devices
Service	8 hrs a day, 5 days a week	24 hrs a day, 7 days a week	24 hrs a day, 365 days non-stop
Service Space	In-person visits, Fax, Phone	Customer's home, kiosks or offices using Internet	Customer's location and Physical Place
Service Form	Several Visits to the Office	Multi-clicks to web portals	One time access to needed Service

According to the OECD/ITU (2011) and the UN (2012) reports, m-government initiatives are implemented with the ultimate aim of improving the accessibility of e-government services provisioning. Adoption of m-government services is said to facilitate equal access to public services and government information in the society (UN, 2014). Moreover, the use of mobile and wireless technologies in the public sectors is said to

promote sustainable development goals through facilitating the achievement of the advocated efficient and effective connected government (OECD/ITU, 2011; UN, 2016).

m-Government is said to improve the quality of public services through enhanced accessibility, availability, and variability (OECD/ITU, 2011). It facilitates availability and accessibility even in the remotest areas where wired mobile phones and Internet cannot reach, through a well-established mobile communication infrastructure coupled with wireless technologies (OECD/ITU, 2011; Nguyen et al., 2015).

In addition, Isagah & Wimmer (2017) attest that m-government services leads to reduction in cost through purchasing mobile devices compared to hardware requirements for e-government services, as well as reduction in cost of accessing government services due to flexibility brought by mobility in government services. This enhances accessibility for citizens at their convenient time, location, and even while on the move.

Furthermore, Müller et al. (2014) identify the contributions of m-government services in the public sector; first through its ability to provides public services twenty-four hours, seven days a week, and second, the improved response time which citizens can receive anywhere and at any time. Moreover, m-government services are also said to improve the efficiency and effectiveness of internal government processes. Implementing the mG2G and mG2E services improves inter-governmental ministries', agencies', and departments' interactions (OECD/ITU, 2011). In the political and governance arena, m-government services are said to improve citizens' participation in carrying out their civic duties and thus deepening democracy (UN, 2012). m-Government services contribute towards improved accountability of public offices by facilitating citizens' access to updated information and thus engagement in political dialogues and querying of public officers (Oghuma, Park & Rho, 2012). These numerous benefits, the advancement in technology, and the high diffusion of mobile and wireless devices have pushed governments to implement m-government services and leverage these advantages.

### **2.3 m-Government Initiatives**

According to Cordella & Bonina (2012), adoption of ICT and subsequently, m-government initiatives, is driven by the New Public Management (NPM) paradigm that aims to reform the crippled public sector governance. The desires within NPM for a

joined-up government whereby the conventional, single-purpose, disaggregated, and structured government undergoes integration into a service delivery government has propelled governments to search for the most innovative way to facilitate this integration (Cordella & Bonina, 2012). Elsheikh & Hijjawi (2016) note the advancements of ICT and its transformational effect of re-organising, re-engineering, streamlining and rationalizing procedures, as observed in the private sector, has significantly altered the interaction between citizens themselves and also how they interact with and demand services from the government. Also, Mandari, Chong & Wye (2017) acknowledge that the ability of mobile technologies to provide service in remote areas where physical Internet infrastructure and wired phones are limited has made m-government a public services delivery channel of choice, especially in developing countries. Features like mobility, ease of use, affordability, and extensive area accessibility have enticed societies and governments alike to embrace mobile and wireless technologies. The ‘anytime-anywhere’ value has driven a drastic uptake of m-government initiatives globally (UN, 2018). With new demands and high expectations from citizens, governments, especially in developing states where Internet infrastructure is limited, are pressured to transit to m-government to complement their e-government initiatives.

### **2.3.1 m-Government across the Globe**

Globally, most countries have embarked on implementing m-government services (van Belle and Cupido, 2013; UN, 2018). With mobile phone subscriptions reaching roughly four-fifths of the world’s population, it provides several opportunities to both private and public sectors alike (UN, 2016). For instance, by 2016, over 99 governments were using the Responsive Web Design (RWD), a dynamic technology for on-line government portal service delivery, which adjusts web appearance depending on orientation and screen size (UN, 2016). The RWD facilitates designing for a multitude of devices available to citizens by eliminating the need to build special mobile versions of the website. In the kingdom of Bahrain, a mobile portal is implemented as an alternative channel to delivering e-government services, listing services such as embassy contacts, doctor search, eWeather and payments of water, electricity bills or traffic fines (Ali AlSoufi, 2013). A similar initiative is also implemented in Jordan, whereby through an SMS gateway, citizens can inquire on vehicle licensing, individual or property tax, customs

fees, vehicle violations or can post complaints (Al-Hujran, 2012). In Mexico, the government has implemented the mEmergency system that sends alert messages to citizens using SMS on meteorological and other potential natural hazards (NenaMexico, 2014). In Hong Kong, a field inspection system developed, called the mPolicing system has been implemented to assist in fighting crime (Eskandar, Ubaldi & Chekasov, 2011).

### **2.3.2 m-Government in Africa**

In Africa, several m-government initiatives are noted (Hellström, 2008; Mengistu, Zo & Rho, 2009; Ogunleye & van Belle, 2014; UN 2018). In an attempt to improve public service access, especially in remote areas, many African countries have embarked on several m-government initiatives. For instance, in Kenya, some m-government initiatives include a road safety application for reporting traffic offences, home affairs mobile-enabled services (Mengistu, Zo & Rho, 2009), the m-utility services, the mobile-kilimo services, a call center for agricultural advise, and m-health for reporting at district level using SMS on the status of the blood bank repository (Ogunleye & van Belle, 2014). In South Africa, examples include the SMS notification system for the department of home affairs, the department of education in North-West province m-learning system for girl learners, and the South African Revenue Services' (SARS) SMS alert for tax returns (Dlamini & Mpekoa, 2018). Similarly, in Uganda, m-government initiatives include settlement of utilities bill payment through a portal that uses mobile phones (Ogunleye & van Belle, 2014); and the Marketplace for Information and Services (MPAIS), an SMS demand-driven informational system for farmers and extension workers on demand and supply of agricultural inputs and outputs in both Uganda (Mengistu, Zo & Rho, 2009). Other initiatives in African countries include the eSoko in Rwanda for marketplace prices on agricultural commodities, the mPedigree in Ghana for reporting counterfeited drugs, and the Digital Solidarity for Fund Project in Burundi and Burkina Faso (Ogunleye & van Belle, 2014).

The versatility of challenges that developing countries faces and thus displayed in adoption of technology in general has created the demand for context specific knowledge to inform implementation. Chronic challenges such as poverty, unreliable power supply, poor telecommunication infrastructures and low literacy have a role in influencing how adoption takes in developing nations (Heeks, 2003; URT, 2015; 2017). Similarly, there



are context specific factors that drives adoption of m-government services in developing countries. Migration from traditional e-government to m-government for sub-Sahara African countries has been anecdotal, with sporadic successes. For instance Munyoka and Manzira (2014) categorised key adoption factors for m-government services in Sub-Saharan Africa into four groups that is national level policies, socio-cultural, technological and economical factors. Ishengoma, Mselle and Mongi (2018) identified from literature security and privacy, infrastructure, usability, accessibility, cost and personal initiatives and characteristics as critical success factors for adoption of m-government adoption in Tanzania. Moreover, the environment in which m-government services are provided that is either mandatory or voluntary services further influences citizens' adoption decisions for m-government.

### **2.3.3 m-Government in Tanzania**

In Tanzania like elsewhere, m-government initiatives are guided by the Public Service Reform Programme (PSRP), which focuses on restructuring the government to be responsive, efficient, effective, and sustainable to local priorities for service delivery (URT, 2000; Lufunyo, 2013). The PSRP agenda has been to harness ICT capabilities in promoting public service quality (Lufunyo, 2013; URT, 2000; 2014). General ICT application in Tanzania includes a government portal, organisational websites, and online tax processing (Hellström, 2008). m-Government is a recent phenomenon with implementation mostly at an organisational level (Hellström, 2008; Mengistu, Zo & Rho, 2009; Wicander, 2011); for example, the mobile supported education management information system a ministry of education initiative (Wicander, 2011).

In 2003, the first ICT policy was formulated, which in 2012 led to the establishment of the eGovernment Agency (eGA) to spearhead coordination, promotion, and supervision of electronic government initiatives (URT, 2014a). To foster nation-wide implementation, eGA launched its integrated government mobile portal, the mGov platform, in 2015. The mGov platform, marking the first-ever integrated m-government service portal in Tanzania, aims to provide a cost-effective mobile technology platform for government organisations to connect and interact with citizens (URT, 2017). Currently, the mGov platform hosts over 79 services, including the electricity token purchase system LUKU, government recruitment portal, and the voters' register. The

mGov offers three services; the PUSH service for broadcasting information to citizens, PULL service for specific citizens' requested services, and the Unstructured Supplementary Service Data (USSD) menu listing various services accessible through dialing \*152\*00# shortcode (URT, 2014a; 2017).

However, several authors attest that the success and impact of m-government, like any other public sector project, lies in its adoption by the masses (Hu et al., 2011; Zhao, Shen, & Collier, 2014; Ooi & Tan, 2016). Hu et al. (2011) argue that without being adopted and utilized by the masses, m-government initiatives fail to align with the core objectives for establishing these initiatives. Moreover, Ooi & Tan (2016) claim that the lack of adoption not only leads to failure but also threatens further advancement in the necessary public ICT infrastructure by discouraging funding. Hence, the success in m-government service implementation is dependent on both provisioning and adoption of such services. Therefore, to facilitate success in m-government implementation in Tanzania, it is necessary to investigate both provision and adoption trends and practices.

## **2.4 Service Provisioning Focus**

According to Rogers (1995), technology diffusion, acceptance, and use decisions are significantly affected by how technological innovation is developed and provided. In a service industry, production and consumption of services occur instantaneously and in an overlapping manner, such that the two processes are inseparable (Osborne, 2018). Consequently, the influences of adoption are not limited to what transpires during consumption but traces back to m-government service development. In an m-government environment, citizens are prompted for specific information that caters towards service production or service personalisation by identifying them or the specific service required, a vital descriptor of service quality. Service quality is a prime determinant of citizen satisfaction and thus drives decisions on service adoption (Wanjau, Wangari & Ayodo 2012). In a high user engagement service like m-government, citizens should be regarded as service co-producers as they actively engage in service production and thus significantly affect the quality of service (Osborne, 2018). Likewise, Wanjau, Wangari & Ayodo (2012) further affirm that unmatched or unmet consumer needs make the service irrelevant and undesired for adoption. Accordingly, if service design and development

activities are not well executed, this may act as a hindrance to service adoption. Consequently, it is imperative for studies on adoption to expand the scope and trace influences of service development and provision on citizen's acceptance and use decisions.

#### **2.4.1 m-Government Service Provisioning Practices**

m-Government initiatives, as indicated in section 2.3, are guided by the NPM ideologies. NPM advocates for radical re-engineering practices for public service businesses, low-cost, efficiency, and the use of public-private partnerships models for funding (Dehkordi et al., 2012). The operationalisation of NPM is thus in two forms; one, the separation of policy formulation from its operation and, two, the implementation of public management as inspired by private-sector management (Kalimullah, Alam & Nour, 2012). The NPM ideology is entirely concerned with implementing adaptive information management models for public service delivery and the promotion of citizens' participation in governance (Bwalya, 2017). Based on NPM, public service platforms are transformed into new technology platforms for citizens to participate in governance or to access public services. With NPM emphasizing output-control in a decentralized delivery, much focus in provisioning is carried out within the e-business model whereby achievement of the functionalities of an electronic transaction is critical. However, citizens are enticed to adopt, not only by the achieved functionality, but also by emotional and cognitive attributes of services (Robert & Lesage, 2010; Wanjau, Wangari & Ayodo, 2012). The nature and practice of how m-government services are conceived and provided can affect citizens' adoption decisions. It is thus paramount to review m-government service provisioning practices in Tanzania to further understand the m-government service adoption challenge.

#### **2.5 Adoption Focus**

The term adoption implies different things depending on the context of its application – either an organisational or individual context. In an organisational context, adoption reflects investment decisions to implement and utilize a given technology to support core business functions (Oliveira & Martins, 2011; Wang & Lo, 2016). Thus, the maturity models described in section 2.2.1 largely describe adoption in an organisational context,

that is, the progress of implementing m-government. Organisational adoption generally matures in five to six stages whereby it progresses from the informational non-interactive stage to the societal transformational stage (Tozsa & Budai, 2005; Maranny et al., 2011; Dlamini & Mpokea, 2018). On the contrary, the individual context of adoption reflects the choice of acceptance of innovation and the contextual interaction with it, or integration to sanctioned social practices (Faqih & Jaradat, 2015; Reyhav, Ndicu & Wu, 2016). Reyhav, Ndicu & Wu (2016) view adoption as an individual's mental state at which he or she decides to accept, plan to use, or actually uses new technology. Citizen adoption as a concept can be described as the citizens' 'intention to engage' (Warkentin et al., 2002), the 'willingness to use' (Gilbert, Balestrini & Littleboy, 2004; Shareef et al., 2016) or the 'intention to use' (Carter & Belanger, 2005) m-government platform; to receive or request for government services. Although in both contexts one would argue that investment of resources such as time and funds is crucial, in organisational settings the primary goal is to implement and later consume, while at the individual level it is purely to consume, that is, to accept and use.

### **2.5.1 Status of m-Government Adoption**

While several authors posit adoption as a critical determinant of successful implementation, it has persistently remained a challenge globally (Yonazi, 2010; Hu et al., 2011; Zhao, Shen, & Collier, 2014; Ooi & Tan, 2016). Despite volumes of m-government initiatives, citizens' adoption of m-government service is below expectations (Al-Hujran et al., 2015; Rana & Dwivedi, 2015; Alotaibi et al., 2016; Ishengoma, Mselle & Mongi, 2019; Talukder, et al., 2019). In Europe, while public service supplies through an electronic platform that is e-government and m-government are as high as 75%, its adoption by citizens is lower, less than 30% (Savoldelli, Codagnone & Misuraca, 2014). In Africa, citizens' adoption, that is the utilisation of m-government services to engage with the government, which is the pinnacle of successful implementation, is low (Ogunleye & van Belle, 2014). In Tanzania, Lubua (2017) and Ishengoma, Mselle & Mongi (2019) indicate that while provisioning of m-government services has tremendously increased, the reciprocation of efforts in terms of mass utilisation is not evident. Lubua (2017) observed that while it was common for citizens to complete online transactions via mobile phones, it was not the same when it came to accessing the

government. Some of the challenges identified that contribute towards limited citizen's adoption include poor infrastructure, perceptions, attitudes, culture, trust, security, and privacy concerns (Al-Hadidi & Rezgui, 2010). Also, Trimi & Sevrani (2010) associate the limited adoption to lack of awareness, limited technical skills and issues of access to such services.

However, several authors indicate that the low adoption status of m-government services is a result of poor provisioning practices (Ibrahim & Mohammed 2008; Mpinganjira, 2014; Misar, Sirshar & Nawaz, 2015; Mawela, Ocharab & Twinomurinzi, 2017). Mpinganjira (2014) establishes that lack of prompt and accurate responses to citizens' inquiries can lead to disappointment and thus non-adoption. Also, aligning with Ishengoma, Mselle & Mongi (2019), limited efforts are noted that explore tracking adoption; thus, sketchy statistics are available to establish progress made in m-government service adoption. The United Nations e-Government Development Index (EGDI) only tracks m-government service supply without any explicit track on its adoption (UN, 2018), thus leaving adoption to be discussed only in relative and implied terms. For instance, Ishengoma, Mselle & Mongi (2019) indicate the TANESCO – LUKU services and the DAWASCO water bill mobile payment systems are successfully adopted and the UTUMISHI portal poorly adopted. Furthermore, Ishengoma, Mselle & Mongi (2019) and Alonazi, Beloff & White (2019) attest for the presence of a critical knowledge gap concerning factors that influence successful citizen adoption of m-government services. Hence a significant knowledge gap is noted regarding statistics to establish the status of m-government service adoption and a comprehensive approach in viewing m-government service adoption challenges.

## **2.6 Challenges in Provisioning m-Government Services**

Although m-government service implementation is still in its nascent stages in most Africa countries (Ogunleye & van Belle, 2014; Ishengoma, Mselle & Mongi 2019), a number of researchers note several challenges related to provisioning (Mengistu, Zo & Rho, 2009; Al-Thunibat, Zin & Sahari, 2011; Almarabeh & AbuAli, 2010; Alshehri & Drew, 2010; Abu-Shanab & Haider, 2012; Abu Tair & Abu-Shanab, 2014; Isagah & Wimmer, 2018). m-Government service provisioning challenges span more than one

dimension (Abu Tair & Abu-Shanab, 2010). Table 2.3 presents five clusters of challenges affecting m-government service provisioning as presented in the literature. First, there are those challenges related to the pressure towards implementing m-government services. Governments across the globe are propelled to transit from e-government to m-government due to the rapid advances in technology and the subsequent high diffusion of mobile and wireless technologies (Abu Tair & Abu-Shanab, 2010). The second group includes those challenges related to the implementation of m-government services. Governments need to ensure the mobile and wireless network infrastructure is inclusive and of desired quality for m-government services to facilitate provision. The third group reflects challenges related to citizens' readiness, such as awareness and citizen skills profile. The fourth entails challenges related to the unpreparedness of the legal and regulatory frameworks.

For instance, Isagah & Wimmer (2017) note that application of mobile and wireless technologies exposes citizens and the government alike through the Bring Your Own Device (BYOD) concept to a whole range of security threats. It is thus difficult to ensure the security of government systems when citizens and employees can use their devices for access. Moreover, while it requires rigorous legal and regulatory frameworks to facilitate operations, Isagah & Wimmer (2018) observe that most legal and regulatory structures lag in accommodating m-government service provision and consumption, thus, posing a severe challenge to m-government service provisioning. The fifth cluster reflects challenges related to collaboration and interoperability issues. Abu Tair & Shanab (2014) note that m-government services require integration of stakeholders' infrastructure and systems for provisioning.

Conclusively, the outcome of all these challenges to m-government service provisioning succumbs to low citizens' adoption (Almuraqab, 2016; Gupta et al., 2016). These challenges ultimately affect citizens' acceptability and usage of m-government services. Moreover, with adoption as the benchmark for successful provisioning (Hu et al., 2011; Zhao, Shen, & Collier, 2014; Ooi & Tan, 2016), it is thus critical to examine the literature on efforts undertaken to improve provisioning of m-government services for citizens' adoption.

**Table 2.3:** Review of Challenges to m-Government Service Provisioning

Challenge Cluster	References	Description
1. Transition from e-Government to m-Government challenges	Kushchu & Kuscu (2005); Kushchu & Borucki (2005); Abu Tair & Shanab (2014)	Government readiness in terms of skilled workforce, infrastructure, and funding required. Advancements in wireless and mobile technologies and the corresponding high diffusion rate create pressure on governments to undertake provisioning of m-government service, which reflects a value addition on public services to both citizens and business.
2. m-Government Implementation Challenges	El-Kiki & Lawrence (2007); Al Thunibat, Zin & Sahari (2011); Isagah & Wimmer (2018); Al-Hadidi & Rezgui (2010)	Wireless and mobile network development challenges (investment for expansion and ensuring quality infrastructure service); mobile penetration and increased accessibility; challenges related to the provision of security and privacy as well as in aligning m-government services with citizens' needs, available technological infrastructure, devices, and applications.
3. Citizens' Readiness	Mengistu, Zo & Rho (2009); Abu Tair & Shanab (2014); Al-Hadidi & Rezgui (2010)	The majority of people, especially in developing countries, are not ready due to unawareness and lack of the necessary skills for utilizing m-government services.
4. Legal and Regulatory Preparedness	Mengistu, Zo & Rho (2009); Isagah & Wimmer (2017); Isagah & Wimmer (2018); Kushchu & Kuscu (2005)	Laws related to citizen data rights, information rights, and the responsibilities of government to citizens and vice versa, are not yet enforced in most countries.
5. Collaboration and Compatibility Challenges	Mengistu, Zo & Rho (2009); Abu Tair & Shanab, (2014); Isagah & Wimmer, (2018)	Compatibility and interoperability challenges related to global standards, variety of devices, networks, semantics, and infrastructures across stakeholders. Challenges related to stakeholder coordination.

## **2.7 Existing Solutions for m-Government Service Provisioning**

To mitigate the challenges facing m-government service provisioning and the corresponding low citizen adoption of m-government service, several efforts are noted in the literature (Jahanshahi et al., 2011). These efforts manifest in the literature either as frameworks or models entailing components and their relationships (Dlamini & Mpekoa, 2018; Isagah & Wimmer, 2018) or as an enumeration of factors, either as critical success factors or factors inhibiting provision or adoption (Ogunelye & van Belle, 2014; Abu Tair & Abu-Shanab, 2014; Ishengoma, Mselle & Mongi, 2019). These efforts can be categorised into four main clusters; evaluative efforts, service delivery efforts, specific purpose effort, and other efforts that include identification of challenges and critical success factors without a particular structure being defined (Table 2.4). For instance, Sultana, Ahlan & Habibullah's (2016) comprehensive m-government service adoption model integrates concepts from UTAUT and the trustworthiness framework, and other factors like perceived good governance, perceived public value, and culture. Likewise, Abdelghaffar & Madgy's (2012) youth adoption model for m-government services for Jordan incorporates compatibility, perceived usefulness, awareness, face-to-face interaction, and social aspects to predict youth adoption patterns for m-government services. Similarly, the Mobile Government Adoption and Utilisation Model (MGAUM) by Alonazi, Beloff & White (2018), and Almarashdeh & Alsmadi's (2017) investigation on how to make citizens utilize mobile-enabled government services, represents such efforts.

However, several limitations are noted on the various efforts towards improving provisioning of m-government services. Apart from specific limitations, according to the category of efforts identified (Table 2.4), there are some general limitations. Generally, it is observed that most such efforts are theoretical or abstract and thus limited in providing practical guidance. Most frameworks focus on identifying components for success and their relationship with each other but fail to provide recommendations at the process level for practical application, that is capturing the various stages and activities involved in development and implementation of m-government services. Ishengoma, Mselle & Mongi (2019) noted a similar observation in the context of drivers for successful adoption of m-government services in Tanzania. These efforts neither explicitly guide nor recommend a course of action at the process level to accomplish the desired factors for citizens' adoption.



Also, it is critical to separate evaluative models from provisioning model, as each is different and serves a different purpose. While evaluation frameworks facilitate monitoring and assessment of progress, provisioning frameworks should guide processes or specific guidelines and their sequence of execution.

Moreover, these efforts are noted to be initiatives grounded within the provisioning perspective; that is, they are developed under providers' perspectives with limited incorporation of citizens' voices as the targeted consumer. A similar observation is made by the UN (2018) report, which recommends citizen-centricity and public value co-creation for sustainable and resilient electronic services in the public arena. Citizen-centricity emphasizes the notion of user-driven and well-defined needs at the core of service provisioning (Gupta, 2007; Bertor, Estevez & Janowski, 2016). Similarly, pioneers of co-creation advocate for cooperation and even competition in a transparent manner among stakeholders (Bell & Nusir, 2017; Bryson et al., 2017). These two strategies are deeply rooted within the principles of human-computer interaction, where user experience is a critical service success parameter (Kim, 2015). Therefore, it is essential to incorporate citizens' voices in the designing and development of m-government service provisioning frameworks or strategies for enhanced citizen adoption.

Consequently, the limitations noted both specific to a given effort (Table 2.4) and the general ones including the lack of practical-oriented efforts and limitation to a single perspective warrants the need for a holistic and practical-oriented effort towards m-government service provisioning. This research addresses this gap by applying a holistic investigation that incorporates both provisioning and consumption perspectives to come up with practical-oriented recommendations towards m-government service provisioning for increased citizens' adoption.

**Table 2.4: Review of Existing Efforts towards Improving m-Government Service Provisioning**

Type of Effort	References	Description	Limitations
1. Evaluative models for m-government services	Sandy and McMillan (2005); Alijerban & Saghafi (2010); Maranny et al. (2011); Dlamini & Mpekoa (2018)	Constitute models that track progress in provisioning of m-government services. These models include m-government maturity models	<ul style="list-style-type: none"> <li>Do not guide provisioning process</li> <li>A simple listing of stages, but no explanation of causes for the transition between stages</li> <li>Only useful for monitoring and evaluation of progress</li> </ul>
2. Delivery models for m-government services	Yu and Kushchu (2004); Jahanshahi et al. (2011); Alonazi, Beloff & White (2019); Sultana, Ahlan & Habibullah (2016); Abdelghaffar & Madgy (2012); Sabarish & Shaji (2016); Isagah & Wimmer (2018)	Models that provide guidance on m-government service delivery, some through the value chain lens (Yu & Kushchu, 2004); others stipulate the necessary components for delivery, for example Jahanshahi et al. (2011)	<ul style="list-style-type: none"> <li>Lacks practical aspirations on how to achieve critical success factors</li> <li>Neither explicitly recommends nor guides the provisioning process</li> </ul>
3. Specific purpose frameworks - Security and Privacy Frameworks for m-government services	Almian, Razaque & Al Dmour (2016); Onashoga et al. (2016)	Frameworks for a specific purpose, to address security and privacy issues	<ul style="list-style-type: none"> <li>Cater for specific needs/purposes on m-government service provisioning</li> </ul>
4. Other efforts	Ogunelye & van Belle (2014); Abu Tair & Abu-Shanab (2014); Ishengoma, Mselle & Mongi, 2019; Almarashdeh & Alsmadi (2017)	Isolated efforts including enumeration of critical success factors; identification of challenges for m-government service adoption	<ul style="list-style-type: none"> <li>Lack of guidance on the process to achieve the identified factors</li> <li>Lack of practical strategies to address identified challenges and overcome inhibiting factors</li> </ul>

## **2.8 Summary**

While the numerous efforts towards m-government service provisioning adoption are plausible, the limitations have rendered the efforts insufficient to address persistently low citizen adoption. Also, with citizen's adoption being a critical determinant of success for m-government service, the continued low adoption significantly undermines the enormous efforts and investments made in m-government initiatives. In addition, the single perspective approach, that is, either the providers' or the consumers' perspective adopted in the formulation of the proposed solution, has been established to impair the resulting solution by omitting one perspective (Section 2.6). Consequently, this research focuses on addressing the limitations in existing efforts (Table 2.4) by adopting a holistic approach that incorporates the provision and consumption voices in the development of the m-government service-provisioning framework for Tanzania. It utilizes knowledge from existing frameworks that assess determinants of citizen's adoption decisions and assesses practices in m-government service provisioning to develop a practical process-oriented framework that guides provisioning of m-government services for enhanced citizen adaptability. In doing so, a theoretical review of existing adoption frameworks is carried out to identify a suitable adoption framework that can comprehensively capture the m-government adoption scenario for a developing country like Tanzania.

## **CHAPTER THREE**

### **CONCEPTUAL MODEL**

#### **3.1 Introduction**

This chapter presents a review of related theories in order to develop a comprehensive conceptual model for examining citizens' adoption of m-government services. A theory is a supposition, a fact, or a system of ideas explaining various constructs of a phenomenon and their relationships (Saunders, Lewis & Thornhill, 2012). A theory provides the setting "of the research", as it provides the foundation of the thinking and the execution of the research study. It forms the basis, the rationale, an argument, or a discussion in research to explain the occurrence or behaviour of a phenomenon in the real-world (Creswell, 2013). Theory provides the lens through which data is collected, analysed, and discussed in the research. Therefore, this chapter presents the various theories applied in information systems studies and public service studies from which substantial variables for investigating factors influencing citizens' adoption decisions and provisioning practices, respectively, were identified. The chapter concludes by presenting the conceptual framework as the lens that guides the investigation of the dynamics in citizens' decisions for adopting m-government services.

#### **3.2 The Link between Service Adoption and Provisioning**

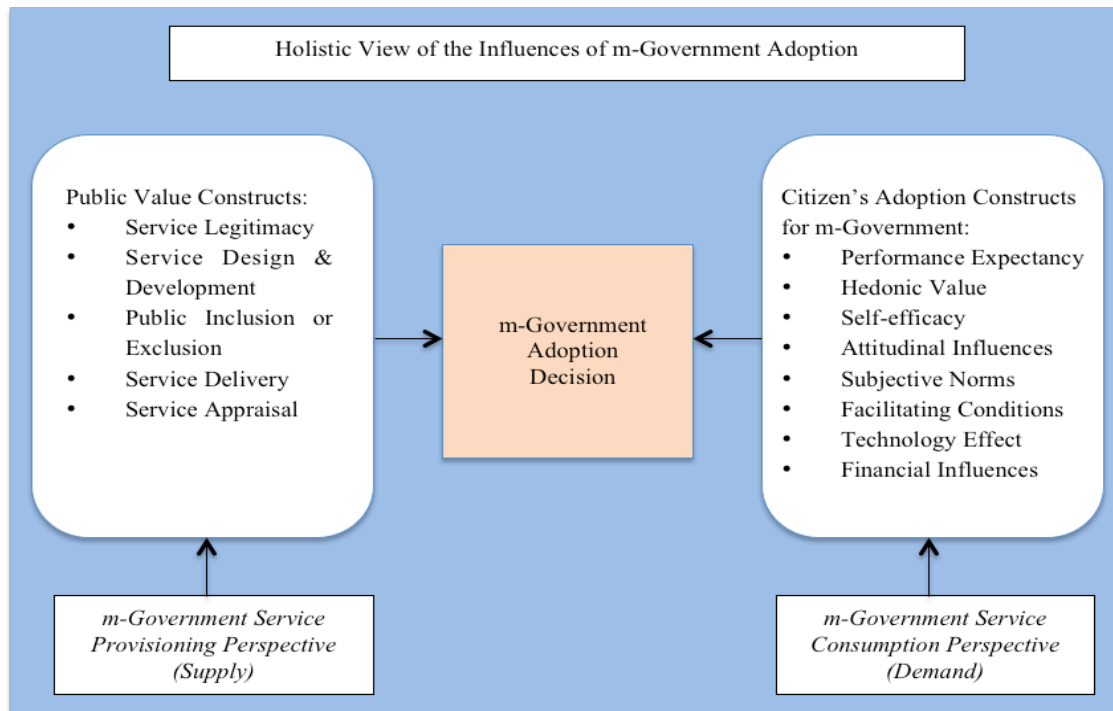
Citizen adoption is both the process and the outcome, in that citizens first take part in the process and then consume the informational output of m-government services (Reychav, Ndicu & Wu, 2016). Osborne, Radnor & Nasi (2012) posit the need to iron out the misconceptions about public service inherited from the manufacturing background in contextualizing public goods. In their supposition, governments neither deliver pre-manufactured products, nor is the relationship between public officers and citizens purely transactional and discrete; the sole business is to provide public services. Public services are process driven, intangible goods based on the promise of what is to be delivered, yet with some concrete elements describing the experience. Moreover, the tangible things that are provided in the public sector are not public goods in their own right but rather are meant to support and enable delivery of intangible and process driven public services.

While a service outcome remains a prerequisite condition, it is not sufficient in itself to derive consumer satisfaction but must be coupled with the quality of the service process (Osborne, Radnor & Nasi, 2012; Stamenkov & Dika, 2015; Voorhees et al., 2017). Thus, in a service dominant logic, Stamenkov & Dika (2015) acknowledge the difficulty in isolating provision and consumption concerns at the point of consumption. Voorhees et al. (2017) further emphasize that at the point of contact between public officers or the system and citizens, service production and consumption processes overlap, thus each influences adoption decisions. With the citizen as a co-producer of public service value and thus satisfactory service experience (Osborne, Radnor & Nasi, 2012), it is consequently critical to adopt a holistic approach that examines both provisioning and consumption practices in order to identify factors challenging citizens' adoption decisions.

### **3.2.1 Holistic Approach to m-Government Service Adoption**

Citizens' adoption decisions are complex and are affected by both consumers' as well as service providers' perspectives. This creates the need for a holistic approach that combines both provision and consumption perspectives. However, holistic approaches are somewhat limited on m-government service adoption (Mtingwi & van Belle, 2012; Almuraqab & Jasimuddin, 2017; Isagah & Wimmer, 2018). Existing approaches have focused on one perspective; either consumers' or citizens' perspectives (for instance Ohme, 2014; Nica & Potcovaru, 2015; Al-Hujran et al., 2015; Ahmad & Khalid, 2017) or providers' perspectives (Al-Hubaishi, Ahmad & Hussain, 2017; Isagah & Wimmer, 2018; Kanaan et al., 2019). Also, even when there are claims of such holistic views, assessment has been limited to only perceptions and attitudes of service providers, technology suppliers or consumers, without an in-depth understanding of the mechanisms affecting acceptance and use (for instance Al-hadidi & Rezgui, 2010; Omeni et al., 2014; Sultana, Ahlan & Habibullah, 2016; Almuraqab & Jasimuddin, 2017). Therefore, to gain a more nuanced understanding of m-government service adoption and inform improvement in provisioning, this research adopted a holistic assessment approach of m-government service provision and consumption in Tanzania.

According to Manceau & Morand (2014), a holistic approach is an all-inclusive approach that incorporates the examination of multiple aspects of operations and expectations, in this case, the investigation of both provisioning and the consumption practices for m-government. Consequently, in adopting a holistic view, the study investigates determinants of m-government adoption from both provision and consumption perspective. Sultana, Ahlan & Habibullah (2016), as noted above, employed a holistic approach; however, their model does not apply in the context of this study due to its exclusion of factors peculiar to m-government, and the service providers' voice in elucidating provisioning practice. Therefore, to facilitate a holistic view, a general framework is conceptualized, which captures both provision and consumption outlooks. Figure 3.1 presents a detailed overview of the holistic approach guiding the investigation of m-government adoption in Tanzania. It indicates the two perspectives that form the holistic investigation: the m-government service provisioning perspective, which guided the inquiry on m-government provisioning practices in Tanzania, which addresses research objective number two; and the consumption perspective which guided the examination of factors influencing citizens' adoption decisions for m-government services, thus addressing objectives one and three of the study. A detailed description of the various theories, constructs, and the justifications for the two perspectives follows in sections 3.3 and 3.4.



**Figure 3.1:** Holistic Examination of m-Government Service Adoption

### 3.3 Service Provisioning Perspective

The service provisioning perspective is viewed through the combined principles of New Public Management (NPM) theory, Public Value Management (PVM) theory and New Public Governance (NPG). While the NPM theory provides context in which information and communication technology is applied in the public sector, PVM and NPG theories provide context for examining m-government service provisioning practices. Other public administration theories, for instance New Public Administration (NPA) theory and New Public Service (NPS) offer no relevance to this study due to the non-alignment between the perspective this study interrogates and the focuses of the theories. For instance, NPA focuses on social equity and social welfare, and NPS advocates for democracy, humanity, community and public interest at the forefront of public administration (Pyun & Gamassou, 2018).

#### 3.3.1 Theories of Public Administration

NPM proposes that governments should cope with the existing environment in which they operate. NPM advocates for governments to be market-oriented, effective, efficient, mission-motivated, consumer-driven, results-oriented, anticipatory and decentralized

(Osborne, 2010). NPM relates public good to neo-capitalist ideologies with a focus on keeping materials progressing and allowing the population to satisfy their needs, thus a preference for decentralisation and agencies structures for service delivery (Pyun & Gamassou, 2018). According to OECD (2015), NPM encapsulates the principles of contemporary public management theory. It is essential to acknowledge that the application of information communication technology (ICT) in public sector and thus m-government initiatives is grounded within the NPM ideology (Thomas (2012). The tenets of NPM solely rest on revamping administrative processes and intra-organisational management, for which the proponents of technology argue that ICT in the public sector facilitates achievement of this vision (Osborne, Radnor & Nasi, 2012). NPM contains indicators for incentives, systems, measurement and mechanisms for evaluation, which can be automated using ICT (Pyun & Gamassou, 2018); thus science and technology enthusiasts argue ICT can efficiently and effectively deliver the advocated managerial and market-oriented approach in public sector administration and service delivery (Osborne, 2010; Osborne, Radnor & Nasi, 2012).

Moore (1995) theorizes PVM under the belief that public managers play an important role in changing and improving public administration. Public value (PV) constitutes collective preferences formulated by the citizenry that can be analysed through the relation between government actions and the impact these have on the citizens (Pyun & Gamassou, 2018). The impact can be either of substantial value to private interests related to financial, social, political or strategic concerns, or intrinsic value to society and democracy, that is, ideological and administrative impact (Osborne, 2018; Pyun & Gamassou, 2018). Thus, Harrison et al. (2012) reason that collaboration, participation and transparency can yield both intrinsic and substantial values.

NPG on the other hand proposes a holistic approach to public administration and management. Important to note in NPG is Osborne's (2018) substantiation of a service-dominant perspective for public services, which is characterized by intangibility, co-produced value, and the simultaneous production and consumption of service. Likewise, Wiesel & Modell (2014) pins the logic of NPG on citizens as co-producers as opposed to consumers or customers as in NPM. In a services-dominant perspective, PV is co-created



on a real-time basis by both the citizens and public officers and thus cannot be stored, as opposed to a product-dominant perspective (Osborne, 2010; Osborne, 2018; Osborne, Radnor & Nasi, 2012; Grönroos & Voima, 2013). NPG emphasizes further the need for collaborative networks as opposed to competitive markets, control on inter-organisational processes as opposed to key performance based on effectiveness and the outputs, and citizen satisfaction as opposed to financial results and efficiency (Pyun & Gamassou, 2018).

Therefore, both its provisioning practice and consumption attributes influence success in the provision of public service, which further emphasizes the need for a holistic approach. According to Panagiotopoulos, Klievink & Cordella (2019), public value theory reflects the assessment of public value principles in the public sector. The public value theory provides an alternative approach to understanding government activities and public service provisions not only on cost-benefit analysis but also along with action-impact analysis (Yotawut, 2018). According to Benington (2011), public value (PV) is an improved alternative variable for explaining public welfare beyond public goods, public interest, and public choice. PV can be viewed in three different ways; as value addition through partnership actions, as a contributor to public wellbeing, or as a heuristic strategic triangulation framework that captures value propositions, operational resources, and authorizing environment (Benington, 2011). PV is a “contested democratic practice” (Benington, 2015:29) in that it not only reflects the general public's values (public interest) but also considers what increases the value to the general public (Bryson, Crosby & Bloomberg, 2015; Hartley et al., 2017). With Hartley et al. (2017) calling for more research in applying PV in assessing public sector performance, this research corresponds with that call by examining the construction of public value in m-government services; that is, for what purpose and which individuals (stakeholders) are involved or excluded in the discussions around value?

### **3.3.2 m-Government Service Provisioning Practice**

Cordella & Iannacci (2010) affirm that digital technologies as value proposition enablers form a key component in public value creation. The application of digital technologies in the public sector affects the public value that citizens expect. Reviewing literature on

public value theory, four themes emerge as critical in assessing public services in delivering public value: these include service legitimacy to the public; stakeholder inclusion or exclusion; as well as the reflection of public value in the process of developing and delivering public services (Benington & Moore, 2011; Bannister & Connolly, 2014; Benington, 2015; Hartley et al., 2017; Yotawut, 2018). Applying the PV theory four variables reflecting the identified themes, which are m-government service needs establishment, service design and development, service delivery focus, and service quality appraisal, are evaluated against m-government service provisioning practices.

According to Hartley et al. (2017), for a service to gain legitimacy in the public domain, it is essential that the need and the purpose of establishing that service be derived from the public. Moreover, Hartley et al. (2017), emphasizing the necessity of involving individuals in the process of establishing public service need, argue that it creates public ownership and acceptance. Then it becomes imperative to investigate the establishment of the need for m-government services, to ascertain if the purposes for these services align with the public need and the involvement of citizens or the public in the process.

Benington (2015), on the other hand, views the derivation of public value in terms of the impact the service has on the general public, proposing the need to investigate the service provider perspective to see if it aligns well with the public expectations of the service, resulting in public satisfaction. However, as citizens' perceptions and attitudes continuously change, so does the derived public value of m-government services. In addressing this, Popova-Nowak & Cseh (2015) advocate for a mechanism that captures such changes in value and invokes a learning practice within organisational structures, systems, and culture. Thus, a service appraisal mechanism that continually captures the changing citizen's perception and attitudes, and facilitates an organisational learning opportunity to reflect the changing public values in the provided m-government services, is essential. These four variables form the basis upon which m-government service provisioning practices are assessed; that is, m-government service needs establishment, m-government service development and provision, public inclusion and exclusion in the process, and m-government service appraisal mechanisms.

### **3.4 Service Consumption Perspective: Technology Adoption**

The service consumption perspective for m-government services is viewed under the lens of technology adoption. Adoption of technology has been widely researched within the Information Systems (IS) field, but it has persistently remained a challenge worldwide (Davis, 1989; Rogers, 1995; Venkatesh et al., 2003; Abdelghaffar & Magdy, 2012; Alonazi, Beloff & White, 2019). Adoption models trace as early as 1918–1970, within the social psychology field, to explain how an individual's attitude influences behaviour. Early theories include Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB) and Technology Acceptance Model (TAM). Other theories in modern times include the Technology-Organisation-Environment (TOE) theory, Diffusion of Innovation (DOI), and Unified Theory of Acceptance and Use of Technology (UTAUT) to mention a few.

#### **3.4.1 Theories of Technology Adoption**

TRA by Ajzen & Fishbien (1980) predicts consumers' adoption intention and behaviour. TRA's simplicity, in its application for predicting targeted consumer behavioural change, has earned the model wide application in the past (Sheppard, Hartwick & Warshaw, 1988). However, TRA is not applicable in determining behavioural patterns if factors concerned are beyond an individual's control (Sheppard, Hartwick & Warshaw, 1988). TPB is an extension of TRA that incorporates perceived behavioural control to address non-volitional behaviour and improve its predictive power (Ajzen, 1991). Despite addressing non-volitional actions, it is argued that TPB lacks the ability to capture habits and general consumer's behaviour towards adoption (Taylor & Todd, 1995). Also, Sniehotta, Pesseau & Araujo-Soares (2014) raised concerns about validity and utility, and thus suggested it is time to retire the theory. TAM, another extension of TRA, replaces attitude with perceived usefulness and perceived ease of use to explain technology adoption (Davis, 1989). TAM however, is limited in terms of not being able to address the effect of subjective norms, technology effect, trust issues, money, and time constraints on adoption decisions (Taylor & Todd, 1995; Abdelghaffar & Magdy, 2012). It also displays a low model variance of 40% (Venkatesh et al., 2003).

In the 1990s, the TOE framework and DOI theory were developed. TOE, by Tornatzky and Fleischer (1990), acknowledges the multi-context nature of technology and thus identifies the contexts in which adoption decisions are made – namely technological context, organisational context, and environmental context. TOE adds the environment context, which captures opportunities and constraints related to technological innovation (Oliveira & Martins, 2010). TOE is limited in contextualizing technology adoption at an individual level and also does not guide the specific factors within the three identified contexts (Oliveira & Martins, 2010; 2011). Rogers' DOI theory explains the progression of adoption decisions within a social-cultural system along a five-step process, namely awareness (knowledge), encouragement (persuasion), decision, implementation, and confirmation (Rogers, 1995; Rogers, 2003). Correspondingly, DOI identifies five characteristics that determine acceptance or rejection decisions, which include compatibility, relative advantage, complexity, trialability, and observability (Rogers, 2003). However, MacVaugh & Schiavone (2010) note that DOI's assumption of adoption for utility maximisation renders it incapable of explaining the case of adoption under the influences of fashion or social acceptance. Also, DOI does not integrate the overlapping effects of contexts and domains in which most recent technologies operate (MacVaugh & Schiavone, 2010; Kiwanuka, 2015).

UTAUT is a consolidation of various theoretical models, including TRA, TAM, TPB, and DOI, to name but a few, to achieve a robust generic model (Venkatesh et al., 2003). UTAUT can explain a 70% variance in behavioural intention to adopt and 50% variance in technology use behaviour (Venkatesh et al., 2003). UTAUT integrates cultural factors, social influences and technical factors to predict technology adoption patterns transposed into four independent factors, namely, performance expectancy, effort expectancy, facilitating conditions and social influences, to predict behavioural intention to adopt as an intermediary factor that determines use behaviour (Venkatesh et al., 2003; Abdelghaffar & Magdy, 2012). However, Venkatesh, Thong & Xu (2012) attest that UTAUT is applicable in explaining organisational adoption and not individual adoption intention or behaviour. Dwivedi et al. (2017) point out that UTAUT has omitted some relationships of significant effect; for example, the facilitating conditions in the behaviour intention relationship. Similarly, variables like price value, hedonic motivation, and

habits that have proved to influence individual-level adoption decisions are omitted in UTAUT (Venkatesh, Thong & Xu, 2012).

Despite significant progress made by the IS field, the need for diverse approaches in conceptualizing the adoption of technology is undeniable (Raza & Standing, 2008; Nemoto et al., 2010; Gangwar, Date & Rao, 2014; Isagah & Wimmer, 2017). Thus, in addressing these shortcomings, a general practice of extending and combining several models or complementing these models with literature emerges (Pedersen et al., 2002; Oliveira & Martins, 2011; Abdelghaffar & Magdy, 2012). Variations of the models reviewed in Table 3.1 exist, for instance, UTAUT2 by Venkatesh, Thong & Xu (2012), TAM3 by Venkatesh & Bala (2008), and the integration of TAM and Technology - Organisational - Environmental (TOE) by Tornatzky and Fleisher (1990). In line with this practice, this study also explores suitable models and knowledge domains to explain the m-government service adoption phenomenon in the context of Tanzania, a developing country. Importantly, the uniqueness of m-government service adoption warrants the conceptualisation of a specific framework to assess its adoption, as discussed in the next section.

### **3.4.2 m-Government Service Adoption**

According to Teo et al. (2012), features peculiar to mobile and wireless technologies make adoption of mobile-enabled services different from other electronic services. Similarly, the EOCD/ITU (2011) report acknowledges the uniqueness of m-government services against other types of e-government services. First, m-government services using Simple Text Messaging (SMS), a type of Mobile Data Services (MDS), are subject to a pay-per-transaction structure as opposed to the once-off payment (pay-per time of access) for an array of services typical of other e-government services (EOCD/ITU, 2011; Teo et al., 2012). Then, the cost of accessing m-government services influences citizens' decision to adopt m-government services (EOCD/ITU, 2011).

Second, m-government services provide alternative channels of access to public services, thus providing additional value other than performance for consumers to evaluate it, in making decisions on its acceptance and use. The crux of m-government service promises to provide location and mobility freedom in accessing public services, relying heavily on

the ability of technology in delivering this promise (OECD/ITU, 2011; Müller et al., 2014; UN, 2018). Thus, technology plays a significant role in determining citizens' decisions towards m-government service adoption.

Finally, the existing literature presents a myriad of other factors that influence citizen's adoption of m-government services that are not captured by existing technology adoption models. For instance, these include: Ogunleye & Van Belle's (2014) drivers of adoption, namely, vision and strategy, supportive infrastructure, technological changes, citizen's expectations and awareness, external pressure, ethical practice, and effective change management; Susanto & Goodwin's (2011) factors including citizen's awareness and their perception of service complexity, compatibility, value for money or sensitivity to cost, efficiency in time and distance, responsiveness, relevance and reliability, usefulness, convenience, trust, support infrastructure, usability, self-efficacy, service variety and the risk associated with user privacy and security; and Mengistu, Zo & Rho (2009), Abu-Shanab & Haider, (2015) and Abu Tair & Abu-Shanab (2014) who identified challenges to citizens' adoption of m-government services, namely privacy and security concerns, usability, service variety, and support infrastructure.

The uniqueness of m-government service adoption established above warrants a critical review of models that explain individual adoption decisions and relevant knowledge domains, to facilitate understanding of citizens' adoption decisions and improve m-government service provisioning.

### **3.4.3 Existing Theoretical Models for m-Government Service Adoption**

With citizens' adoption at the pinnacle of successful provisioning of m-government services, only models that explain individual adoption were considered and not those that explain progress in the implementation of m-government services, including maturity models. Reviewing extant literature, it is observed that models that explain individual-level adoption are an extension of existing technology adoption models; for instance, UTAUT2 by Venkatesh, Thong & Xu, (2012) is an extension of the UTAUT model by Venkatesh et al. (2003), and the Mobile Government Adoption and Utilisation Model (MGAUM) by Alonazi, Beloff & White (2018) extends TAM by Davis (1989). The Unified Model of Electronic Government Adoption (UMEGA) by Dwivedi et al. (2017)

was developed on a review of nine models assessing individuals' adoption of technology.

UTAUT2 that extends UTAUT model facilitate the assessment of adoption at an individual level, which is a consumer context adoption (Venkatesh, Thong & Xu, 2012). UTAUT2 incorporates three additional factors, habit, price value, and hedonic motivations, to the four existing UTAUT factors. According to Venkatesh, Thong & Xu (2012), UTAUT2 improves UTAUT prediction of behavioural intention from 56% to 74% with a significant improvement in variance explained for technology usage from 40% to 52%. Despite model robustness, UTAUT2 does not comprehensively apply in the context of m-government services. For instance, it ignores factors like technology effect, and trust and security issues that extant literature establishes as critical for citizen adoption (EOCD/ITU, 2011; Abu Tair & Abu-Shanab, 2014).

UMEGA a context-specific model for evaluating the adoption of e-government service has the ability to explain 80% variance in behavioural intention to adopt e-government services (Verkijika & De Wet, 2018). Despite UMEGA's robustness in explaining variance in e-government adoption, the peculiar nature inherent from mobility makes the model not applicable in the context of m-government services. For instance, Dagli & Jenkins (2016) substantiates the assertions of the significant contribution of mobility in pointing out the wide acceptance and use of mobile enabled services.

MGAUM, a product of literature review on technology acceptance, utilizes TAM as a foundational framework (Alonazi, Beloff & White, 2018). MGAUM is not adopted in this study; first, its foundation is derived from TAM, and despite TAM being widely applied (Alonazi et al., 2018; Alomary & Woollard, 2015; Rabaa'i, 2015), the shortcomings of TAM are very well-known, as elaborated in Table 3.1. Second, while MGAUM represents a model specific to the m-government service context, the model's robustness in predicting adoption is unverified. Alonazi, Beloff & White's (2019) work only develops the model and validates the instrument by exploring correlations between variables in a pilot study.

The mobility aspect brought forth with mobile and wireless technologies differentiates m-government from e-government and other related technological innovations. It therefore equally presents different features for consideration in evaluating citizen adoption, such

as the effect of technology, price value, hedonic value, security, and trust (EOCD/ITU, 2011; Abu Tair & Abu-Shanab, 2014; Ogunleye & Van Belle, 2014). Furthermore, with existing frameworks not comprehensively addressing these factors, this raises the need for a conceptual model to examine citizens' adoption of m-government services. Therefore, this research explores existing literature and models on individual technology adoption to develop a conceptual model that guides this study.

#### **3.4.4 Conceptual Model for m-Government Service Adoption**

The lack of a comprehensive model for m-government service adoption led this study to develop a conceptual framework. The conceptual framework extends the UTAUT2 model by adding factors and enriching the definition of the indicators measuring the factors to develop context-specific measures for the factors. In enriching the definition for the measures of the factors, two knowledge domains – the technology domestication knowledge domain and the technology use and gratification knowledge domain – were applied.

The UTAUT2 framework forms the basis for developing the conceptual models for the following reasons: First, UTAUT2 provides a consumer context-specific model, thus applicable in capturing citizen's perceptions as consumers of m-government services. Second, UTAUT2 incorporates many recent developments in consumer technology adoption, thus enriching its comprehensiveness in describing consumer adoption (Gupta, Dogra & George, 2018). Last, UTAUT2 provides a robust framework in the consumption context due to its better predictive validity and its ability to be easily extended and complemented with literature for further comprehensiveness (Venkatesh, Thong & Xu, 2012). Thus, UTAUT2 has been widely applied to explain consumer technology adoption in diverse contexts, including adoption of mobile learning technologies (Kang et al., 2015), learning management software (Raman & Don, 2013), online gaming (Xu, 2014), mobile payment systems (Slade, Williams & Dwivedi, 2014), social recommender systems (Oechslein, Fleischmann & Hess, 2014), and pervasive information systems (Segura & Thiesse, 2015). The UTAUT2 model is extended by adding one additional factor relevant to the context and also by enriching the definition of other existing factors,



for a better understanding of the influences of citizens' adoption decisions on m-government services.

#### **3.4.4.1 Modification to UTAUT2**

According to EOCED/ITU (2011), technology itself is a significant contributor to its adoption and the adoption of resulting services. Dagli & Jenkins (2016) and Chen et al. (2016) establish that mobility brought forth by mobile and wireless technologies is a significant motivator to consumers' adoption of mobile-enabled services. Dholakia & Kshetri (2004) and later, Al-Lozi & Al-Debei (2014), affirmed that the anywhere-anytime concept provided by wireless and mobile technologies is the most appealing feature attracting its adoption. This fact is further evidenced by the high diffusion rate of mobile phones globally and in Africa (MDI, 2013; ITU, 2019). Therefore, it is critical to assess the mobile technology effect on citizens' adoption of m-government service.

The technology use and gratification knowledge domain postulate that the pleasurable emotional happiness derived from achieving a goal or a task is what strongly appeals to one's decision to adopt the technology (Pedersen et al., 2002; Zhang, Tang, & Leung, 2011). This domain provides an avenue for understanding adaptors' basis of choice for technology and media for services access (Chen, 2014). Dimmick, Sikand & Patterson (1994) identified sociability, reassurance, and instrumentality of the telephone as gratification motives within the fixed telephony services context. Leung & Wei (2000) provided four additional motives related to the mobile telephony context – status, relaxation, mobility, and flexibility – arguing that newer mobile phones are becoming both content medium and communicators at the same time. However, a variety of definitions of what constitutes mobility exists; for example, 'freedom in space and time in interaction' (Kargin, Basoglu & Daim, 2009), and 'preference over alternative channels of access bearing in mind cost minimisation related to storage, search and the channel in general' (Dwivedi et al., 2016). Mobility generally reflects issues about flexibility, capacity, speed, compatibility, scalability, service variety or options, ease of use, and connectivity (EOCED/ITU, 2011; Kumar et al. 2013; Kumar, 2014; Dwivedi et al., 2016). Therefore, in defining variables for the conceptual model, technology use and

gratification concerns around adoption are considered, to gain a richer understanding of the phenomenon under investigation.

The technology domestication knowledge domain centers its proposition on how and why technology gets internalized or integrated into everyday life. Domestication theory provides an alternative approach to explaining the adoption of technology through the practical application and the meaning derived from the use of technology in assisting daily life activities (Vuojärvi, Isomäki & Hynes, 2010; Liste & Sørensen, 2015). According to Hynes & Richardson (2009), domestication traces adoption through four aspects. These include: appropriation, which entails possession and ownership; objectification captures the value, style, and taste as expressed; incorporation, which accounts for the use of ICTs, entailing the time structure (temporal) and physical location or position (spatial) of use. Ling (2001) identified concepts of style and fashion in relation to the integration of technology to an individual or community, namely the display of purpose or communication, developing a social capital that acts as a basis for inclusion or exclusion in the community. Furthermore, Vuojärvi, Isomäki & Hynes (2010) elaborates that the derived social capital is symbolic in encouraging or discouraging new adopters. Therefore, in developing a framework for assessing m-government service adoption, aspects of ownership, time, fashion, location (spatial), and transformation are considered to develop context-specific factors.

#### **3.4.4.2 The Unified Model of Technology Adoption for Mobile Enabled Services**

Figure 3.2 presents the Unified Model of Technology Adoption for Mobile Enabled Services (UMTAMES) as the conceptual framework to guide the identification of factors influencing citizens' adoption of m-government services in Tanzania. UMTAMES comprises eight independent variables, namely Performance Expectancy (PE), Self-Efficacy (ES), Hedonic Value (HV), Attitudinal Influences (AI), Subjective Norms (SN), Technology Influences (TI), Facilitating Conditions (FC) and Financial Influences (FI). Also, Behavioral Intention to use (BI) as an intermediary variable, and Use Behavior (USE) as a dependent variable.

UMTAMES aligns with the assumptions of UTAUT2; that is, using PE, SE, HV, AI, SN, FC, FI as moderated by age, gender and experience in predicting citizen's behaviour intention and use behaviour for m-government services. However, the adapted variables from UTAUT2 are modified to capture a wider scope by applying knowledge from the technology use and gratification domain and the technology domestication domain. Moreover, UMTAMES incorporates an additional variable, TI, in predicting citizens' BI, which significantly influences USE. According to the EOCED/ITU (2011), technology itself, specifically mobile and wireless technologies, significantly affects citizens' decisions to adopt the resulting services. The discussion below presents the UMTAMES variables, the corresponding measurements and justifications for each variable.

PE reflects the instrumentality of technology to achieve efficiency and effectiveness in accomplishing a task (Venkatesh, Thong & Xu, 2012). PE has a significant positive effect on behavioural intention (BI) to adopt technology (Venkatesh et al., 2003; Venkatesh, Thong & Xu, 2012). Similarly, UMTAMES assumes a significant effect of PE on BI; however, the definition of PE is enriched further to reflect the m-government service context. According to Venkatesh, Thong & Xu (2012), the core motive for any technological innovation is how instrumental it is in fulfilling one's goals or tasks, that is, its utilitarian value. PE needs to include other measures of performance in a wireless and mobile technology context. By employing knowledge from the technology use and gratification domain, PE is expanded to include mobility, flexibility, accessibility, relaxation, and security, as identified by Pedersen et al. (2002).

HV reflects the enjoyment or gratification derived from using technology (Venkatesh, Thong & Xu, 2012). Pedersen et al. (2002), and later, Venkatesh, Thong & Xu (2012), affirm that for everyday m-government services, utilitarian values become less important compared to the derived enjoyment from use. HV, although derived motives, not primarily intended by m-government services, has a positive and significant effect on behavioural intention to use (Pedersen et al., 2002; Thong, Hong & Tam, 2006; Venkatesh, Thong & Xu, 2012). Therefore, it is essential to evaluate the derived enjoyment from the mobility effect of m-government services.

SE signifies users' perceptions of their control to use technology, that is, effort and time expended affects ones' decision to use technology (Susanto & Goodwin, 2011; Venkatesh, Thong & Xu, 2012). Venkatesh, Thong & Xu (2012) established a significant positive effect of SE on behavioral intention. SE relates to user's behavioral change concerning judgment of their capabilities to execute the tasks (Pellas, 2014; Joyce & Kirakowski, 2015). Several works of literature have substantiated that high self-efficacy motivates adoption (Cheng & Tsai, 2011; Tseng & Tsai, 2010).

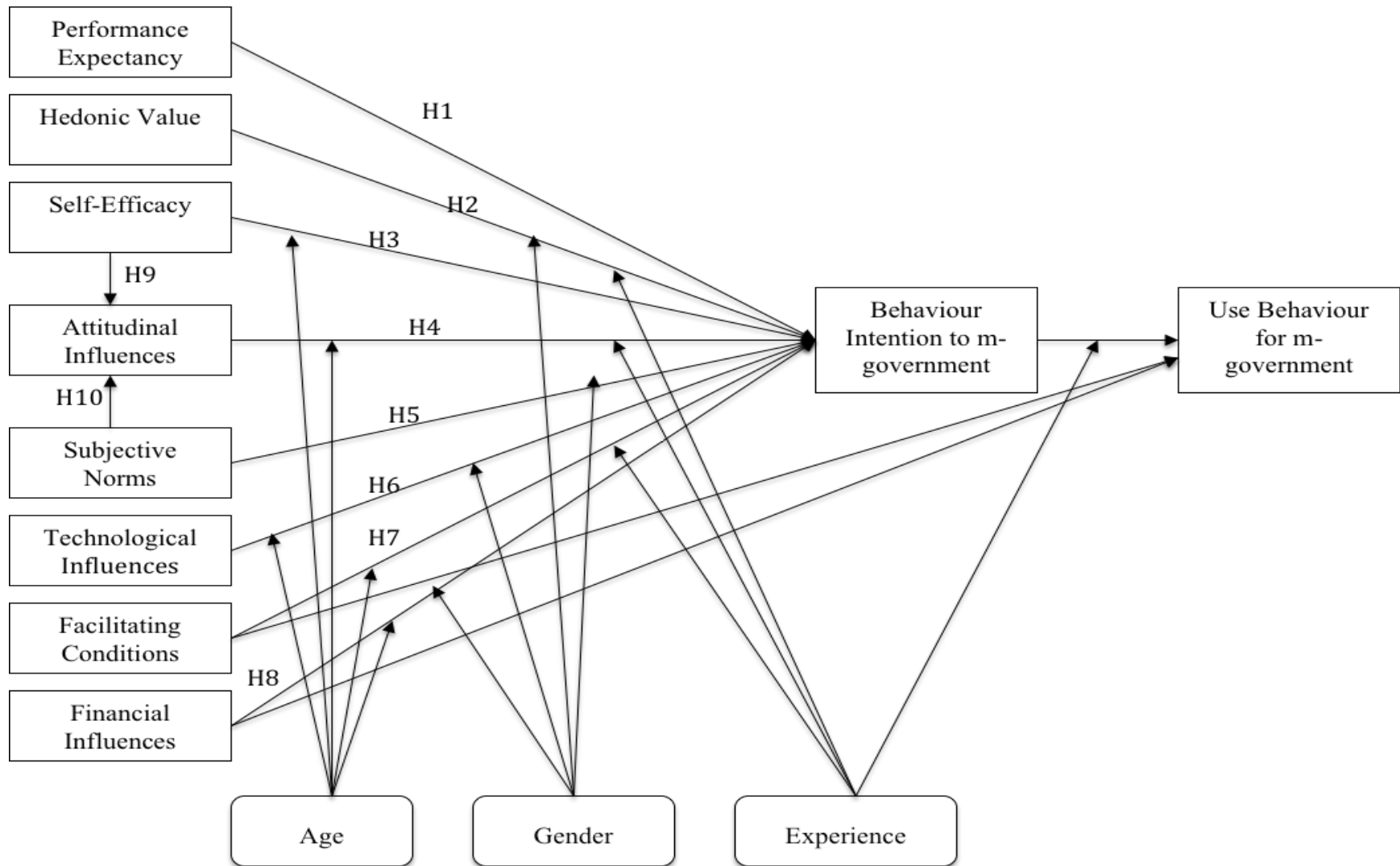
AI reflects the outlook or formed opinion of technology (Pellas, 2014). AI reflects the underlying triggers for a particular habit or pattern of behavior. While UTAUT2 evaluates the resulting behavior, this study suggests an evaluation of the motives behind the habit. Self-perception of self-competence, a component within self-efficacy, is said to influence attitude towards technology and hence its adoption (Harsha, 2011; Pellas, 2014). Attitude leads to the development of habit; therefore, developing positive attitudes towards technology encourages its adoption. Similar to Pedersen et al. (2002), age, gender, and experience moderates the effect of AI on BI.

SN, similar to Venkatesh, Thong & Xu's (2012) social influence in UTAUT2, reflects the influence of other people on consumers' adoption decisions. SN is said to significantly influence behavioral intention toward technology adoption (Pedersen et al., 2002; Venkatesh & Bala, 2008; Venkatesh et al., 2003; Venkatesh, Thong & Xu, 2012). To ensure an m-government service context, SN is differentiated from social influence; while social influence focuses on the influence of opinions and experiences of others in shaping one's adoption decisions, SN includes both an individual or self- (internal) assessment and the society's (external) assessment of the experience with technology (Pellas, 2014; Dwivedi et al., 2016). Where there is congruence between interpersonal and social perception of technology, adoption is said to be high (Liu et al., 2011).

TI, in this case, the mobile technology effect, similar to Dholakia & Kshetri (2004) and the OECD/ITU (2011), is postulated to influence the adoption of m-government services significantly. The effect is more magnified in developing countries where poor communication infrastructure and limited skilled personnel and funds prevail (OECD/ITU, 2011).

The 'mobility' by mobile and wireless technology that gives governments the 'anytime,' 'anywhere' and 'on the move' edge, certainly adds an appeal to m-government service adoption (Leung & Wei, 2000; Dholakia & Kshetri 2004; Kargin, Basoglu, & Daim, 2009; OECD/ITU, 2011; Al-Lozi & Al-Debei, 2014; Dwivedi et al., 2016). Gratification outcomes concerning mobile and wireless technologies include mobility and immediate access (Leung & Wei, 2000); and more freedom in time and space about interactions achieved using mobile devices (Kargin, Basoglu, & Daim, 2009). In line with Kumar et al. (2013) and Dwivedi et al. (2016), the study suggests using citizen's perceptions of waiting time and the quality of service in terms of compatibility with existing mobile devices, and freedom from space and time, to assess the effect of mobile and wireless technology.

FC reflects the perception of control, availability, and accessibility of sufficient organisational and technological supportive mechanisms and structures to facilitate technology use (Venkatesh & Bala, 2008; Venkatesh, Thong & Xu, 2012). FC, in this study context, adapts all-inclusive behavioral control influences that include all supporting structures and mechanisms to facilitate use extending beyond suppliers' capabilities. Organisational supportive structures range from communication infrastructure (technology, policy, and regulations) to security issues (Venkatesh, Thong & Xu, 2012; Salvoldelli Codagnone & Misuraca, 2014). Thus, for m-government services to be adopted, other supportive structures need to be in place; for instance, mechanisms that assure information quality, availability and confidentiality must be in place for citizens' trust to develop and thus adopt m-government services (Susanto & Goodwin, 2011; Salvoldelli Codagnone & Misuraca, 2014). However, according to Tanzania regulatory authority January to March quarterly report (2020) the mobile subscription in Tanzania as of January 2020 stood at 44.13 million subscribers, which is 75% of the total population. This indicates that facilitating conditions have less influence on Tanzanians' attitudes to acquire or use mobile services. Therefore, FC is observed in terms of both behavior control indicators and also trust and security indicators.



**Figure 3.2:** Unified Model of Technology Adoption for Mobile Enable Services (UMTAMES)

FI entails the implications of the cost incurred by a consumer in accessing m-government services. FI differentiates consumer adoption from organisational setting's adoption and also m-government service adoption from other e-government service adoption, since m-government services apply the pay-per-transaction costing (EOCD/ITU, 2011; Teo et al., 2012). FI reflects the tradeoff between perceived benefits and the monetary value that consumers are willing to spend on the services (Venkatesh, Thong & Xu, 2012). Therefore, in this study, FI is considered as the effect of the perception of price value and pricing strategy for m-government services. However, the FI effect is moderated by gender and age, especially in developing countries where there is a disparity in accessing disposable income (Venkatesh, Thong & Xu, 2012).

#### **3.4.4.3 Hypotheses**

The conceptualized model translates into the following ten (10) hypotheses that were tested empirically in this study.

Hypothesis One (H1):

**H<sub>0</sub>:** Performance expectancy insignificantly influences the citizens' behaviour intention to use m-government services.

**H<sub>1</sub>:** Performance expectancy significantly influences the citizens' behavior intention to use m-government services.

Hypothesis Two (H2):

**H<sub>0</sub>:** Hedonic value insignificantly influences the citizens' behavior intention to use m-government services.

**H<sub>1</sub>:** Hedonic value significantly influences the citizens' behavior intention to use m-government services

Hypothesis Three (H3):

**H<sub>0</sub>:** Self-efficacy insignificantly influences the citizens' behavior intention to use m-government services.

**H<sub>1</sub>:** Self-efficacy significantly influences the citizens' behavior intention to use m-government services.

Hypothesis Four (H4):

**H<sub>0</sub>:** Attitudes insignificantly influence the citizens' behavior intention to use m-government services.

**H<sub>1</sub>:** Attitudes significantly influence the citizens' behavior intention to use m-government services.

Hypothesis Five (H5):

**H<sub>0</sub>:** Subjective norms insignificantly influence the citizens' behavior intention to use m-government services.

**H<sub>1</sub>:** Subjective norms significantly influence the citizens' behavior intention to use m-government services.

Hypothesis Six (H6):

**H<sub>0</sub>:** Mobile technology insignificantly influences the citizens' behavior intention to use m-government services.

**H<sub>1</sub>:** Mobile technology significantly influences the citizens' behavior intention to use m-government services.

Hypothesis Seven (H7):

**H<sub>0</sub>:** Facilitating conditions insignificantly influence the citizens' behavior intention to use m-government services.

**H<sub>1</sub>:** Facilitating conditions significantly influence the citizens' behavior intention to use m-government services.

Hypothesis Eight (H8):

**H<sub>0</sub>:** Financial influences insignificantly affect the citizens' behavior intention to use m-government services.

**H<sub>1</sub>:** Financial influences significantly affect the citizens' behavior intention to use m-government services.

Hypothesis Nine (H9):

**H<sub>0</sub>:** Self-efficacy insignificantly affects attitudes.

**H<sub>1</sub>:** Self-efficacy significantly affects attitudes.

Hypothesis Ten (H10):

**H<sub>0</sub>:** Subjective norms insignificantly affect attitudes.

**H<sub>1</sub>:** Subjective norms significantly affect attitudes.



### **3.5 Summary**

The discussion in this chapter focuses on the formulation of the conceptual framework that guided the study. Despite the presence of numerous adoption models, the peculiar nature of m-government services and the need for a holistic approach renders existing models insufficient to capture and explain citizens' adoption. According to Sultana, Ahlan & Habibullah (2016), a holistic approach is necessary, to have a comprehensive understanding of citizen's adoption behaviour of m-government services. Hence, this study recommends a holistic approach that captures both provisioning and consumption perspectives of m-government services in Tanzania, eventually contributing to the body of knowledge.

The study applies the public value (PV) theory in investigating the m-government service provisioning practice. According to Benington (2011), PV facilitated the assessment of the provisioning practices through the examination of the m-government service value chain; therefore, the study examined the processes, partnerships, and collaborations for provisioning m-government services. The Unified Model of Technology Adoption for Mobile Enable Services (UMTAMES), a modified Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) with complements from the technology domestication and the technology use and gratification theories guided the examination of the adoption perspective.

Hence, the holistic approach and the underlying theories discussed facilitated the identification of appropriate methods and methodologies, as presented in chapter four, to guide the study field work.

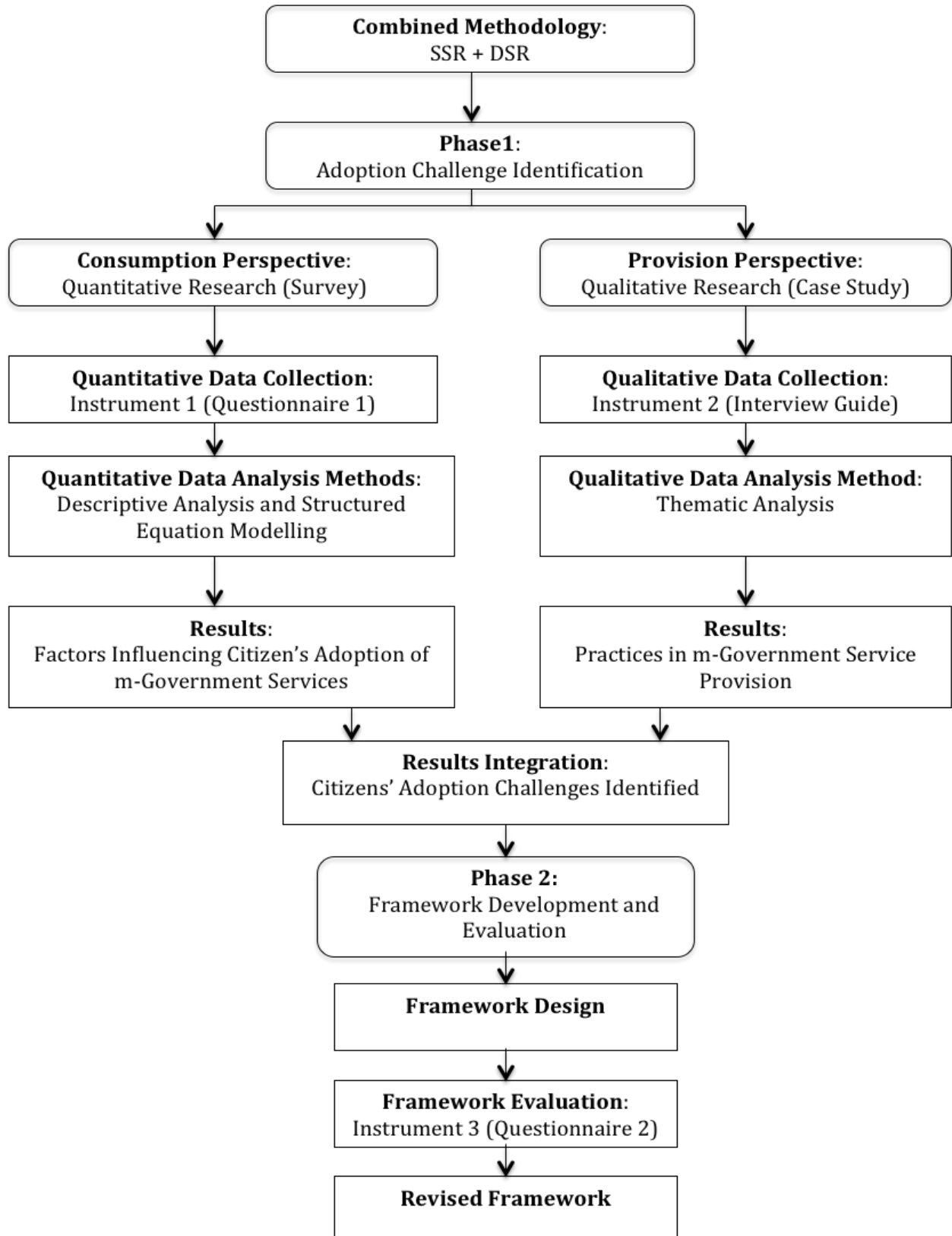
## **CHAPTER FOUR**

### **RESEARCH METHODOLOGY**

#### **4.1 Introduction**

According to Kothari (2010), research methodology refers to the scientific and systematic approach to knowledge searching. The research methodology is concerned with the utilisation of a well-organised strategy and procedures grounded within specific ontological and epistemological assumptions to examine a research problem (Daniel, Kumar & Omar, 2018). The methodology of research provides a frame of reference for carrying out a research activity through a detailed accounting of the research process in terms of tools and procedures to be applied, as well as the justification for each choice made (Kumar, 2019). In this research, the research onion model guides the identification of the various research approaches and procedures for identifying factors of adoption as well as understanding provisioning of m-government services in Tanzania by Saunders, Lewis, and Thornhill (2009).

Social science research (SSR) methodology concerns inquiries that describe the world's social reality (Bhattacharjee, 2012). It involves the investigation of society and how human beings behave and influence the world. Conversely, design science focuses on prescribing solutions to social reality, with most applications being in pure science research. Design science research (DSR) entails the designers providing answers to human problems through the development of artefacts, therefore, advancing knowledge (Hevner & Chatterjee, 2010). However, Gregor & Baskerville (2012) argue that the fusion of DSR in SSR, especially in information system research, contributes to a better understanding of how to achieve knowledge advancement that is impactful to both research and practice. Thus, this research applied design science research principles in understanding the adoption of m-government services by citizen of Tanzania, which is a social phenomenon. Figure 4.1 presents the research methodology flowchart with the corresponding phases, methods and processes in executing this research. The various sections in this chapter provide the research process and procedures to answer the research questions RQ1, RQ2, RQ3, RQ4 and RQ5 (Section 1.4).



**Figure 4.1:** The Research Process Flowchart

## 4.2 Research Philosophy

According to Bhattacharjee (2012:p17), “a research paradigm is a mental model, belief system, or frame of reference that guides the organisation of reasoning and observations to generate knowledge”. Conversely, research philosophy is a types of belief system or worldview for a chosen enquiry, encompassing the different designs, processes, strategies, and methods for investigating knowledge on a construct or object (Saunders, Lewis & Thornhill, 2012). Research philosophy generally refers to the perspective of the knowledge development process, entailing values and assumptions underlying a specific investigation, hence guiding the choice of research strategy and methods (Yonazi, 2010).

Interpretivism is a common social science philosophy that emphasizes the role of the researcher in embracing complex and dynamic qualities of the social world by getting close, participating, and entering social realities to develop appropriate interpretations, thus integrating human interest in the study (Kelliher, 2011; Saunders, Lewis & Thornhill, 2012). Positivism, often applied in natural science, entails an objective strategy of observing natural phenomena, their properties, and relationships (Saunders, Lewis & Thornhill, 2012). Pragmatism, which relies on the situation, action, and consequence, proposes an ideology’s satisfactory practical application should it be the guiding principle (Creswell, 2013). Pragmatism advocates that the nature of inquiry of the research question should determine the philosophy to be applied (Saunders, Lewis & Thornhill, 2012). Moreover, in instances where the research question does not suggest a definite philosophy, either interpretivism or positivism, pragmatism encourages flexibility for applying both philosophies. While interpretivism uses qualitative methods and positivism uses quantitative methods, pragmatism advocates the use of mixed methods in addressing the research question (Creswell, 2013).

Therefore, this research applies pragmatic philosophical thinking for the following two reasons; first, to accommodate the diverse nature of the research questions that necessitated the application of mixed-methods. In such instances, pragmatic philosophical thinking is more suitable, and thus it has been highly applied in information system research (Goodyear & Retalis, 2010; Venkatesh, Brown & Bala, 2013). Second, the research required the application of more than one research approach, which only pragmatism supports. These include qualitative approaches to understand provisioning practices, and quantitative approaches to determine factors influencing citizen's

adoption decision. According to Venkatesh, Brown & Bala (2013), pragmatism, which is based on deductive reasoning, allows the incorporation of both quantitative and qualitative approaches.

### **4.3 Research Approach**

A research approach is defined as the overall strategy and procedures for conducting research, encompassing the assumptions and detailed methods used in the collection of data, analysis, and interpretation to generate knowledge (Saunders, Lewis & Thornhill, 2012). Saunders, Lewis & Thornhill (2012) identify two strategies in knowledge development, namely deductive and inductive approaches. Deductive reasoning is associated with theory testing, whereby knowledge is confirmed if the conclusion reached conforms to a set of premises (Johnson & Christensen, 2019). Thus, deductive approaches are more suitable for knowledge generalisation (Saunders, Lewis & Thornhill, 2012; Kumar, 2019). A deductive approach constitutes a top-down approach to scientific knowledge enquiry that subjects the collected data to statistical methods of analysis to deductively develop the body of knowledge (Bryman & Bell, 2015). According to Saunders, Lewis & Thornhill (2012), deductive approaches are highly objective; thus, according to Komba (2012), it is highly favored in IS research. However, the sophisticated methodology and rigorous statistical analysis act as a significant disadvantage in social science research (Saunders, Lewis & Thornhill, 2012).

On the contrary, inductive reasoning is associated with theory building from empirical observations. An inductive approach permits more in-depth insight into the real-world situation. While inductive approaches widely apply in qualitative research, some applications are noted in quantitative research (Komba, 2012). Kelliher (2011) posits that arguments based on experience or observations are better captured by an inductive approach as it permits the use of interviews and observation to gain insight into reality. Inductive reasoning facilitates the construction of an artefact through a more profound understanding of real-life problems, thus it has excellent application in design science (Peppers et al., 2008; Kumar, 2019).

This study combines both inductive and deductive approaches to facilitate the execution of the holistic approach explained in section 3.2. While the enquiry concerning the practices in m-government service provisioning required inductive reasoning, the enquiry into factors influencing citizen's adoption decisions for m-government services required a deductive approach. According to Creswell (2013), mixed-methods entail the integration of inductive and deductive

approaches in a single research. The research made use of both the questionnaire and interviews to collect data, as well as quantitative and qualitative analysis techniques for the research. The application and justification for mixed-methods are explained further in section 4.4. Therefore, this approach was deemed appropriate to facilitate the investigation of the provision of m-government services in Tanzania.

#### **4.4 Research Methods**

According to Creswell & Creswell (2017), there are three types of research methods, namely, quantitative, qualitative, and mixed-methods. Qualitative methods dwell on enquiry and interpretation, using words contrary to quantitative methods that focus on making explicit observations using numerics and close-ended questions (Babbie, 2016; Kumar, 2019). However, Saunders, Lewis & Thornhill (2012) attest that in theory making, it is useful to employ mixed-methods, as it combines both quantitative and qualitative methods. The mixed-methods approach involves the application of both qualitative and quantitative methods in a single research study (Creswell, 2013). The mixing of quantitative and qualitative methods is a common practice within information system research (Komba, 2012; Yonazi, 2012). This research adopted the mixed-methods approach (refer to phase 1 and phase 2 in Figure 4.1) in investigating the provisioning of m-government services in Tanzania due to the reason discussed below.

First, a mixed-methods approach was adopted to facilitate enquiry of the different research questions posed, whose nature required different data types, collection, and analysis methods. Using a mixed-method approach allowed for a richer understanding of the provision of m-government services in Tanzania that entailed provisioning practices and adoption factors. Important to note is that different organisations exhibit different practices and experience in provisioning m-government services, and also, different citizens have varied experiences and views on using m-government services. Therefore, to address the objectives of this research, a qualitative method using open-ended questions explored the m-government services provisioning practice on a small sample of organisations. Also, the quantitative method employed closed-ended questions to explore individual citizen's experiences to identify which factors influence their adoption decisions, which was directed to a large sample of citizens.

Second, a mixed-methods approach facilitated understanding and addressing the research problem statement that required a holistic approach, as described in section 3.2. The mixed-methods

approach facilitated the simultaneous collection of both qualitative and quantitative data, which queried different aspects of the research (Creswell, 2013; Creswell & Creswell, 2017). Third, mixed-methods permit the execution of separate analysis for qualitative and quantitative data and then integrating results for consolidated research findings (Babbie, 2016). Fourth, a mixed-methods approach aligns well with the chosen philosophy that guided the research, that is, pragmatism (Creswell, 2013).

#### **4.4.1 Research Phase**

In this study, two phases, indicated as phase 1 and phase 2 in Figure 4.1, facilitate enquiry into different aspects of the holistic approach. Phase 1 queries the provision and consumption of m-government services in Tanzania to identify practices and factors challenging citizen's adoption of m-government services, while phase 2 is concerned with the development and evaluation of the m-government service provisioning framework.

##### **4.4.1.1 Phase 1: Adoption Challenges Identification**

The adoption challenges identification, noted as phase 1 in Figure 4.1, addressed the research questions RQ1 to RQ4. A quantitative approach was applied to address research questions RQ1 and RQ3 by gathering citizen's perceptions of factors influencing their adoption decisions for m-government services. Simultaneously, to address research questions RQ2 and RQ4, a qualitative approach that made use of interviews was applied to gather information regarding practices in m-government service provisioning in Tanzania. The study applied an integrative logic that assumes different parts contribute to the whole; hence the different parts of the study were investigated simultaneously using different methods to contribute to the body of knowledge (Mason, 2006; Poth, 2018). Therefore, the study adopted a concurrent method mixing approach whereby collection and analysis of both qualitative and quantitative data occur at the same time (Creswell, 2013). In this study, different parts of the holistic approach adopted were investigated differently to contribute to knowledge building regarding the challenges hindering citizen's adoption of m-government service in Tanzania.

##### **4.4.1.2 Phase 2: Framework Evaluation**

The framework evaluation, denoted as phase 2 in Figure 4.1, also utilized both quantitative and qualitative data approaches to collect and analyse data using a semi-structured questionnaire that constituted both open and closed-ended questions. This phase responded to the research question

RQ5. In design science, an artefact may consist of constructs, methods, models, or better theories (Venable, Pries-Heje & Baskerville, 2017). Models or frameworks provide a blueprint, or skeleton which must be evaluated to provide feedback on the quality of the artefact (Yonazi, 2010; Sein et al., 2011; Sonnenberg & vom Bocke, 2012). The questionnaire was administered to a sample of twelve (12) experts in the field of information, communication and technology to evaluate the developed service-provisioning framework and ascertain its applicability and relevance. The twelve respondents consisted of four information system managers (that is one from each participating organisations), four information system technical personnel (that is one from each participating organisations), and four academics in information and technology (that is one from four different universities). Similarly, the second phase of the research followed a concurrent method mixing approach to collect and analyse expert opinion regarding the applicability and relevance of the developed m-government service-provisioning framework.

#### **4.5 Research Strategy**

According to Saunders, Lewis & Thornhill (2012), a research strategy refers to the step-by-step plan of execution for collection of data and analysis to derive quality and realistic results. While there are many strategies for carrying out research, a few include case study, experimental, grounded theory, action, ethnographic, and a survey research strategy. An experimental strategy involves laboratory and field experiments, mostly to establish the causal-effect relationships between variables, whereby one variable is manipulated, one is observed or measured, and the other one is a control variable (Kothari, 2010). The case study strategy is often used in in-depth qualitative research, although in some instances, it may employ both qualitative and quantitative methods for collection and analysis of data (Saunders, Lewis & Thornhill, 2012). Action research strategy applies when either an action or intervention is applied in real-world settings and then investigated to seek its consequence (Sien et al., 2011). A grounded theory research strategy facilitates the generation of theory from data or constructs (Creswell & Creswell, 2017). An ethnographic strategy involves the researcher becoming part of the research to investigate meaning rather than measuring the phenomena (Saunders, Lewis & Thornhill, 2012). The survey, a popular research strategy in social science research, involves the collection of quantitative data, usually using a questionnaire, across a large population (Kothari, 2010). However, Badke (2004) acknowledges that surveys can also collect qualitative data through the use of either interviews or open-ended questions in a questionnaire.



Therefore, the research adopted two strategies, that is, a survey strategy and a case study strategy that employed thematic analysis approach for qualitative data analysis as noted in Figure 4.1. A survey research strategy is appropriate for this research due to the following three reasons. First, the study needed to explore a large sample of citizens in order to identify factors influencing their decisions to adopt m-government services in Tanzania. According to Creswell & Creswell (2017), surveys facilitate enquiry on a large sample size and generalisation to the population, which was a requirement for this study. Second, the flexibility of surveys in collecting both types of data in a single study supported the mixed-method approach adopted for this research. Survey strategy supported the execution of the holistic approach by facilitating the investigation of the interplay between m-government service provisioning practices with factors influencing citizen's adoption decisions. Finally, a survey strategy permits quantitative data to be analysed using both descriptive and inferential statistical methods for which the results can be generalized to the population (Sekaran & Bougie, 2009).

A case study strategy was applied in this research to enable the elicitation of information on practices for m-government service provisioning in Tanzania. Therefore, multiple cases that constituted four government organisations were investigated to collect in-depth qualitative information on provisioning practices. Also, the case study approach applied thematic data analysis approach. According to Thorne (2000, pg.69), thematic analysis “is a method that depends on constant comparative analysis processes to develop ways of understanding human phenomena within the context in which they are experienced”. Thematic analysis is applied due to its usefulness in analyzing qualitative data in primary qualitative researches (Creswell, 2008; Thomas & Harden, 2008; Alotaibi, Houghton & Sandhu, 2016). Thus, using thematic data analysis approach, themes on m-government service provisioning practices were identified, forming the basis for drawing relationships with quantitative findings.

#### **4.6 Research Design**

A research design is a blueprint, that is, the plan and strategy on how to execute the entire research activity (Creswell & Creswell, 2017). Three types of research design exist, namely, exploratory, descriptive, and explanatory designs (van Wyk, 2012). An exploratory research design is instrumental in examining a problem and proffering a solution as it examines “what is happening” and identifies “new insights on a phenomenon” (Saunders, Lewis & Thornhill, 2012). In a descriptive research design, the enquiry focuses on providing a description of the features of

a phenomenon of interest (Sekaran & Bougie, 2009). According to Saunders, Lewis & Thornhill (2012), a descriptive research design extends exploratory design by allowing researchers to expatiate an argument or a discussion. On the other hand, an explanatory research design focuses on constructing and explaining relationships between variables (Saunders, Lewis & Thornhill, 2012). Moreover, a research design may employ qualitative, quantitative, or mixed-methods depending on the nature of the research (Creswell, 2013; Bryman & Bell, 2015). However, the choice of research design is guided by type of research questions it addresses and the status of knowledge (Mbwambo, Barongo & Makuru, 2011; Babbie, 2016).

This study found it necessary to combine more than one research design; these are the descriptive research design and explanatory research designs. Combining different research designs to facilitate achieving individual components or phases of a single study is a common practice in information systems research (Komba, 2012; Yonazi, 2010; Karokola, 2012). The justification for combining two research designs arises from the nature of the questions that the research adopts. While, the 'what' questioning dwells on describing a phenomenon, the 'how' or 'why' questioning seeks an explanation of either behaviour or the relationship between variables (De Vaus, 2001; Babbie, 2016). Therefore, to address RQ1, RQ3, and RQ5, a descriptive design was applied, while for research questions RQ2 and RQ4, an explanatory design was found to be more relevant. It was essential to adopt a descriptive research design to facilitate the utilisation of existing knowledge to examine and further expand the understanding of an already structured m-government service adoption problem. Also, the explanatory research design is appropriate for this study because it facilitates the understanding of the factors influencing citizens' adoption decisions for m-government services in Tanzania, a necessary pre-requisite for prescribing a solution within design science.

#### **4.7 Research Time Horizon**

Saunders, Lewis & Thornhill (2012) define research time horizon as the time frame for collecting research data. Two types of research time horizon exist, namely cross-sectional and longitudinal time horizon. A cross-section research time horizon entails data collection at a specific point in time, while in longitudinal research, data collection occurs at different times to facilitate multiple observations for answering the research questions (Sekaran & Bougie, 2009; Saunders, Lewis & Thornhill, 2012). This study adopts a 'cross-sectional research time horizon' for two reasons;

first, it is less expensive as data collection occurs only once, which aligns with the nature of research as it does not require multiple observations in different time frames. Second, cross-sectional research is less time consuming and is thus highly adopted by students and accepted by academic organisations for degrees in management, information systems, and other related fields (Wilson, 2014).

#### **4.8 Study Site and Setting**

This research was conducted in Dar es Salaam, Tanzania for the following three reasons; first, the high population density and popularity of Dar es Salaam in piloting technological innovation in the country made the city ideal for this study (Yonazi, 2010). Dar es Salaam is the largest commercial city with the highest population density in Tanzania of over 5.1 million people in 2018 (NBS, 2019). The mGov service by eGA, which represents the highest attempt to coordinate m-government service initiatives in Tanzania, was also pilot tested in Dar es Salaam in 2015. Thus, residents of Dar es Salaam are relevant and ideal in providing informed perceptions on m-government service adoption. Second, the city, at the time of data collection, housed the headquarters of government organisations, including ministries, departments, and agencies, before the relocation in 2019 to Dodoma, the capital city. Last, Dar es Salaam provides both the urban modern city experience while its outskirts provide the rural or peri-urban areas for this research. The urban-rural diversity was necessary for the research to be able to generalize the results. The strategic importance of the region on both social-political development and the economy at large, coupled with the vast population, has made Dar es Salaam an ideal study site for this research.

Therefore, the study involved residents of Dar es Salaam city in identifying factors influencing citizens' adoption decisions for m-government services. Two out of the three districts in Dar es Salaam were involved at the time of data collection in January 2018, that is, Ilala and Kinondoni. The two districts were considered due to their population size and the presence of government organisations in these districts. Kinondoni is the densely populated district in Dar es Salaam with a population of 1,775,049 million people. In contrast, the Ilala district, which has a population of 1,220,611 million residents, was selected due to having the highest number of government offices in the city (NBS, 2019). Due to a lack of official data describing the newly established districts, such as population statistics, economic and social status, apart from geographical demarcations at the time of data collection, the researcher was forced to utilize the old districts' settings to enable

fieldwork.

The investigation into the provisioning practices for m-government services, noted within phase 1 of the research in Figure 4.1, involved four government organisations whose headquarters were located in Dar es Salaam. The study needed to maintain the confidentiality and anonymity of the participants and the organisations to allow participants to freely give relevant information, to establish practice in m-government service provisioning. Thus, the research made use of pseudonyms such as organisation A, B, C, and D to conceal the identity of the investigated organisations, and aliases such as respondent1, respondent2, respondent3 were assigned to research participants.

## **4.9 Sampling Design**

A sample design refers to the plans, process, and methods involved in identifying elements of the research, including identifying the target population and selecting the sample (Kabir, 2016; Mbwambo, Barongo, & Makuru, 2011). The choice of the sample design for research is, however, dependent on research objectives and the resources available. The detailed explanation of the different aspects of the sample design adopted for this study is discussed in the following sub-sections.

### **4.9.1 Research Population**

A research population is the totality of elements conforming to a set of specific characteristics of interest (Kothari, 2010; Babbie, 2016). In specifying the research population, the researcher made considerations of the nature and aims of the research and the information needed to address the research questions. In this study, the research population constituted residents of the two districts of Dar es Salaam that is, Ilala and Kinondoni, including employees from the four government organisations whose practices for m-government service provisioning were investigated. Therefore, the population targeted for the adoption challenges identification phase was 2,995,660 million people, from the two districts (NBS, 2018).

The population for the framework evaluation phase comprised ICT experts, which included management and personnel in the ICT departments of the participating organisations, and the academics that hold a PhD in information systems or related fields.

#### **4.9.2 Sample and Sampling Techniques**

A research sample is a small collection of elements selected from a larger population for measurement (Saunders, Lewis & Thornhill, 2012). Sampling techniques are the methods or approaches for selecting the elements. Sampling is the process of selecting a small set of elements (Mbwambo, Barongo, & Makuru, 2011; Saunders, Lewis & Thornhill, 2012). Investigating the entire population of approximately 3 million people residing in Ilala and Kinondoni districts is extremely expensive, time-consuming, and somewhat unrealistic. Moreover, the quantitative approach provides an advantage in the ability to work with smaller samples and draw inferences about the larger population (Lubua, 2014; Mbwambo, Barongo, & Makuru, 2011). Hence, it was more practical to work with a sample rather than the population.

Generally, there are two categories of sampling techniques, which are probability and non-probability techniques (Saunders, Lewis & Thornhill, 2012; Mbwambo, Barongo, & Makuru, 2011). In probability sampling, elements of the population have a non-zero equal opportunity of being selected, thus it is regarded as unbiased sampling (Kumar, 2019). Probability sampling techniques employ statistical techniques to determine the inclusion or exclusion of an element to the sample (Saunders, Lewis & Thornhill, 2012; Kumar, 2019). A simple random sampling technique is a type of probability sampling in which each element of the population has an equal chance of being selected in the sample (Saunders, Lewis & Thornhill, 2012). In non-probability sampling, elements are selected subjectively, based on the researcher's judgment towards meeting certain conditions or criteria; thus, elements of the population do not have equal chances of being selected (Saunders, Lewis & Thornhill, 2012). Non-probability sampling techniques include convenience sampling, snowball sampling, and purposive sampling. Convenience sampling entails drawing sample elements from part of the population that is accessible and willing to participate; thus, elements fall under selection only by being situated where the researcher or the research is situated (Saunders, Lewis & Thornhill, 2012). Hence, convenience sampling is affordable, flexible, and easy to conduct (Etikan, Musa & Alkassim, 2016). While purposive sampling refers to the selection of population elements based on specific criteria, snowball sampling is when sample elements are recruited or identified for participation from other sample elements (Mbwambo, Barongo, & Makuru, 2011; Saunders, Lewis & Thornhill, 2012).

This research applied non-probability sampling techniques, specifically purposive sampling and convenience sampling because they are reasonably accessible in mixed-methods research

(Komba, 2012). Purposive sampling techniques were applied in the selection of the participating wards, villages, government organisations and the employees that participated in the research, for the following three reasons. First, the selection of the wards and the villages followed a purposive sampling technique to ensure the inclusion of urban and rural or peri-urban wards and the densely populated wards, either with people or public offices. Second, the four participating organisations were selected based on their role in provisioning m-government services in Tanzania. Thus, the organisations with strategic roles, such as coordination, m-government service development, and provision, were considered for the study. Lastly, a purposive sampling technique was also applied in the selection of respondents from the four participating organisations for qualitative research. Purposive sampling facilitated the selection of managers and technical personnel, as they are more likely to provide the required information based on their knowledge and experience with the provisioning of m-government services in Tanzania (Oppong, 2013). The organograms of the respective organisations guided the identification of crucial respondents. Fourth, participants for the framework evaluations were also purposively sampled based on their expertise in information systems and technology, as this was a critical requirement to gain an expert opinion on the applicability and relevance of the framework.

A convenience sampling technique was applied in recruiting citizens from the identified districts for the quantitative part of the research. This is because convenience sampling techniques provided the flexibility to recruit citizens in their natural environment, where they are more comfortable to divulge the required information (Etikan et al., 2016). Moreover, the technique allowed the researcher to adjust strategies in the field to ensure the targeted sample was attained, including change physical locations for recruiting citizens, as their participation relied purely on their willingness to participate. Despite using an accidental or convenience sampling technique to recruit participants, the researcher attempted to ensure an equal proportion of participants, that is, youth, elderly, women, and men, in the sample.

#### **4.9.3 Sample Size and Distribution**

The sample size is the total number of elements or people taking part in a research study (Saunders, Lewis & Thornhill, 2012). The targeted sample size for the quantitative part of the research, noted in Figure 4.1, was 422 participants, which is between 51 and 54 participants per ward, to maintain an equal contribution of approximately 12% of each ward to the total sample.

Table 4.1 indicates the sample size and its distribution across the selected wards in the respective districts. According to Krejcie & Morgan's (1970) table, for a population of 3 million people, a sample size of at least 384 participants is sufficient for quantitative analysis. Also, by applying Hair et al.'s (2006) sample size determination rule of twenty cases to one variable (20:1) rule, scientific quantitative analysis research of thirteen (13) variables requires a minimum sample of 260 observational cases. The conceptual framework discussed in section 3.6.2 raises a total of 13 variables to be investigated. Thus, with making a provision of 10% to cater for non-return and data quality issues such as data omission and incorrect filling of the questionnaire, a sample size of 422 participants is considered sufficient on both conditions.

**Table 4.1:** Distribution list for administering questionnaires to citizens

<b>District</b>	<b>Ward</b>	<b>Area Descriptor</b>	<b>N</b>	<b>%</b>
Ilala	Ilala	Urban	54	12.8
	Kivukoni	Urban	54	12.8
	Chanika	Peri-Urban/Rural	52	12.3
	Kinyerezi	Peri-Urban/Rural	51	12.1
Kinondoni	Kinondoni	Urban	54	12.8
	Kawe	Urban	54	12.8
	Kunduchi	Peri-Urban/Rural	52	12.3
	Mbezi Juu	Peri-Urban/Rural	51	12.1
<b>Total</b>			<b>422</b>	<b>100</b>

The sample size for the qualitative part of the adoption challenges identification, noted as phase 1 in Figure 4.1, constituted sixteen (16) participants, four from each participating organisation; that is, one (1) management representative, one (1) business or system analyst, one (1) programmer, and one (1) service administrator (Table 4.2). Despite being a small sample, data collection proceeded until there was no new data obtained; that is a saturation point, a necessary condition for qualitative data collection (Mbwambo, Barongo, & Makuru, 2011). Moreover, this sample size is consistent with literatures suggestion of a sufficient sample size for statistically significant

qualitative study to range from five to 50 sample elements (Dworkin, 2021). Understanding provisioning practices coupled with citizens' perceptions, allows a holistic understanding of the challenges citizens experience when adopting m-government services in Tanzania. The derived information is insightful towards recommending a strategy that overcomes these challenges and thus enhances citizens' adoption.

**Table 4.2:** List of ICT management and technical personnel for the interview

<b>Organisational Code</b>	<b>Participants Position/Role</b>	<b>Number of Respondents</b>	<b>Code</b>
Organisation A	Business or system analysts	1	Respondent 1
	Programmers	1	Respondent 2
	Service Administrators	1	Respondent 3
	Management Representative	1	Respondent 4
Organisation B	Business or system analysts	1	Respondent 5
	Programmers	1	Respondent 6
	Service Administrators	1	Respondent 7
	Management Representative	1	Respondent 8
Organisation C	Business or system analysts	1	Respondent 9
	Programmers	1	Respondent 10
	Service Administrators	1	Respondent 11
	Management Representative	1	Respondent 12
Organisation D	Business or system analysts	1	Respondent 13
	Programmers	1	Respondent 14
	Service Administrators	1	Respondent 15
	Management Representative	1	Respondent 16

The sample for framework evaluation, noted as phase 2 in Figure 4.1, consisted of twelve (12) purposively sampled participants, as indicated in Table 4.3. The sample included four (4) management representatives, four (4) business analysts (each from the four participating organisations), and four (4) experts/researchers in academia purposively selected across four different universities within and outside Africa. While practitioners' expert opinions are very critical for possible future adoption and implementation of the artefact, the theoretical opinion is equally essential for research artefact development and recommendation, thus the inclusion of participants from academia in the evaluation. Furthermore, participants were identified for



participation based on their knowledge and experience of the phenomenon being investigated (Sekaran & Bougie, 2013).

**Table 4.3:** List of participants for framework evaluation

<b>Organisation</b>	<b>Expert Type</b>	<b>Number of respondents</b>	<b>Code</b>
<b>Organisation A</b>	Management Representative	1	Expert 1
	Business or system analyst	1	Expert 2
<b>Organisation B</b>	Management Representative	1	Expert 3
	Business or system analyst	1	Expert 4
<b>Organisation C</b>	Management Representative	1	Expert 5
	Business or system analyst	1	Expert 6
<b>Organisation D</b>	Management Representative	1	Expert 7
	Business or system analyst	1	Expert 8
<b>Academia</b>	Academic with PhD (from Universities in Tanzania)	1	Expert 9
	Academic with PhD (from Universities in South Africa)	2	Expert 10
			Expert 11
	Academic with PhD (from Universities outside Africa)	1	Expert 12

#### **4.10 Research Instrument Design and Administration Procedure**

Creswell & Creswell (2017) define a research instrument as a tool used to facilitate data collection. In executing the adoption challenges identification phase, primary data was collected because the nascent nature of m-government services in Tanzania made data on implementation and citizen's perceptions rare. In such cases where secondary data is scarce, it is inevitable for researchers to engage in the field for fresh data collection (Yonazi, 2010; Babbie, 2016). While in qualitative research, text or non-numeric data is usually collected through open-ended questions, observation, and interviews, which could be structured, unstructured or semi-structured, in quantitative research, questionnaires are mostly used to collect numeric data (Saunders, Lewis & Thornhill, 2012; Creswell & Creswell, 2017).

In phase 1, a questionnaire labeled as instrument 1 in Figure 4.1, was used to collect quantitative data from citizens residing in the identified wards (Appendix A). The reason for using a

questionnaire was to facilitate the collection of data from a large sample of citizens in order to be able to generalize findings on challenges influencing citizen's adoption decisions for m-government services. Moreover, the qualitative data for this phase was collected through the use of semi-structured interviews with ICT managers, which was facilitated by instrument 2 (Figure 4.1), the interview guide (Appendix B). The semi-structured interviews allowed the researcher to have some structure in questioning respondents and, at the same time, permitted in-depth probing and querying for further information regarding the practice in provisioning m-government services.

The framework evaluation phase used an evaluation questionnaire (Appendix C), noted as instrument 3 in Figure 4.1. Instrument 3 consisted of both open and closed-ended questions to collect expert opinions on the applicability and relevance of the framework. The evaluation questionnaire consisted of closed questions that captured numerical data followed by open-ended questions that sought an in-depth explanation on the choices made and any data that could have been missed by the close-ended questions.

#### **4.10.1 Questionnaire Designing**

A questionnaire is a self-account data collection tool filled by each participant in the survey (Mbwambo, Barongo, & Makuru, 2011; Babbie, 2016). The questionnaire method is chosen due to its ability to efficiently collect data from large samples (Sekaran & Bougie, 2013). In designing the questionnaires for this study, several issues, as outlined by Brace (2018) and Creswell & Creswell (2017), were taken into consideration. First, the questionnaire questions were aligned with the research objectives as well as the conceptual framework to ensure they captured all the desired variables of the study. There are three kinds of questions that may feature in a questionnaire, namely closed-ended, open-ended, and mixed questions. However, the choice of questions to include in a questionnaire depends on the nature of the research questions. Therefore, while the challenges identification phase questionnaire used closed-ended questions, the evaluation questionnaire had mixed questions that were open-ended questions for qualitative data, and closed-ended questions for quantitative data. Second, for the wording of the questions on the questionnaire, the researcher employed the assistance of a statistician to ensure that the questions had a concise structure, and simple and clear language. Third, to ensure the execution of the two phases, two questionnaires were developed, one for each specific phase of the study.

#### **4.10.1.1 Adoption Challenges Identification Questionnaire**

In phase1, instrument 1, a questionnaire was developed to collect data on factors influencing citizen adoption of m-government services (Appendix A). The conceptual research framework influenced the choice of questions on instrument 1; that is, the variables and the type of measurement of the variable. Since the research focus is to establish citizen's ratings on the importance of a given variable in their adoption decision-making for m-government services, then closed-ended questions were more suitable. The operationalisation of the variables from the conceptualized framework adopts a richer definition and is context-specific to m-government services, as described in section 3.6.2. The resulting questionnaire had four parts: first, the introduction section that describes the research purpose and aims; second, the informed consent to participate form detailing participants' rights regarding the research exercise; third, the participant profiling details; and last, the citizen's perception ratings of their experience with m-government services. Instrument 1 contained closed-ended questions in the form of statements that assessed the importance of each variable in decision-making towards m-government service adoption. The assessment of the variables was by using a 5-point Likert scale, whereby participants were requested to rate their perception, ranging from strongly disagree to strongly agree, on various statements that measured each variable. The developed questionnaire was then examined by a statistician to gain their expert opinion to ensure the quality of the questions in collecting the desired information for a reliable analysis.

#### **4.10.1.2 Framework Evaluation Questionnaire**

Instrument 3, the evaluation questionnaire, contained mixed questions that were open- and closed-ended questions (Appendix C). Instrument 3, the evaluation questionnaire, was divided into four parts, each made up of closed questions followed by open-ended questions, to facilitate data gathering on a specific criterion from among the four assessed; namely, adequacy, relevance, usability, and feasibility. Part A, part B, and part C of the evaluation questionnaire consisted of questions that collected data for assessing the adequacy of the modeled m-government service adoptability problem, the modeled m-government service adoptability solution, and the user-centered m-government service provisioning framework respectively. The adequacy criteria examined the comprehensiveness of the models and the subsequent framework in addressing all the significant issues related to m-government service provisioning and adoption.

Part D of the questionnaire consisted of closed questions followed by open-ended questions that collected data examining the relevance, usability, and feasibility of the framework. Relevance or usefulness criteria assessed the alignment of the framework with existing policies, its contribution to best practices in m-government service implementation, and facilitation on citizens' awareness and involvement in the design, development, and delivery of m-government services. The usability evaluation criteria assessed the efficiency of use, learnability and error-freeness (Nielsen, 1993), hence in this study, data was collected on the ease of use, ease of understanding and ease of communicating the models and the framework among implementing stakeholders, as well as the ease of implementing with minimum changes. Feasibility criteria assessed the perception of the possibility of applying the designed artefact, for which information such as application within existing structures and resources, cost-effectiveness, and the time frame requirement was collected. Moreover, the evaluation questionnaire, through the incorporation of both open and closed-ended questions, is flexible to accommodate additional feedback that may improve the modeling of the problem or the solution and ultimately, the user-centered m-service framework for enhanced m-government service adaptability.

#### **4.10.2 Interview Process Design**

Interviews, a data collection method whereby the researcher asks questions and the participant responds, is a useful method for collecting rich and in-depth information about a phenomenon (Babbie, 2016). Interviews fall under qualitative data collection approaches. Depending on the nature of the study and the way the interview discussion unfolds, three types of research processes exist; unstructured, structured, and semi-structured interviews (Saunders, Lewis & Thornhill, 2012). An unstructured interview that entails free discussion, not dwelling so much on structures and hierarchy of the discussion, is most appropriate in discovery type of research (Creswell & Creswell, 2017). In structured interviews, the line of questioning and answers follows a specific structure and hierarchy; the interviewer follows a strict order of questioning guided by an interview guide (Creswell, 2013). The semi-structured interview borrows the best of form from the other two kinds; while following a particular structure and order guided by an interview guide, it allows the flexibility to pursue other sub-topics related to the main line of enquiry (Mbwambo, Barongo, & Makuru, 2011).

In this research, semi-structured interviews were organized with ICT personnel from four participating government organisations to explore their practices in providing m-government

services. The semi-structured interviews were carried out through the use of instrument 2, as denoted in Figure 4.1, the interview schedule attached as Appendix B. Similar to the questionnaire development, the reviewed literature on public service provision and related fields informed the structure and questions of the interviews. Furthermore, the interview schedule was then subjected to pre-testing with experts to assess its quality in probing the required information.

#### **4.10.3 Data Collection Strategy**

A data collection strategy refers to the entire plan and process for gathering data to be analysed to address the problem statement, the research questions or hypotheses (Creswell & Creswell, 2017). To offset the weaknesses of one technique as well as to facilitate a holistic approach that aligns with the research objectives, multiple data collection strategies were deployed (Komba, 2012). Similar to Yonazi (2010) and Komba (2012), this study made use of primary data as the basis of the study findings and secondary data to complement these primary findings. While interviews and questionnaires were primary data collection tools, a review of organisational and scholarly documents served as a technique for gathering secondary data. Prior to data collection, the researcher contacted the relevant authorities to secure the necessary permits, including obtaining gatekeepers' letters (Appendix D and Appendix E) from participating organisations and the ethical clearance (Appendix F and Appendix G) from the university for the research fieldwork.

##### **4.10.3.1 Primary Data Collection**

Instrument 1, for collecting data in the adoption challenges identification phase, was administered directly to citizens. A total of four hundred and twenty-two (422) of the questionnaires were distributed to citizens in the two (2) selected districts, whereby between fifty-one (51) and fifty-four (54) copies were distributed in each of the eight (8) wards (Table 4.1). The self-administered questionnaires were dispensed on a face-to-face basis to citizens that were willing to participate in the research. The face-to-face administration of instrument 1 facilitated immediate completion and, thus, immediate collection of questionnaires due to its ability to respond on the spot to any queries raised (Wilson, 2014). Face-to-face or personal administration of the questionnaires promoted a high response rate due to its ability to facilitate follow-ups and assistance during questionnaire filling (Sekaran & Bougie, 2009). However, conducting face-to-face questionnaire administration is challenging due to traveling costs associated with being in the data collection site and the time spent in administering the questionnaire (Wilson, 2014); thus, the research engaged the services of two research assistants. The research assistants were given an orientation

on the study to facilitate response on the spot to any question during data collection.

The citizens that participated in the quantitative data collection were conveniently identified. Elements in a conveniently sampled population usually meet a specific practical criterion set by the researcher, including geographical proximity, availability, willingness, and easy accessibility (Etikan et al., 2016). Therefore, strategic places where all categories of people gathered in masses were chosen. Public areas, including bus stops, markets, universities, colleges, malls, cafeterias, places of worship and public offices, were purposively identified as areas for approaching citizens for questionnaire filling because they provided a convenient place for accessing a high volume of people at one time. The participants were, however, recruited based on their willingness and convenience to participate. In the event of scarcity of participants, the researcher and assistants were forced to change the recruitment strategy in terms of the locations and the approach permissible in convenience sampling. Administration and collection of feedback on instrument 1 for the first phase of the research took twelve (12) weeks, and a total of four hundred and seven (407) questionnaires were collected, of which eleven (11) were discarded, leaving three hundred and ninety-six (396) questionnaires for data analysis.

Instrument 3 for the framework evaluation phase was sent out via email to addresses of twelve (12) purposively sampled ICT experts from both the four participating organisations and academics (Table 4.3). The exercise took six (6) weeks of follow-up and collection via email of the filled questionnaires.

The interviews with management and ICT personnel from the four participating government organisations on m-government service provisioning practices also served as a primary data source for this study. A total of sixteen (16) semi-structured interviews guided by instrument 2 were scheduled between the researcher and four (4) management representatives (one from each organisation) and twelve (12) personnel with different roles within the ICT departments. Two (2) of the sixteen (16) interviews had to be conducted telephonically due to the busy nature of the work of the critical respondents. The interviews conducted lasted between twenty (20) to forty (40) minutes per session.

#### **4.10.3.2 Secondary Data Collection**

Secondary data refers to already collected or data readily available for analysis (Creswell & Creswell, 2017). In this study, secondary data collection constituted a review of the literature,

including published and unpublished dissertations, online and print journal articles, conference papers, and textbooks, as well as documents such as reports, policies, guidelines, and procedures relevant to either m-government service adoption or provision. The review of the literature and relevant organisational documents proved instrumental in positioning the study findings in terms of interpretation and discussion. Moreover, the secondary data gathered provided a source for discussing the implications of the study findings and the recommended solution.

#### **4.11 Data Quality Control Strategy**

Research data quality refers to the state of data being fit for use in the analysis (Saunders, Lewis & Thornhill, 2012). Creswell & Creswell (2017) stated that the quality of data in research is a reflection of the excellence of the collection tools, such as the questionnaire or an interview schedule. It is essential to ensure the clarity, consistency, and the ability of the tool to fetch the required information in order to have quality data for analysis (Komba, 2012). Therefore, for research to be accepted within the research community, two data quality issues, namely reliability and validity, must be sufficiently addressed by the researcher.

##### **4.11.1 Validity**

According to Babbie (2016), validity refers to the degree of relevance, usefulness, and suitability of a specific scale against the concept it intends to measure. Validity concerns the ‘relationship’ between the variables as well as the indicators used to observe or measure the variables (Mbwambo, Barongo & Makuru, 2011). There are different types of validity, including the construct, face, discriminant, content, and convergent validity (Celik, Sahin & Aydin, 2014). Face validity focuses on the appropriate use of language, such as avoiding the use of unambiguous language in developing the questions that query for the required information. Content validity refers to how representative the content of the measure or the scale is in relation to a construct it measures (Straub, Boudreau & Gefen, 2004). Construct validity tests how well a scale measures what it is claimed to measure, such that any variations in the measures are only a result of the variations in scale or score (Celik, Sahin & Aydin, 2014). Moreover, while discriminant validity measures the degree to which two similar concepts are different from each other, convergent validity tests the relatedness of the concepts that are expected to be related.

In this research, construct, content, discriminant, convergent, and face validity on top of external validity were applied to ensure the validity of the study findings. First, face validity was assured

through the use of various experts, including language editors and statisticians, to ensure that the questions posed on the questionnaire and the interview schedule were clear and that they fetched the required data from respondents. Second, content validity was assured through the use of experts knowledgeable in ICT from both industry and academia, to evaluate the developed artefacts, including the research instruments and the framework. Third, construct validity assured alignment of the research instruments with the variables as identified in the conceptual framework and objectives. Additionally, most of the variables examined were adopted from previous studies with sound theoretically tested frameworks, thus guaranteeing the validity of the adopted variables. Following the feedback concerning the complexity, compliance, and comprehensibility of the scales, the questionnaire underwent several revisions and re-wording of the scales. Lastly, like Celik et al. (2014) and Chen et al. (2016), discriminant and convergent validity were examined through the use of factor analysis.

#### **4.11.2 Reliability**

Reliability refers to the degree to which observations are free from measurement errors so as to ensures that the research method produces accurate and consistent results under similar conditions over time (Mbwambo, Barongo, & Makuru, 2011; Creswell, 2013; Babbie, 2016). The three types of reliability assessments include ‘test-retest’, ‘inter-rater’, and internal consistency. The ‘test-retest’ assesses reliability across time whereby the same instrument produces the same outcome at different times; the inter-rater reliability tests examine the degree of similarity between different verdicts on the same phenomenon under investigation; and the internal consistency or reliability across items examines the degree to which items on the scale are interrelated, that is, it measures the attribute (Creswell, 2013; Saunders, Lewis & Thornhill, 2012). Important to note is that the research instruments were developed from the scratch.

This research, being a cross-sectional study that used research instruments that were developed from scratch, did not permit the researcher to carry out a test-retest and inter-rater reliability test. Only internal consistency was examined to minimize errors and biases, since the research instruments were developed from scratch. Applying statistical approaches, internal consistency was examined in three different stages in this research. First, the sample reliability to determine the appropriateness of the sample and the data collected for the desired analysis was carried out using Cronbach Alpha values. Second, the reliability of the scales used for measuring the constructs were also assessed by comparing the combined scale alpha values to the scale alpha



value for when an item on the scale is deleted (Tarhini, Hone & Liu, 2014). Lastly, the reliability of the structure, that is, the conceptual framework (Figure 3.2), was also examined by assessing the model ‘goodness of fit’ for both the measurement and structural model. The ‘goodness of fit’ indices, namely chi-square to degrees of freedom ratio ( $\chi^2/df$ ), incremental fit index (IFI), comparative fit index (CFI), and the root mean square error approximation (RMSEA) were observed against benchmarks established in the literature.

#### **4.12 Ethical Research Consideration**

Preserving ethical norms in research practices is fundamental in promoting research aims without fabrication, falsification, or misrepresentation, thus enhancing public credibility and usefulness of research outputs (Resnik, Rasmussen & Kissling, 2015). Ethical research issues that needed to be considered included informed consent, confidentiality, privacy, and protection from physical and psychological harm. In this study, the ethical guidelines, process, and procedure of the University of KwaZulu-Natal were followed, which entailed completing an ethical clearance form, together with the research instruments and gatekeepers' letters permitting access to respondents in participating government organisations and citizens in the identified districts. The gatekeepers' letters to allow the researcher to access citizens in the selected areas were granted by the responsible district authorities in accordance with the rules and regulations for accessing respondents in Tanzania (Appendix D and Appendix E). Furthermore, the research obtained permission to conduct interviews with staff from the participating organisations before approaching the individual staff. However, since it was deemed necessary to preserve the identities of the participating organisations, the letters are only submitted to the university's humanities and social science research ethics administration office as proof of permission. Upon completion of the review and satisfaction with the ethical requirements, and ethical approval letter with reference number HSS/2085/017D of 07<sup>th</sup> December 2017 (Appendix F) and its amendment of 29<sup>th</sup> May 2019 (Appendix G) were issued for this research to proceed with phase one and phase two fieldwork respectively.

In the field, each participant was requested first to read and sign an informed consent form before any data was collected. Informed consent, by stipulating the rights and responsibilities of both parties to research, offers protection to both the participants and the researcher. The informed consent allows inclusion to the research only after an individual's approval; it thus protects

participants from any physical and psychological harm, the researcher from possible litigation, and the research from being deemed unethical and invalid (Resnik, Rasmussen & Kissling, 2015). Additionally, participants were informed that at any time in the process, they might seek clarification regarding their role, rights, and on any issue concerning the research, or may terminate their participation. Moreover, the researcher strived to ensure participants' confidentiality and privacy were preserved by ensuring that all the identifying information is securely preserved out of reach of anyone not directly involved with the study in accordance with the University of KwaZulu-Natal data protection policy. All the data collected were handed in to the School of Management, Information Technology, and Governance at the University of KwaZulu-Natal for safekeeping and disposal in accordance with the rules and procedures.

#### **4.13 Summary**

This chapter aimed to describe the various methodological choices made, the justifications concerned, and the application of the methods to carry out this study. The researcher justified the adoption of design science principles in social science research as this permits the development of a real-life solution to the existing m-government service adoption problem in Tanzania (Yonazi, 2010; Hevner & Chatterjee, 2010). The justification for the selection of pragmatic philosophy and the mixed methods approach to facilitate simultaneous investigation of the different parts of the holistic view is provided. The adoption challenges identification phase applied an explanatory concurrent mixed-methods research strategy that facilitated data to be collected and analysed concurrently yet separately, and the results integrated for the research findings' interpretation (Creswell, 2013). This chapter justifies applying a survey strategy to quantitatively elicit citizen's adoption factors, and equally, a multiple-case studies strategy to qualitatively investigate – and by applying thematic analysis – establish the m-government service provisioning practices in Tanzania. Similarly, the framework evaluation phase followed a concurrent method mixing research design, which entails simultaneous data analysis and interpretation to enable the cross-validation of the findings (Creswell & Creswell, 2017). Additionally, the chapter describes the research sample design and techniques, research instruments, data collection strategy, and the ethical considerations made for this study. The chapters set out the blueprint for conducting the fieldwork for this research.

# **CHAPTER FIVE**

## **DATA ANALYSIS AND PRESENTATION**

### **5.1 Introduction**

Data analysis is the process of inspecting, cleaning, transforming and modelling the collected data to uncover meaningful information (Kothari, 2010; Babbie, 2016). The benefits of data analysis in research include structuring the findings from the data, providing clarification on concepts and theories applied as well as minimizing human biases in making suppositions (Babbie, 2016). In this research, data analysis facilitated the scrutiny and structuring of data to extract patterns of meaningful information. This chapter presents and discusses the analysis and interpretation techniques used to determine challenges affecting citizen's adoption decision for m-government services, that is, factors of adoption and the provisioning practices for m-government services.

It is critical to note that both qualitative and quantitative data collected aimed at uncovering factors influencing citizen's decision to adopt m-government services, thus were used to respond to research questions RQ1, RQ2, RQ3 and RQ4 (refer section 1.4) as they related to citizen's challenges in adopting m-government services. While quantitative data collected through a questionnaire were analysed by using descriptive and inferential statistics, qualitative data from interviews conducted were analysed using thematic analysis.

### **5.2 Response Rate**

A total of 422 questionnaires, marked as instrument 1 in Figure 4.1, were distributed to residents of eight (8) wards, four from each participating district in Dar es Salaam, which is Ilala and Kinondoni districts. An equal amount of 211 questionnaires were distributed in the two districts, as indicated in Table 5.1. Instrument 1 was administered personally to respondents, and as the respondent-researcher contact provided the opportunity for respondents to seek clarification and also allowed the researcher to collect the completed questionnaires immediately, this promoted a high response rate. Survey fieldwork for data collection, that is, questionnaire distribution, follow-up and collection, took twelve (12) weeks. Upon completion of the field exercise, only 407 questionnaires were received. Eleven (11) questionnaires were discarded due to incomplete responses. Therefore, a total of 396 questionnaires representing a 93.8% of the distributed questionnaires were usable for the survey data analysis. A clean dataset of 396 cases was

sufficient to carry out quantitative data analysis as it satisfied the two guiding conditions. According to Krejcie & Morgan's (1970) table for determining sample size, which indicated a sample of at least 384 cases, this was sufficient. Also, Hair et al.'s (2006) twenty (20) cases to one variable rule discussed in section 4.8.4, which indicates at least 260 cases are sufficient for quantitative analysis, is satisfied.

**Table 5.1:** Response rate for quantitative sample

District	Ward	Area Descriptor	Questionnaires			
			Distributed	Received	Discarded	Used
Ilala	Ilala	Urban	54	53	1	52
	Kivukoni	Urban	54	51	2	49
	Chanika	Peri-Urban/Rural	52	50	3	47
	Kinyerezi	Peri-Urban/Rural	51	50	1	49
Kinondoni	Kinondoni	Urban	54	53	1	52
	Kawe	Urban	54	50	0	50
	Kunduchi	Peri-Urban/Rural	52	51	2	49
	Mbezi Juu	Peri-Urban/Rural	51	49	1	48
<b>Total</b>			<b>422</b>	<b>407</b>	<b>11</b>	<b>396</b>

### 5.3 Data Analysis Tools and Techniques

According to Kothari (2010), there are several data analysis techniques; however, the choice of which technique to use is dependent on the nature of the research objectives. In this study, the nature of the research objectives called for a mixed-method approach in data collection, and subsequently, the analysis method is quantitative and qualitative methods. Quantitative data analysis used both descriptive and inferential statistical techniques to identify determinants of citizens' adoption of m-government services. Descriptive analysis is based on frequencies and percentage distribution of the responses on a particular item. The inferential analysis included chi-square tests, binomial tests and structured equation modelling (SEM) techniques to model factors influencing citizen's adoption decisions. Qualitative data were analysed using thematic analysis methods. By examining the raw qualitative data, various important patterns were identified. The established patterns guided the organisation of the data and coding to develop themes concerning m-government service provisioning practices.

### **5.3.1 Descriptive Statistical Analysis**

The descriptive analysis provides an overview or summary of the quantitative data set (Kothari, 2010). It uses statistical indices, represented as frequency distribution tables, pie charts, histograms or bar graphs, to summarize or describe a large data set. It is thus common to commence the presentation of results with descriptive statistics to provide readers with an overview of the data (Kothari, 2010; Wilson, 2014). Therefore, this research used descriptive statistical analysis to provide a demographic description of the data set available before commencing a detailed analysis that addressed specific research questions. The demographic variables that are descriptively analysed included age, gender, education, income, occupation and experience with similar services from the private sector.

### **5.3.2 Binomial Test**

According to McHugh (2013), the binomial test of significance is used to either compute the statistical significance of deviation from an expected outcome or to examine the distributions of a single variable with two mutually exclusive outcomes. In this research, the binomial test was applied to assess the distribution of responses on three variables; experience with similar services, awareness on m-government services, and the nature of access to service whether voluntary or compulsory. Thus, the binomial test examined if a significant proportion of the respondents were aware of the existence of m-government services, their perception of the nature of access, and if they had prior experience with similar services from the private sector.

### **5.3.3 Chi-square Test**

The chi-square test is a non-parametric test commonly used to examine the relationship between categorical variables (Gaunt, Pickett & Reinert, 2017). According to Rana & Singhal (2015), the chi-square goodness of fit test determines how significant the difference is between observed sample distribution and the expected distribution. In this research, the chi-square goodness of fit test was used to determine how significant the proportion of respondents was in selecting a given response. Variables whose responses were tested were frequency of accessing m-government services that ranged from never to daily, and the popularity of media choice for hearing news regarding government innovations, including magazines, televisions, radio and street promotions.

#### **5.3.4 Structural Equation Modeling (SEM)**

In examining factors influencing citizens' adoption decision for m-government services, the study made use of the Structural Equation Modeling (SEM) technique. SEM, a multivariate analysis technique, is useful in assessing and confirming structural relationships (Hair et al., 2016). SEM is widely applied in behavioural sciences, more specifically in information systems research, due to its ability to facilitate hypotheses testing and modelling of complex relationships involving latent constructs (Hair et al., 2012; Rahman, Kamarulzaman & Sambasivan, 2015; Ooi & Tan, 2016; Oliveira et al., 2016; Tarhini, Hone & Liu, 2014). According to Kohnke, Cole & Bush (2014), latent constructs are abstract variables that cannot be measured directly or their measurement is error-prone; thus, they are observed through other variables.

SEM involves a combination of multivariate multiple regression or path analysis with confirmatory factor analysis, yielding a compelling analysis that examines the relationship between measured and latent variables while effectively accounting for data multicollinearity and unreliability (Rahman, Kamarulzaman & Sambasivan, 2015). Advantages of SEM compared to multiple regression analysis include flexible assumptions that allow interpretation even in the presence of multicollinearity, reduced measurement error due to the use of confirmatory factors analysis, and its ability to test the overall model with multiple dependents rather than individual coefficients (Shadfar & Malekmohammadi, 2013). This research collected data on latent constructs such as performance expectancy, effort expectancy, hedonic value, attitudinal influence, financial influence, mobile technology influence, and facilitating conditions. For instance, performance expectancy for m-government services is a latent construct measured through its time saving aspect, its usefulness and its assistance in achieving citizens' goals.

This research applied SEM to examine the relationship between factors influencing citizen's behaviour intention to adopt m-government services. Using the IBM SPSS AMOS 22 program, the SEM analysis was executed and thus modelled the factors influencing citizens' adoption decision against behaviour intention and citizens' use behaviour for m-government services, that is, the measurement model and the structural model. The IBM SPSS AMOS package was chosen due to its wide application in SEM analysis as a result of its availability and accessibility compared to other packages like SAS PROC CALIS, OpenMx, R packages, LISREL, EQS, lavaan, and Mplus (Narayanan, 2012). Likewise, using the same software, the hypothesized relationships between variables were tested and confirmed. However, before commencing any

analysis, the data was tested using Kaiser-Meyer-Olkin (KMO) and Bartlett tests to see its conformity of the data set to the requirements for factor analysis. KMO and Bartlett's tests statistically measure sample adequacy for each variable and the comprehensive model (Williams, Onsman, & Brown, 2010). Thus, KMO and Bartlett's tests were performed on factors influencing citizens' decision on m-government service adoption to determine the adequacy and appropriateness of the data set available for factor analysis.

### **5.3.5 Thematic Analysis**

According to Clarke & Braun (2013), thematic analysis is a method that identifies themes or patterns within qualitative data. Two reasons led to the selection of thematic analysis technique; its robustness over a wide range of research questions, and its ability to establish structure in handling qualitative data (Nowell et al., 2017). Babbie (2016) asserts that qualitative analyses are reflexive and interpretive, leading to the generation of common subjective explanations based on responses and the researchers' objectivity. While quantitative research uses extractive methods, qualitative analysis utilizes inductive approaches to derive a theory, usually from respondents' lived experiences, captured through interviews or narratives with an individual or a group (Creswell, 2011). Therefore, in this study, thematic analysis was ideal for establishing patterns in m-government service provisioning practices from the interview data collected.

Coding, a technique in thematic analysis, facilitates the identification, analysis, organisation, description, and representation of meaningful themes or patterns to determine the relationship between variables in the data set (Corbin & Strauss, 2015). While coding can be done with the assistance of a computer, this study employed a manual coding process due to its flexibility in applying both inductive and deductive techniques in identifying themes from the qualitative data set (Clarke & Braun, 2013; Nowell et al., 2017). According to Corbin & Strauss (2015), the inductive method involves identification of patterns from the data through the guidance of research questions. Conversely, the deductive approach involves working with a theory whereby hypotheses guide the establishment of themes from the data set (Corbin & Strauss, 2015). This research applied inductive approaches since specific interview questions guided the qualitative data collection, and it is upon these questions that themes from the data were identified. The interview data, which was collected in English, was transcribed to text and stored in a separate Word document before commencing analysis. To protect the identity of interview respondents, pseudonyms, as indicated in Table 4.2, were assigned to each respondent.

## **5.4 Quantitative Data Analysis and Results**

In this section, quantitative results on factors influencing citizens' adoption decision for m-government services are presented. The questionnaire that collected the quantitative data had two parts, with a total of 10 questions. The first part is composed of respondents' profiling questions (i.e. questions Q1 to Q10), collected on demographic features of the respondents. The second part of the questionnaire (i.e. question Q11) is composed of statements on a 5-point Likert scale assessing citizen's perceptions on factors influencing their adoption decisions for m-government services. Part two of the questionnaire therefore contains statements that are clustered into eight subsections; performance expectancy, hedonic value, self-efficacy, subjective norms, facilitating conditions, attitudinal influences, financial influences, technological influences, and behavioural intention. Facilitating conditions collected information on behavioural control, and trust and security influences, as explained in section 3.6.2.

### **5.4.1 Respondents' Profile/Characteristics**

In this section, an overview of respondents' demographic details is presented. Describing the sample to build its profile provides a detailed picture to understand the influences of decision-making concerning m-government service adoption other than the main constructs. According to Komba (2012), demographic features play a significant role in explaining citizen's adoption behaviour. In describing the profile of the respondents, demographic features such as age, gender, education, occupation and previous experience with similar services were captured in the survey. Results on the various categories of demographic features are presented and discussed in subsections 5.4.1.1 to 5.4.1.4. These demographic variables have a moderating effect on behaviour intention to use technology (Venkatesh, Thong & Xu, 2012).

#### **5.4.1.1 Age and Gender**

Age and gender have been commonly investigated in relation to their effect on a user's decisions on technology adoption (Venkatesh et al., 2003; Venkatesh, Thong & Xu, 2012; Yonazi, 2010; Komba, 2012). Similarly, in this study, the surveyed sample comprised of 228 (57.6%) males and 168 (42.4%) females (Table 5.2). Moreover, the sample was distributed in the following age groups: the majority were between 30 and 55 years, comprising 200 respondents (50.5%); followed by those between 18 years to 29 years, comprising 113 respondents (28.5%); and those aged above 55 years, comprising 83 respondents (21.0%), as indicated in Table 5.2.



**Table 5.2:** Sample distribution by age and gender

				<b>Valid</b>	<b>Cumulative</b>
		<b>Frequency</b>	<b>Percent</b>	<b>Percent</b>	<b>Percent</b>
<b>Age</b>					
Valid	Up to 29	113	28.5	28.5	28.5
	30-55	200	50.5	50.5	79.0
	Over 55	83	21.0	21.0	100.0
Total		396	100.0	100.0	

				<b>Valid</b>	<b>Cumulative</b>
		<b>Frequency</b>	<b>Percent</b>	<b>Percent</b>	<b>Percent</b>
<b>Gender</b>					
Valid	Male	228	57.6	57.6	57.6
	Female	168	42.4	42.4	100.0
Total		396	100.0	100.0	

#### 5.4.1.2 Educational Profile

Education has both a direct and indirect influence on an individual's decision and disposition to adopt technological innovations. Education has been found to have a positive correlation with technology access and ownership, and in some cases technology usage, isolating between adopters and non-adopters (Komba 2016; Dwivedi et al., 2016). In the survey sample, the majority (47.1%) of the respondents had intermediate level education, holding diplomas and certificates; 23.9% of respondents had attained some level or completed secondary education; 21.4% held advanced education with either degrees or higher degrees; while a minority (5.6%) had either some or complete primary education; and 2.3% had no formal education (Table 5.3).

**Table 5.3:** Highest attained education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No formal education	9	2.3	2.3	2.3
	Primary level education	22	5.6	5.6	7.9
	Secondary level education	94	23.7	23.7	31.6
	Intermediate level (Certificate/diploma)	186	47.0	47.0	78.6
	Advanced level (degree/ higher degree)	85	21.4	21.4	100.0
Total		396	100.0	100	

#### 5.4.1.3 Income and Occupation

Similar to education, occupation and income have been commonly used to discriminate between adopters and non-adopters of technology. For instance, DOI suggests that early technology adopters are those with high disposable income (Rogers, 1995; Komba 2016). Hence, profiling the sample to uncover the income distribution was necessary to eliminate any biases resulting from income disparity. Based on income, generally, the sample was a good representative of all identified income groups. The majority (35.4%) of the respondents had income ranging between TZS 500,000 – 1,000,000 while others that earned between TZS 100,000 – 499,999 were 28.3%; those between TZS 50,000 – 99,999 were 11.4%; and those who earned either less than TZS 50,000 or more than TZS 1,000,000 were 6.5% and 18.4% respectively (Table 5.4).

**Table 5.4:** Income profile

	Income	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<TZS 50,000	26	6.5	6.5	
	TZS 50,000 – TZS 99,999	45	11.4	11.4	17.9
	TZS 100,000 – TZS 499,999	112	28.3	28.3	46.2
	TZS 500,000 – TZS 1,000,000	140	35.4	35.4	81.6
	>TZS 1,000,000	73	18.4	18.4	100
Total		396	100	100	

In addition to income, type of occupation entails the skills set a person possesses and their biases towards technology adoption. People with high-skilled occupations are more likely to adopt technology than those with a lower skillset (Yu, Lin & Liao, 2017). Based on the type of employment, the sample consisted of 149 (37.6%) respondents from the private sector, 116 (29.3%) self-employed respondents, 85 (21.5%) government employees and 46 (11.6%) unemployed respondents (Table 5.5). Since the sample is composed of citizens from both the private and public sector, it indicates minimal employer loyalty bias. Moreover, the diversity in employment type also indicates a good representative sample of the different categories of employment in the desired population, thus a representative sample.

**Table 5.5:** Occupational profile

	<b>Occupation</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
Valid	Government employee	85	21.5	21.5	21.5
	Private sector employee	149	37.6	37.6	59.1
	Self-employed	116	29.3	29.3	88.4
	Unemployed	46	11.6	11.6	100
Total		396	100	100	

#### 5.4.1.4 Experience with Similar Services

Previous experience with m-government services or similar services is also believed to be among the variables moderating adoption. The effect of experience in the literature has been said to moderate the relationships between facilitating conditions, attitudinal influences and hedonic values with behaviour intentions, and also the relationship between behavioural intention and the technology use behaviour (Venkatesh, Thong & Xu, 2012). For instance, Taylor & Todd (1995) empirically demonstrated that with increasing levels of experience, the effects of perceived facilitating conditions, usefulness and attitudes on behaviour intention become more significant. Hence, it was necessary to capture and profile the sample based on experience with similar mobile-enabled services. A binomial test was applied to ascertain if a significant proportion of respondents had prior experience through the use of mobile payment gateways, mobile banking or mobile gaming.

Table 5.6 shows that a significant proportion had prior experience with similar services, with the majority claiming to have used mobile money services (99%,  $p<0.0005$ ), while a smaller percentage indicated they have used either mobile gaming (64%,  $p<0.0005$ ) or mobile banking services (at 57%,  $p<0.005$ ). These results reveal that the sampled population exhibited prior experience with similar services from the private sector, which is expected to boost their behaviour intention to use m-government services.

**Table 5.6:** Binomial results for citizen's experiences with similar services

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
Q5.1 Mobile Money/Payment (M-Pesa, TiGO Pesa, Airtel Money)	Group 1	Yes	392	.99	.50	.000 <sup>a</sup>
	Group 2	No	4	.01		
	Total		396	1.00		
Q5.2 Mobile Banking Services (e.g. CRDB Simbanking, NMB Mobile)	Group 1	Yes	169	.43	.50	.005 <sup>a</sup>
	Group 2	No	227	.57		
	Total		396	1.00		
Q5.3 Mobile Gaming (Biko, Tatu Mzuka, Sport Pesa)	Group 1	Yes	141	.36	.50	.000 <sup>a</sup>
	Group 2	No	255	.64		
	Total		396	1.00		

a. Based on Z Approximation.

#### 5.4.2 Current Adoption Situation for m-Government Services in Tanzania

Even though citizens' adoption of m-government services remains a global challenge (Al-Hujran, 2012; Rana & Dwivedi, 2015), it was necessary to establish the current status of adoption in Tanzania. This section thus presents results on the status of citizens' adoption of mobile-enabled government services, mainly services embedded in the mGov platform by eGA in Tanzania. The status of citizen adoption is examined based on two variables: the first variable is citizens' awareness of the presence of the mGov platform and its services; and the second variable is the frequency of accessing and using m-government services. In terms of awareness, both the level of citizens' awareness and the type of media where citizens heard about such government innovative initiatives, were assessed.

Table 5.7 shows binomial tests of significance results on the distribution of respondents' proportions in relation to awareness regarding the existence of m-government services in Tanzania. Results indicate a significant proportion (63%,  $p < 0.0005$ ) of respondents were unaware of the existence of government services provided via mobile phones.

**Table 5.7:** Binomial results for awareness on m-government services

		Category	N	Observed Prop.	Test Prop.	Asymp. Sig. (2-tailed)
Q6 Have you heard of government services being offered through mobile phones	Group 1	No	251	.63	.50	.000 <sup>a</sup>
	Group 2	Yes	145	.37		
	Total		396	1.00		

a. Based on Z Approximation.

Moreover, the type of media that is popular with the respondents for informing them regarding government innovation was examined. The chi-square goodness of fit test was conducted to identify which media type was selected significantly more than anticipated. Table 5.8 indicates that a significant proportion of the sample, with 221 observed values compared to the 98.8 expected value, indicated that they heard about government innovations on service provision through television ( $\chi^2 (3) = 246.408$ ,  $p < 0.0005$ ).

**Table 5.8:** Chi-square goodness of fit tests for type of media

	Observed N	Expected N	Residual
Radio	81	98.8	-17.8
TV	221	98.8	122.3
Magazine/newspaper	89	98.8	-9.8
Street promotion	5	98.8	-93.8
Total	396		

**Test Statistics**

Q7. Indicate through which ONE of the following media you MOSTLY hear about government innovations on service provision		
Chi-Square		246.408 <sup>a</sup>
df		3
Asymp. Sig.		.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 98.8.

Additionally, respondents were asked to note their frequency of accessing services on m-government services by selecting one option between a range of options that included never accessed, less than once a year, at least once a year, once a month, once a week and once a day. Table 5.9 presents chi-square results on the frequency of using m-government services. The chi-square goodness of fit test was conducted to determine the proportional distribution of the sample against the various access frequencies. Table 5.9 indicates that a significant proportion of the sample had never accessed mobile-enabled government services ( $\chi^2 (5) = 801.046$ ,  $p < 0.0005$ ). This result further affirms the continual existence of challenges for citizens' adoption of m-government services in Tanzania despite efforts by eGA to integrate implementation efforts.

**Table 5.9:** Chi-square goodness of fit test on frequency of using m-government services

	Observed N	Expected N	Residual
Never	265	65.0	200.0
Less than once a year	77	65.0	12.0
At least once a year	34	65.0	-31.0
At least once a month	10	65.0	-55.0
At least once a week	6	65.0	-59.0
At least once a day	4	65.0	-61.0
Total	396		

#### Test Statistics

Q8 How frequently do you access government services using a mobile phone?

Chi-Square	801.046 <sup>a</sup>
df	5
Asymp. Sig.	.000

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 65.0.

### 5.4.3 Analysis of Determinants of Citizens' Adoption of m-Government Services in Tanzania

The primary objective of this research is to understand the influences on citizens' adoption of m-government services and thus recommend an appropriate service-provisioning framework that encourages citizens' adoption. This section presents results on factors that affect citizens' adoption of m-government services in Tanzania. Survey data collected on citizen's perceptions of influencers of m-government service adoption were statistically analyzed to determine factors that significantly influence the adoption of m-government services in Tanzania. However, before commencing the confirmation of factors influencing citizens' adoption, the quantitative data set was subjected to various tests of validity and reliability, as indicated in subsection 5.4.3.1. Likewise, subsections 5.4.3.2 and 5.4.3.3 presents results on the examination and confirmation of the conceptualized relationship between variables as indicated in the conceptual framework (UMTAMES in section 3.3.2.1). That is, sample appropriateness for factor analysis, validity,

reliability and goodness of fit testing for both measurement and structural model was examined. Finally, after confirming the suitability of the quantitative data set for analysis, results on hypotheses testing and the moderating effect of age, gender and experience with similar services on the hypothesized relationships are presented in subsections 5.4.3.5.

#### **5.4.3.1 Sample Appropriateness, Reliability and Validity**

This section presents validity and reliability results on quantitative data collected on responding to part two of the questionnaire (question Q11), which gathered citizens' views on various influences on adoption. Using the Kaiser-Meyer-Olkin (KMO) test and Bartlett's tests of sphericity, the samples' appropriateness for analysis was determined. Furthermore, various reliability and validity tests were carried out to examine the quality of the measurement model, that is, the conceptualized model. For reliability, both constructs and the scale reliability were examined; for model validity, both convergent and discriminant (divergent) validity were assessed. Using Cronbach's Alpha values, composite reliability values (CR), average variance extracted (AVE) values, maximum-shared variance (MSV), and average shared variance (ASV) model validity and reliability were examined.

**Sample Appropriateness:** Table 5.10 presents results on Kaiser-Meyer-Olkin (KMO) tests and Bartlett's tests of sphericity for the quantitative data set. On the data set consisting of replies on citizen's opinions regards factors influencing their adoption decision for m-government services, the KMO tests and Bartlett's test of sphericity indicated a significantly adequate sample for further analysis. According to Hair et al. (2010), a sample is appropriate for factor analysis when the KMO test value is greater than 0.5 at a significant Bartlett's tests of sphericity value  $p < 0.05$ . The KMO test returned 0.908 with a significant Bartlett's test of sphericity value of 0.000; implying the data is significantly suitable for factor analysis.



**Table 5.10:** KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.908
Bartlett's Test of Sphericity	Approx. Chi-Square	12322.212
	df	703
	Sig.	.000

**Sample Reliability:** Table 5.11 summarizes the results for internal reliability in terms of Cronbach Alpha values. Cronbach's Alpha test has been widely applied to assess reliability in quantitative research (Komba, 2016; Venkatesh, Thong & Xu, 2012; Oliveira et al., 2016). Hair et al. (2016) note that Cronbach's Alpha assesses reliability by summarizing the extent to which items in a given set are interrelated. The effect of the interrelationship is measured through a scale of coefficients ranging between 0 and 1; Hair et al. (2006) recommend acceptable satisfactory reliability being values above 0.7. Moreover, Hinton (2004) classified reliability into four different clusters; values above 0.90 signify excellent reliability, between 0.90 and 0.71 signify high reliability, between 0.70 and 0.50 means moderately high reliability, and values below 0.50 signify low reliability.

Therefore, in line with Hinton's (2004), Hair et al.'s (2010) and Taherdoost's (2016) application of criteria for benchmarking conditions for acceptable reliability, the model generally demonstrated a significantly good degree of reliability. Cronbach Alpha values for all assessed variables, namely performance expectancy (PE), hedonic values (HV), self-efficacy (SE), attitude influences (AI), subjective norms (SN), technological influences (TI), financial influences (FI), facilitating conditions (FC), and behaviour intention (BI), were higher than 0.8, which is above the benchmark criteria value of 0.7 (Table 5.11). A similar application of the cut-off criteria is in Venkatesh, Thong & Xu (2012), Oliveira et al. (2016), and Tarhini, Hone & Liu (2014). The Cronbach Alpha values ranged between 0.930 (for technological influences), the highest, and 0.854 (for performance expectancy), the lowest value, which is classified between excellent and high reliability respectively. Generally, the model indicated high reliability for assessing citizens' adoption of m-government services.

**Table 5.11:** Cronbach Alpha values for construct reliability

Construct	Cronbach Alpha	Reliability
	Value	Classification
Performance Expectancy (PE)	0.854	High
Hedonic Values (HV)	0.920	Excellent
Self-Efficacy (SE)	0.887	High
Attitudinal Influences (AI)	0.860	High
Subjective Norms (SN)	0.911	Excellent
Technological Influences (TI)	0.930	Excellent
Facilitating Conditions (FC)	0.919	Excellent
Financial Influences (FI)	0.895	High
Behaviour Intention to Use (BI)	0.923	Excellent

**Sample Validity:** Table 5.12 presents results on the assessment of the quality of the research measurement model. In line with Hair et al.'s (2016) argument on the appropriateness of composite reliability in establishing the internal reliability compared to Cronbach's Alpha test, the measurement model was further analysed using factors analysis. The scale reliability was thus evaluated based on composite reliability (CR) values and item loadings on the model. Hair et al. (2010) demonstrated that CR values greater than 0.7 indicate an acceptable degree of reliability for conducting factors analysis. Applying a similar CR cut-off value as used by Ooi & Tan (2016), reliability of the scale measure used was discriminated only for CR values greater than 0.7.

Moreover, Oliveira et al. (2016) argued that for an item to be included in a scale, its loading value should be at least equal to or greater than 0.7. Important to note is that facilitating conditions (FC) is observed by two sets of indicators, that is, trust and security (TS) and behaviour control (BC) indicators, as explained in section 3.6.1. According to Susanto & Goodwin (2011), citizens are motivated to adopt only if systems and structures are available to support the use, security and safety of any transactional data.

According to Table 5.12, the measurement scales used to measure the eight variables presented a significantly good degree of reliability (at  $p < 0.001$ ). The CR values for the eight variables, that ranged between 0.844 and 0.930, were significantly higher than 0.7. Likewise, loadings values for

items used to measure the variables were significantly reliable (at  $p < 0.001$ ), with values ranging between 0.654 and 0.939, satisfying Oliveira et al.'s (2016) condition of equal or greater than 0.7. Generally, the scales used to measure the constructs demonstrate a reasonable degree of reliability; thus, the measurement model has a reasonable degree of reliability.

The validity, on the other hand, was assessed in terms of convergent validity and discriminant validity. Convergent validity is assessed by comparing average variance extracted (AVE) against CR values, while discriminant validity was examined by comparing maximum shared variance (MSV) and average shared variance (ASV) against average CR values. Where AVE values are higher than CR values, convergent validity is confirmed. Similarly, where MSV and ASV values are less than AVE, discriminant validity is established (Hair et al., 2010; Ooi & Tan, 2016; Tarhini, Hone & Liu, 2014). Results in Table 5.12, as opined by Ooi & Tan (2016), confirm that measures used to observe the eight constructs are measuring the constructs. CR values for all the variables were found to be higher than their AVE values. The AVE values for all the items on the scale measure were higher than 0.5; that is, the constructs explain more than 50% of the variance in their scales, indicating a good measurement model. Additionally, discriminant validity was established since MSV and ASV values for all the eight constructs were less than related AVE values. Therefore, according to Hair et al. (2010), and Tarhini, Hone & Liu's (2014) criterion, the measurement model demonstrates satisfactory discriminant validity.

**Table 5.12:** Measurement model quality assessment criterion (n=396)

Construct	Items	Loadings	t-values	AVE	CR	MSV	ASV
Performance Expectancy (PE)	PE3	0.826	35.420***	0.644	0.844	0.317	0.147
	PE2	0.848	38.936***				
	PE1	0.728	33.015***				
Hedonic Values (HV)	HV3	0.874	3.561***	0.795	0.921	0.358	0.071
	HV2	0.929	4.842***				
	HV1	0.871	7.530***				
Self - Efficacy (EE)	SE3	0.749	8.150***	0.74	0.894	0.358	0.063
	SE2	0.939	3.743***				
	SE1	0.882	5.530***				
Attitudinal Influences (AI)	AI3	0.734	14.742***	0.686	0.866	0.166	0.102
	AI2	0.939	10.651***				
	AI1	0.798	12.698***				
Subjective Norms (SN)	SN6	0.759	23.271***	0.617	0.906	0.513	0.255
	SN5	0.784	23.697***				
	SN4	0.771	23.220***				
	SN3	0.809	23.310***				
	SN2	0.843	24.285***				
	SN1	0.743	25.490***				
Mobile Technology Effect (TI)	TI6	0.722	34.285***	0.69	0.93	0.327	0.154
	TI5	0.786	33.321***				
	TI4	0.861	32.558***				
	TI3	0.834	33.287***				
	TI2	0.926	33.533***				
	TI1	0.842	31.883***				
Facilitating Conditions (FC)	TS4	0.835	14.522***	0.575	0.923	0.533	0.242
	TS3	0.846	13.996***				
	TS2	0.869	16.762***				
	TS1	0.759	19.634***				
	BC5	0.701	10.834***				
	BC4	0.707	12.839***				
	BC3	0.684	21.583***				
	BC2	0.735	22.025***				
	BC1	0.654	23.644***				
Financial Influences (FI)	FI5	0.657	8.954***	0.653	0.903	0.533	0.258
	FI4	0.726	6.991***				
	FI3	0.867	16.638***				
	FI2	0.924	19.539***				
	FI1	0.837	21.487***				
Behavior Intention to Use (BI)	BI1	0.86	33.611***	0.803	0.924	0.449	0.228
	BI2	0.891	35.021***				
	BI3	0.936	35.374***				

Note: \*\*\*Significant at  $p < 0.001$

#### **5.4.3.2 Construct Measurement: Validity and Reliability of Scales**

This section presents results on the reliability and validity of the scales used to measure the latent variables. According to MacKenzie, Podsakoff & Podsakoff's (2011), it is critical to assess the validity of the scale measure used to observe each of the factors that were loaded on the proposed model. Examining the validity of the scales was achieved by comparing the combined scale Cronbach's alpha value against the scale alpha value for when a given indicator is deleted from the scale; thus the higher the alpha value for a deleted scale item the more reliable the construct measure is without the deleted scale item. Tarhini, Hone & Liu (2014) applied a similar approach in establishing construct validity.

Appendix H indicates that the scales measuring the nine (9) loaded factors, PE, HV, SE, SN, FC, AI, TI, FI and BI, are statistically valid measures for their constructs; since alpha values of the combined scale measures for these eight constructs (Table 5.11) are higher in values than if an item on any of the scales is deleted from the scale, as indicated in Appendix H. For instance, the scale measure for Subjective Norm (SN): the alpha values for a combined scale measure that combines six indicators SN1, SN2, SN3, SN4, SN5, SN6 which is 0.911 (Table 5.11) is higher than for when any of the indicators are deleted from the scale; Deleting SN1 alpha value is 0.902, SN2 alpha value is 0.892, SN3 alpha value is 0.888, SN4 alpha value is 0.892, SN5 alpha value is 0.892, and SN6 alpha value is 0.900. Thus the combined scale measure for SN accounts for 91.1% of the variance in SN, while omitting any of the indicators considered will result in the scale measure accounting for lower than 91% variance in the variable.

On the contrary, results indicate a reasonable degree of scale validity for measuring self-efficacy after deletion of item SE3 on the scale. Appendix H shows that for self-efficacy, deleting SE3 yields a better scale measure with a higher alpha value of 0.903 compared to a combined scale alpha value of 0.887 (Table 5.11). However, Table 5.8 shows SE3 loads significantly on the scale measure for self-efficacy (0.749 at  $p < 0.001$ ). Sijtsma (2015) demonstrated that alpha values do not reflect internal consistency due to its un-relatedness to internal structure. Cho & Kim (2015) suggest consideration of other reliability tests to complement alpha values in determining scale validity and reliability; in this case, loading values for SE3 facilitated the judgment for its inclusion on the scale measuring self-efficacy. Therefore, the study used a combined scale measure with three items, SE1, SE2 and SE3 as a measure to observe self-efficacy.

#### 5.4.3.3 Model Goodness of Fit Analysis on the Conceptual Model

**Measurement model goodness of fit:** Table 5.13 presents results on various indices used to examine the degree to which the data collected fits the conceptualized model. Structural equation modelling (SEM), with its power to estimate structure and measurement, was used in examining the relationships among variables. SEM, an extension of the linear model, allows multiple regression equations to be tested simultaneously. Moreover, the most appealing factor for using SEM is its ability to allow examination of a theoretical model against empirical data (Becker, Rai & Rigdon, 2013). Applying SEM requires an assessment of the goodness of fit of the theorized model against the data first. The model goodness of fit was evaluated based on four indices; Incremental Fit Index (IFI), Comparative Fit Index (CFI), Root Mean Square Error Approximation (RMSEA), and the classical good fit measure ratio between chi-square and degrees of freedom ( $\chi^2/\text{df}$ ). Table 5.13 indicates that the hypothesized model demonstrates a reasonable degree of fit with the data, based on acceptance criteria for the four indices as recommended by Hair et al. (2010). The RMSEA index value registered is 0.061, which is less than the 0.08 cut off; CFI index value is 0.925 and IFI index is 0.925, which is higher than the 0.90 threshold; lastly, the chi-square to degrees of freedom ( $\chi^2/\text{df}$ ) ratio registered is 2.448, demonstrating a better fit model as recommended by Hair et al. (2010), although any value less than 5 is acceptable as a good fit.

**Table 5.13:** Measurement model goodness of fit indices

Fit Index	Fit values	Criteria by Hair et al. (2010)
$\chi^2 / \text{df}$	2.448	< 5 (preferable <3)
IFI	0.925	> .90
CFI	0.925	> .90
RMSEA	0.061	< .08

**Structural Model Goodness of Fit:** Once the measurement model's goodness of fit criteria was established, the structural model theorized was tested as well for the goodness of fit. The structural model goodness of fit was examined by using model chi-square ratio ( $\chi^2/\text{df}$  or CMIN/DF), Comparative Fit Index (CFI), Root Mean Square Error Approximation (RMSEA), together with Normed Fit Index (NFI). The results on the indices, namely CMIN/DF, CFI,

RMSEA, Tucker Lewis (TLI) and NFI presented in Tables 5.14, 5.15 and 5.16 demonstrates an adequate fit structural model.

Table 5.14 reports results on the structural model chi-square ratio, which indicates an acceptable fit of the data on the structural model. Results indicate a chi-square ratio value of 2.448 (Table 5.14). Although a chi-square ratio value equal to 2 or less is preferable, values greater than 0.1 but not more than 5 are acceptable for ruling out model fit adequacy (Hair et al., 2010; Tarhini, Hone & Liu, 2014).

**Table 5.14:** Structural model chi-square ratio results

<b>Model</b>	<b>NPAR</b>	<b>CMIN</b>	<b>DF</b>	<b>P</b>	<b>CMIN/DF</b>
Default model	193	1835.082	752	0	2.448
Saturated model	945	0	0		
Independence model	84	14658.965	861	0	17.026

However, the chi-square test can be too strict a measure or sometimes misleading as the size of the sample and between correlation variables affects its outcome. For instance, in large samples greater than 400 cases, chi-square is always statistically significant. To complement the chi-square test, other tests such as NFI, CFI and RMSEA were conducted to determine the goodness of fit of the structural model. Exploring the NFI and TLI indices, both values (refer Table 5.15) are lower than the preferred cut-off value of 0.95 as recommended by Hooper et al. (2008) and as applied by Cangur & Ercan (2015). Based on TLI, the measurement model improves fit by 91% relative to the independent model, while NFI indicates model fit improvement by 87.5% relative to the independent model. Considering CFI, a revised form of NFI, which is insensitive to sample size, it registers a model fit improvement of 92.2% (Table 5.15). This is higher than the acceptable benchmark conditional value of 0.90 (Cangur & Ercan (2015), affirming the adequacy of the measurement model.

**Table 5.15:** Baseline model comparison results

<b>Model</b>	<b>NFI (Delta1)</b>	<b>RFI (rho1)</b>	<b>IFI (Delta2)</b>	<b>TLI (rho2)</b>	<b>CFI</b>
Default model	0.875	0.857	0.922	0.91	0.922
Saturated model	1		1		1
Independence model	0	0	0	0	0

Moreover, considering RMSEA measure for goodness of fit the measurement model is adequately fit since the RMSEA value of 0.060 (Table 5.16) is less than a threshold value of 0.080 as recommended by Hair et al. (2010) and Hooper, Coughlan & Mullen (2008). Conclusively the measurement model based on CFI, RMSEA, TLI and NFI demonstrates an acceptable degree of model fit when compared to an independent or null model.

**Table 5.16:** Root mean square error approximation (RMSEA) results

<b>Model</b>	<b>RMSEA</b>	<b>LO 90</b>	<b>HI 90</b>	<b>PCLOSE</b>
Default model	.060	.057	.064	.000
Independence model	.201	.199	.204	.000

#### 5.4.3.4 Structural Model Analysis

This section presents results on the analysis of the structural model, which was carried out in two stages. The first stage explored and confirmed the relationship between the hypothesized factors and citizens' intention to use m-government services. The second stage involved the analysis to confirm the effect of the hypothesized factors, including the behaviour intention on citizens' use behaviour for m-government services. Confirmatory factor analysis is used to analyse conceptualized relationships and extract the relevant factors. Appendix I indicates results from the confirmatory factor analysis, while Appendix J and Figure 5.1 shows the path analysis on the strength of the effect of the independent variables on behaviour intention to use m-government services.

**Confirmatory factor analysis:** Confirmatory factor analysis (CFA) facilitated the verification of the structure, that is, the Unified Model of Technology Adoption for Mobile Enabled Services (UMTAMES). Generally, the results presented in Appendices I and J statistically confirm the



structure of the conceptualized model for evaluating factors influencing citizens' behaviour intention to use m-government services. The CFA on the structural model confirmed the extraction of eight factors influencing behaviour intention (BI). These factors include performance expectancy (PE), hedonic values (HV), self-efficacy (SE), attitude influences (AI), subjective norms (SN), technological influences (TI), financial influences (FI) and facilitating conditions (FC). The results indicate that items on the eight factors loaded significantly (at  $p < 0.001$ ) with standardized estimate values ranging between 0.653 and 0.937 (Appendix I). Likewise the item loading for behaviour intention; the intermediate variable loaded significantly (at  $p < 0.001$ ) with standardized values noted in Appendix H to range between 0.857 and 0.935.

Moreover, the results statistically confirm the items used for observing the latent variables. For instance, factor F1 loads three items that were theorized to measure Self-Efficacy (SE), that is, SE1, SE2 and SE3. Factor F2 loads three items HV1, HV2 and HV3 that are theorized to measure Hedonic Value (HV). Factor F3 loads three indicators, PE1, PE2 and PE3, that were theorized to measure Performance Expectancy (PE). Factor F4 is observed using items measuring Attitudinal Influences (AI), namely AI1, AI2 and AI3. Factor F5 loads six indicators for observing Subjective Norms (SN), that is, SN1, SN2, SN3, SN4, SN5 and SN6. Factor F6 loads six indicators, TI1, TI2, TI3, TI4, TI5 and TI6, which were theorized to measure Technology Influences. Factor F7 loads indicators that measure Facilitating Conditions (FC), which is observed by using two sets of indicators as explained in section 3.6.1; that is, trust and security (TS) and behaviour control (BC). Items loading for FC included TS1, TS2, TS3, TS4, BC1, BC2, BC3, BC4 and BC5. Factor F8 loads five items for measuring Financial Influence (FI) that included FI1, FI2, FI3, FI4 and FI5. Lastly, factor F9 loads three indicators for assessing Behavior Intention (BI), BI1, BI2 and BI3. All the items in the extracted factors loaded significantly on their respective theorized factors at  $p < 0.001$  (Appendix I).

**Path Analysis:** In this study, path analysis enabled the evaluation of the causal model by regressing the eight extracted factors against behaviour intention to use m-government services. Appendix J shows path analysis results of the second stage of structural model analysis that examined the relationship between the theorized factors influencing citizens' adoption decision (BI, independent variables), citizens' behaviour intention (an intermediary variable), and citizens' use behaviour (USE, a dependent variable). Appendix J further confirms the extraction of eight factors influencing BI. The eight independent factors loaded significantly (at  $p < 0.001$ ) with

standardized values ranging between 0.654 and 0.935. Similarly, the items loading for measures of behaviour intention loaded significantly (at  $p < 0.001$ ), with standardized values ranging between 0.857 and 0.936. However, USE is observed to load insignificantly on the structural model at  $p > 0.001$ , that is 0.146, 0.082 and 0.079 for  $USE \leftarrow BI$ ,  $USE \leftarrow BC$  and  $USE \leftarrow FI$  relationships (Appendix J). This phenomenon is a result of limited data on citizens' use behaviour that can be explained due to the infancy of m-government services, more specifically mGov platform in Tanzania.

Figure 5.1 indicates the relationships and the strength of the effect of each item and each variable on the predicted relationships, as depicted by the standardized regression coefficients, on the structural model. The three paths leading to USE, that is,  $USE \leftarrow BI$ ,  $USE \leftarrow FC$  and  $USE \leftarrow FI$  are all insignificant with  $p$  values 0.146, 0.082 and 0.079 respectively (refer Appendix J). This finding implies that data does not statistically support the effect of behaviour intention to use m-government services as a predictor of citizens' use behaviour. This result is contrary to prior research, such as Venkatesh, Thong & Xu (2012), as well as Venkatesh & Bala (2008) who established behaviour intention as a strong predictor of use behaviour. In line with Tan et al.'s (2014) explanation, in light of the infancy of m-government services, more specifically, services provided through the mGov platform that was launched towards the end of 2015, there are no sufficient use cases among respondents to confirm the relationship between behavioural intentions and use behaviour. In this study then, the analysis was limited to behaviour intention as a proxy to m-government services adoption. A similar application of behaviour intention as a proxy for adoption is noted in the works of Ooi & Tan (2016), Sim et al. (2014), and Venkatesh & Bala (2008).

#### **5.4.3.5 Hypothesis Testing**

This section presents results on the testing of the ten hypotheses of the study using regression analysis. Table 5.17 provides a summary of the hypotheses testing, which indicates some structural paths were insignificant, thus not supporting the hypothesized relationship in the context of Tanzania. While all variables loaded on the structural model, only four relationships were statistically confirmed to be significant; thus, the null hypothesis ( $H_0$ ) is rejected. The factors that were statistically confirmed to be significantly influencing behaviour intention included Attitudes ( $BI \leftarrow AI$ ), Subjective Norms ( $BI \leftarrow SN$ ), Technology Influences ( $BI \leftarrow TI$ )

and Financial Influences (BI  $\leftarrow$  FI).

Conversely, four factors were statistically insignificant in predicting behaviour intention to use m-government services, for which the null hypothesis ( $H_0$ ) was accepted. The insignificant relationships were performance expectancy (BI  $\leftarrow$  PE), hedonic value (BI  $\leftarrow$  HV), self-efficacy (BI  $\leftarrow$  SE), and facilitating conditions (BI  $\leftarrow$  FC) on behaviour intention to use m-government services in Tanzania. Furthermore, the influence of self-efficacy on attitude was also established to be insignificant in the context of Tanzania. However, while only four factors are statistically significant, the influence of other factors is not ignored but demonstrated to be insignificant in the case of Tanzania. The fact that all eight factors loaded significantly on the proposed structural model implies all eight do affect citizen's decision, but the effect was insignificant for PE, HV, FC and SE as compared to AI, SN, TI and FI.

#### ***H4: The Influences of Attitudes on Citizens' Behavior Intention to use***

Table 5.17 indicates that attitudes significantly influence citizen's intention to adopt m-government services ( $H_4$ ,  $\beta = 0.109$ ,  $T = 3.304$ ,  $p < 0.01$ ); therefore, the null hypothesis ( $H_0$ ) is rejected. This finding implies that formed opinions and subsequently developed habits significantly influence behaviour intention to use m-government services in Tanzania. However, the moderating effect of age and experience with similar services on the influences of attitudes on citizens' behavioural intention, were found to be statistically insignificant (Appendix K). Therefore, to influence citizen's adoption of m-government services in Tanzania, provisioning organisations need to focus on building positive attitudes towards technology and government services.

#### ***H5: The Influences of Subjective Norms on Behavior Intention to use***

Subjective norms were found to have a significant impact on behaviour intention ( $H_5$ ,  $\beta = 0.261$ ,  $T = 3.815$ ,  $p < 0.001$ ). This finding indicates that the experiences and opinions of other people in the society informs and significantly affects respondents' decisions on accepting and using m-government services. Similarly, they would offer their opinions and experiences to others, consequently influencing their adoption decisions as well. It is thus essential for provisioning organisations to acknowledge that experiences and opinions of others in the community or society have a decisive impact on ones' intention to use m-government services.

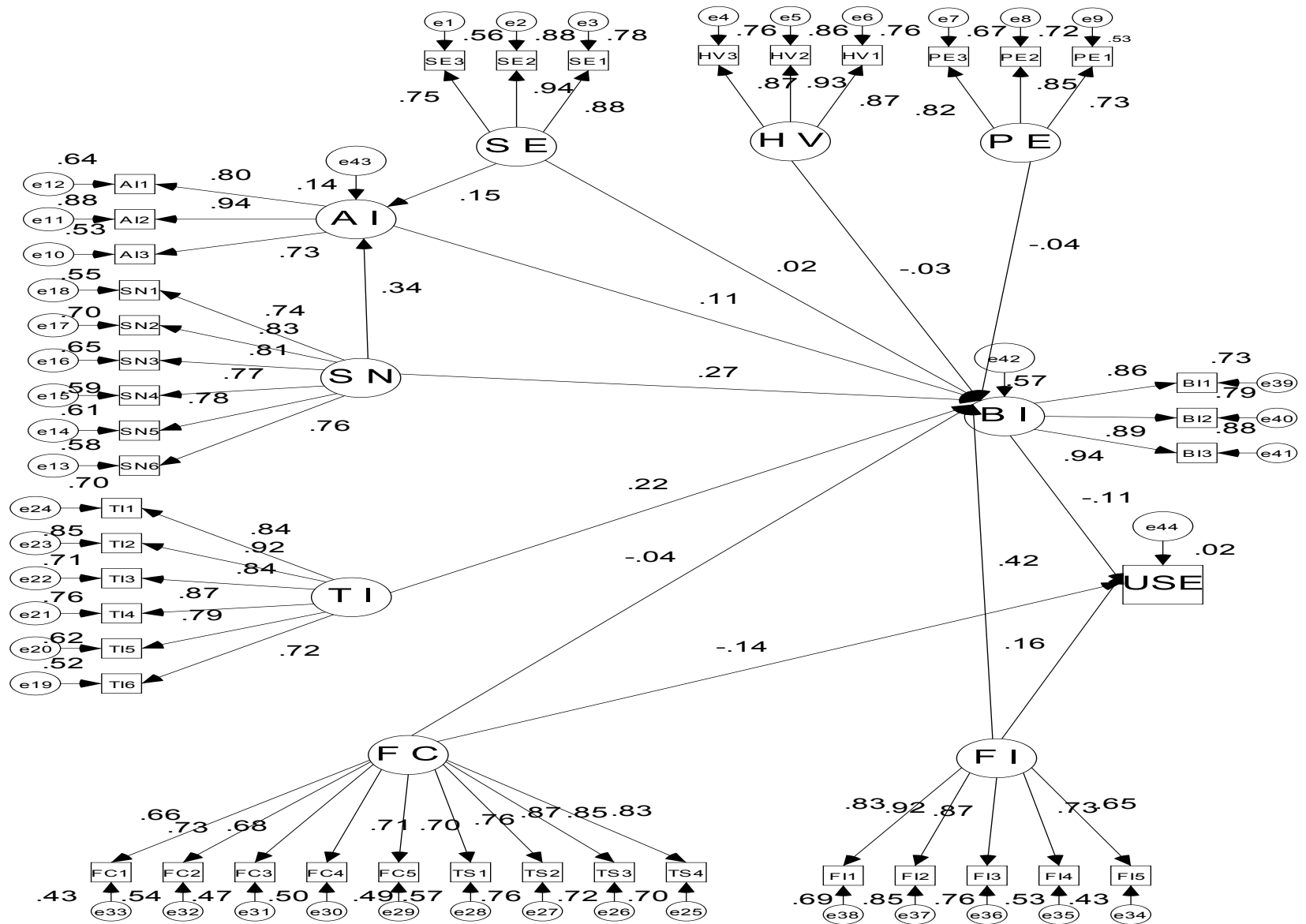


Figure 5.1: Path Diagram with Use Behavior (Use) as a Dependent Variable

**Table 5.17:** Results on hypotheses testing

Path	Hypothesis	Hypothesis Statement	Path Coefficients ( $\beta$ )	T Statistics (T)	Remarks
BI $\leftarrow$ PE	H1	<b>H<sub>0</sub>:</b> Performance expectancy insignificantly influences citizens' behaviour intention to use m-government services	-0.042	1.130	Accept <b>H<sub>0</sub></b>
BI $\leftarrow$ HV	H2	<b>H<sub>0</sub>:</b> Hedonic value insignificantly influences the citizens' behaviour intention to use m-government services.	-0.03	-1.484	Accept <b>H<sub>0</sub></b>
BI $\leftarrow$ SE	H3	<b>H<sub>0</sub>:</b> Self-efficacy insignificantly influences citizens' behaviour intention to use m-government services	0.027	1.097	Accept <b>H<sub>0</sub></b>
BI $\leftarrow$ AI	H4	<b>H<sub>0</sub>:</b> Attitudes insignificantly influences citizens' behaviour intention to use m-government services	0.109**	3.304**	Reject <b>H<sub>0</sub></b>
BI $\leftarrow$ SN	H5	<b>H<sub>0</sub>:</b> Subjective norms insignificantly influence citizens' behaviour intention to use m-government services	0.261***	3.815***	Reject <b>H<sub>0</sub></b>
BI $\leftarrow$ TI	H6	<b>H<sub>0</sub>:</b> Mobile technology insignificantly influences citizens' behaviour intention to use m-government services	0.226***	5.566***	Reject <b>H<sub>0</sub></b>
BI $\leftarrow$ FC	H7	<b>H<sub>0</sub>:</b> Facilitating conditions insignificantly affect citizen's behaviour intention to use m-government services	-0.034	0.533	Accept <b>H<sub>0</sub></b>
BI $\leftarrow$ FI	H8	<b>H<sub>0</sub>:</b> Financial influences insignificantly affect citizens' behaviour intention to use m-government services	0.416***	4.566***	Reject <b>H<sub>0</sub></b>
AI $\leftarrow$ SE	H9	<b>H<sub>0</sub>:</b> Self-efficacy insignificantly affects attitudes	0.149	1.681	Accept <b>H<sub>0</sub></b>
AI $\leftarrow$ SN	H10	<b>H<sub>0</sub>:</b> Subjective norms insignificantly affect attitudes	0.337***	6.618***	Reject <b>H<sub>0</sub></b>

Note: \*\*\* significant at  $p < 0.001$ ; \*\* significant at  $p < 0.01$

However, this effect was moderated by gender; Table 5.18 statistically confirms the moderating effect of gender on the influences of subjective norms on behaviour intention. The moderating effect of subjective norms was found to be significantly higher on women than men. For a unit increase in the effect of subjective norms, behaviour intention increases by 74.6% for females and by 54.2% for males (Table 5.18). Specifically, women experienced a positive moderation effect on the positive influence of subjective norms on respondents' behaviour intention to use m-government services ( $\beta = 0.696$ ,  $p < 0.001$ ). The findings in Table 5.18 thus imply women are much more susceptible to opinions, suggestions and experiences of other people around them in shaping their decisions towards the adoption of m-government services than men.

**Table 5.18:** Moderation effect of gender (using the regression method)

			Unstandardized Coefficients		Standardized Coefficient	t	Sig.
Moderated Relationship	Moderating variable	Indicator	B	Std. Error	Beta		
BI <--- SN	Gender	Male	0.542	0.062	0.500	8.687	0.000
		Female	0.764	0.061	0.696	12.496	0.000

***H6: The Influences of Mobile Technology on Citizens' Behavior Intention to use***

Table 5.17 shows the impact of technology, more specifically, the mobile technology effect on behaviour intention to use m-government services to be positively significant (H8,  $\beta = 0.226$ ,  $T = 5.566$ ,  $p < 0.001$ ). This result implies that respondents are more susceptible to the mobile technologies effect on interaction. Specifically, 'the mobility' aspect, namely 'instant connectivity and access', 'time and space efficiency', 'on the go access', 'location independence' and 'the twenty-four hours seven days a week' access to government organisations significantly impact respondents' intention to use m-government services. Aspects like 'routine usage'; 'ability to repeatedly access information' and 'the addictive nature of mobile technology' were identified to influence citizen's adoption decisions significantly. Moreover, age and gender were found to have an insignificant moderation effect on the influences of technology on behaviour intention to use m-government services (Appendix K).

### ***H8: Financial Influence on Behavior Intention***

Table 5.17 reveals that the most significant influence is experienced from financial influences on behaviour intention (H10,  $\beta=0.416$ ,  $T=4.566$ ,  $P=0.001$ ). This result implies Tanzanians are more cautious about finance-related issues concerning the use of m-government services, such as price, pricing strategies and their inclusion in the service pricing process. A negative perception of financial issues related to m-government services demoralizes citizens' intention to adopt m-government services. Furthermore, the moderating effect of age and gender on the influences of finance in predicting behaviour intention was established to be insignificant (Appendix K). Therefore, to encourage citizens' acceptance and use of m-government services, provisioning organisations need to ensure a positive attitude towards service pricing, which may include transparency and citizens' inclusion in services pricing processes.

### ***H10: Subjective Norms affect Attitudes***

In confirming the effect of the relationship between independent and dependent variables, that is, factors influencing behaviour intention, the relationship between independent variables was also examined. Results in Table 5.17 support the relationship between subjective norms and attitudes ( $AI \leftarrow SN$ ), but does not support the relationship between self-efficacy and attitudes ( $AI \leftarrow SE$ ). Results indicate a significant effect of subjective norms on attitudes exists (H2,  $\beta= 0.337$ ,  $T=6.618$ ,  $p< 0.001$ ), whereas that of self-efficacy on attitudes was found to be insignificant (H1,  $\beta= 0.149$ ,  $T=1.681$ ,  $p<0.001$ ). It implies that respondents' attitudes are shaped by how others perceive them, their social status and the social capital that they derive from using m-government services that reflects their ability to manage to navigate and use the technology.

### **5.4.4 Consolidation of Quantitative Data Analysis**

Conclusively, the quantitative findings indicate that citizens' adoption of m-government services in Tanzania is still very low as indicated by the frequency of accessing such services (Table 5.8). The low citizen adoption of m-government services in Tanzania is characterized by limited citizen awareness (Table 5.7). Moreover, the confirmatory factor analysis results confirmed UMTAMES (Figure 3.2) by loading all the independent variables, that is, PE, HV, SE, AI, SN, TI, FI and FC, in predicting citizens' behavior intention to use m-government

service (Appendix I). However, while all factors loaded successfully on UMTAMES, only AI, SN, TI and FI (Table 5.17) were found to significantly influence Tanzanians' decisions to adopt m-government services.

## **5.5 Presentation of Qualitative Analysis**

The section presents factors affecting citizens' adoption decisions based on m-government service provisioning practises in Tanzania. Qualitative responses collected from structured interviews with technical personnel (system analysts, programmers and service administrators) and managers from m-government provisioning organisations in Tanzania are analysed and results presented in this section. The interview data were transcribed and analysed using thematic analysis employing an inductive approach to identify the themes. The inductive approach is appropriate in this study because the qualitative data collected, and the themes, must relate to components of service provisioning practices (Corbin & Strauss, 2014), thus corresponding to research question RQ2.

According to Braun and Clarke (2006) there are six phases in conducting thematic data analysis; familiarizing with the data, generation of initial codes, searching for themes, reviewing of themes, defining and naming themes and lastly producing the reports. Thus, in analysing the interview data, first the data was read and re-read while writing notes about initial ideas. The written notes together with the interview data enabled the researcher to generate initial codes by unveiling the various activities pertaining to the various categories as identified in the literature reviewed; that is, m-government service needs establishment, m-government service development and provision, public inclusion or exclusion in the process, and m-government service appraisal mechanisms (See section 3.3.3, page 41 and 42). Then the codes were grouped and labeled according to the sub-themes and then grouped according to the four variables that formed the main themes. The categorization was reviewed to ensure that all the sub-themes and the respective initial codes were consistent with the four identified main themes that are informed by literature. Then presentation and discussion of the emergent themes and sub-themes is organized in two categories, that is, findings from technical personnel and findings from management.

### **5.5.1 Interview Findings from Technical Personnel**

Table 5.19 presents the cluster, emergent themes and sub-themes from interviews with ICT technical personnel that constituted systems analysts, programmers and service



administrators from participating organisations. The emerging themes are subsequently categorized into three major clusters, namely service development practices, collaboration practices, and service delivery practices. The major themes identified in Table 5.19 correspond to responses to interview questions in section A of the interview schedule (Appendix B).

**Table 5.19:** Emergent classes and themes from the interview with technical personnel

Cluster	Main Themes	Sub-Themes	Code
Service Development Practices	Service requirement analysis	Service re-engineering	SRE
		Service automation	SA
		Existing requirements	ER
		Needs assessment	NA
	Service design and development	In-house development	IHD
		Outsourced development	OD
		Limited skilled personnel	LSP
		Development guidelines	DG
	Service verification	Verified against user needs	VUN
		Verified against institutional guidelines	VIG
		Users exclusion	UE
Collaboration Practices	Stakeholders' roles and responsibilities	Multiple stakeholders	MS
		Multi-tier architecture	MTA
	Service upgrading	Guidelines or structural changes	GC
		Plan change	PC
		Citizens' complaints	CC
		Technology change	TC
	Managing change	Change management process	CMP
		Later notification	LN
		Interoperability challenges	IC
		Ad hoc implementation	ADI
Service Delivery Practice	Service quality descriptors	Network quality (speed & availability)	NQ
		Server availability	SA
		Service completion	SC
		Secured service	SS
	Service support systems	Lack of centralized user support	LCS
		Individual help desks	IHD

#### 5.5.1.1 Service Development Practices

This sub-section presents interview responses on m-government service development practices. In understanding m-government service provisioning practice, it was critical to

examine m-government service development process. Consequently, the interviews conducted inquired on various aspects to establish m-government service design and development practices of participating organisations. Thus, two aspects of m-government service development practices relevant to the context of Tanzania were examined; platform development, that is the mGov platform, and service content development practices.

### **Service Requirement Analysis**

Respondents from all four organisations, in responding to question A2, A2.2 and A3 (Appendix B), indicated that m-government services are established and designed based on existing service requirements through service “re-engineering”, “service automation” or “re-visiting requirements” of already existing services. One respondent stated:

*“Since service requirements are already known from our existing services that were provided through physical channels, therefore our tasks are only to automate the service such that it can be provided via mobile phones”* (Respondent 1, sub-themes ER, SA).

Similarly, another respondent acknowledged:

*“Most of the services that we provide via mobile phones are existing ones, whose requirements are already known; hence there was no need to involve users. Therefore, all we do is revisit their requirements and customize the services to be possible for provisioning on a mobile platform”* (Respondent 5, sub-themes ER, SRE).

Also, another respondent indicated:

*“To implement our service through mobile phones, all we do is re-engineer the currently physically provided services and make them available on mobile phones”* (Respondent 9, sub-theme SRE).

On the other hand, regarding the development of the mGov platform, the gateway to public mobile networks, respondents from organisation A, in responding to question A2.2, indicated that it is a result of high demand from ministries, departments and agencies (MDAs) to leverage the potentials of mobile technologies in public service provision. Contrary to requirements establishment for other existing public services, the mGov platform

requirements are a result of an extensive research work that was conducted. One respondent indicated:

*“The mobile platform was developed after research on how government services can be delivered efficiently and effectively using ICT platform given the ICT constraints in the country”* (Respondent 1, sub-theme NA).

Another respondent commented:

*“We received several requests from other government organisations, especially those which lacked financial muscles to negotiate with operators, to take up this role and implement a structure that connects government products to public networks. Also, issues of service reliability, security and trust prompted the agency to consider a cost-effective and efficient way that could be affordable to many government organisations. Thus, we came up with the mGov platform as one of the solutions to act as a gateway for government mobile services”* (Respondent 2, sub-theme NA).

The statement indicates that m-government services implementation of existing public services is carried out based on existing provisioning requirements and designs. The resulting m-government services are limited to interactivity requirements and designs, consequently inhibiting achievement of satisfactory citizen experience.

### **Service Design and Development**

On issues concerning the development of m-government services, two aspects, that is, application development and content development practices, were examined corresponding to questions A2.1 and A3.1 (Appendix B). In exploring the practice regarding application development, it was noted that the government organisations achieve development either through “in-house development” or “outsourcing” from the private sector or other government organisations. Two organisations, A and B, indicated they develop their applications in-house. One respondent from organisation A noted:

*“Most service applications that are currently embedded on the mGov platform were developed by us, while some few by the service hosting organisation either using their internal capacity or through outsourcing private contractors. Service hosting organisations are not forced to have their application developed by us. Similarly,*

*where the service application is hosted, is also solely the decision of the government organisation providing the service” (Respondent 2, sub-themes IHD, OD).*

Also,

*“Most of our applications are in-house built. We have a dedicated department with a skilled workforce to carry out application development” (Respondent 6, sub-theme IHD).*

However, organisations C and D acknowledged outsourcing their application development processes either to other government organisations with capacity or to private contractors. One respondent from organisation D reported:

*“Due to limited capacity within the organisation, we commission most our software application development to other government organisations or private contractors with capacity” (Respondent 13, sub-themes LSP, OD).*

Importantly, it is noted that the developed applications are guided by standards and guidelines provided to allow for connectivity to the mGov platform. Responding to question A3.2 (Appendix B), respondent 1 said:

*“All application, whether developed by us or independently through hosting organisations, they must abide by certain standards and guidelines provided on our website to guide development and connectivity to the mGov platform” (Respondent 2, sub-theme DG).*

Also, other respondents noted:

*“Within the government nowadays there are specific standards and guidelines in developing applications that we have to follow” (Respondent 10, sub-theme DG)*

*“The coordinating agency for ICT implementation provides training on different standards and guidelines to ensure our systems connect to other applications within the government” (Respondent 14, sub-theme DG).*

Thus, regarding application and service content development, the results indicate it is achieved through regulated and standardized in-house development or outsourcing development from the private sector.

## **Service Verification and Testing**

Finally, regarding m-government service verification and testing practices that were examined, results show that in all the four organisations investigated, citizens, as primary consumers, are least involved in service development and provisioning. Similar to requirements elicitation and design practices, resulting m-government services are verified against assumed citizen needs. Some of the responses to question A2.3 (Appendix B) were:

*“We do not deal directly with citizens ... User needs verification is done against organisational business processes and service needs as established by the service hosting organisations”* (Respondent 2, sub-theme UE, VIG).

And,

*“Before handing over the developed service application, the system is tested against established user needs. Commonly, the testing involves system analysts who represent citizens, and also service administrators responsible with the day to day running of the services”* (Respondent 8, sub-themes UE, VUN).

The above attestations suggest that m-government services are designed, developed and provisioned with minimum citizen involvement. These findings affirm the limited citizen awareness indicated by the quantitative results in section 5.4.2, as they are neither involved in the provisioning process nor are their needs targeted by the resulting m-government services.

### **5.5.1.2 Collaboration Practices**

The research conducted interviews to establish collaboration practices in m-government service provisioning. In establishing collaboration practices, the nature of collaboration, that is, stakeholders' roles and responsibilities, content management and change management among collaborating stakeholders, were examined. Responses from interviews identified three similar themes; stakeholders' roles and responsibilities, application and content updating, as well as change communication protocol among stakeholders. These are presented in this section.

### **Stakeholders' Roles and Responsibilities**

The interviewed organisations indicated that m-government service provisioning has a multi-tier architecture. Some responses to question A5 and A5.1 (Appendix B) were:

*“The architecture of government m-government service provisioning in Tanzania is a two-step system for the USSD menu service whereby citizens access services via the mGov platform which then reconnects them to specific host systems; while for the Pull and Push services citizens directly connect to the systems of the service hosting organisation, i.e. the government organisation hosting or designated for a particular public service provision”* (Respondent 2, sub-theme MTA).

And,

*“For us to be able to provide our service via mobile phones cost-effectively, we are required to utilize existing government platforms to connect to the outside world; therefore we will need to work with the e-government agency and mobile phone companies”* (Respondent 15, sub-themes MTA, MS).

m-Government service provisioning involves several stakeholders with different roles and responsibilities. Respondents in responding to question A5 (Appendix B) noted:

*“To facilitate the provision of m-government services, three keys players must come into agreement and work together; these are public service providing organisation, mobile infrastructure access provider (eGA) and mobile phone operators”* (Respondent 3, sub-theme MS).

And,

*“Decisions on the level of access citizens should have, and service hosting organisations make the information that they can access. For instance, for the LUKU service, TANESCO is responsible for verifying and authenticating all transactions”* (Respondent 1, sub-theme MS).

The extracts above suggest that m-government service provisioning is a multi-tier architecture that involves several stakeholders with different roles and responsibilities. Stakeholders for m-government service provisioning in Tanzania thus include the e-Government Agency (eGA) as an infrastructure access provider, mobile phone operators and Internet service providers for telecommunication services, public service providers for public service provisioning and finally policymakers for the legal and regulatory framework for providing m-government services.

## Service Upgrading

Since m-government service provision in Tanzania involves two applications, that is, the infrastructure and the service application from different government organisations, it was crucial to establish practice on application and content updating. First, it was critical to establish the origin or trigger for change for such service provisioning architecture with multiple stakeholders. Responding to questions A6 and A7, all four organisations acknowledged that change may be a result of ‘system/plan changes’, ‘technology advancements’, while organisations B, C and D had an additional theme for triggering change; that is, ‘citizen complaints’. Responses to verify this include:

*“Needs for updating/upgrading the mobile platform arise either due to changes in the rollout plan, technology change or user complaints”* (Respondent 9, sub-themes PC, CC and TC).

And,

*“It is on the basis of user complaints, technology advancements and structural changes that we make recommendations to programmers to make changes on the service applications”* (Respondent 5, sub-themes CC, TC, GC).

Also,

*“Occasionally, service upgrading has been a result of changes in guidelines and procedures and some cases due to change in technology. We sometimes are forced to amend our services to address complains from the public regarding our services”* (Respondent 13, sub-themes GC, TC, CC).

Moreover, interview responses on questions A6.1 and A7.1 shed light on the roles and responsibilities of stakeholders on service application and content updating/upgrading practice, indicating that each stakeholder is responsible for their particular application in m-government service provisioning. The responses included:

*“Different stakeholders have different roles and limitations. For instance, the mGov platform updating/upgrading is the sole responsibility of eGA while the service application changes are the responsibility of service hosting organisations. However, service changes can also be affected by eGA on special request and approval by the client. Service application changes are solely the responsibility of eGA clients”* (Respondent 3, sub-theme MS).

Similarly,

*“We can only change the service application in terms of updating it or upgrading it. We do not have access to the platform application”* (Respondent 8, sub-theme MS).

The quotes above suggest that a high level of synchronisation and collaboration is required to facilitate change management among stakeholders in m-government service provisioning in Tanzania. Consequently, it was essential to investigate how change is managed in terms of communication among stakeholders.

### **Managing Changes**

This part presents responses that establish the practice for communicating change for updating/upgrading m-government service provisioning in Tanzania. Generally, the responses indicated that communication among m-government service provisioning stakeholders takes place before changes are carried out. In responding to questions A6.2 and A7.2 (Appendix B), two organisations, A and B, indicated the presence of a proper structure upon which change is communicated among stakeholders. Responses to verify this include:

*“To perform any changes (updating/upgrading) on the mobile platform, a change management process is invoked which facilitates change communication and approval by relevant stakeholders (i.e. eGA, government organisations and mobile operators)”* (Respondent 5, sub-theme CMP).

Another respondent stated:

*“Change management gets invoked when changes are to be made on the platform for which eGA clients are notified and must provide their approval for such changes to be effected”* (Respondent 2, sub-theme CMP).

However, the other two organisations, C and D, acknowledged that there is no proper channel for communicating change within and outside the organisations. Their responses were:

*“We deal with different organisations, therefore in most cases with implementing the change and later notify our stakeholders of the service changes made to bring them abreast”* (Respondent 9, sub-theme LN).

And,



*"Due to the sheer number of services we provide, sometimes it is difficult to communicate all the changes to our stakeholders before. So, at the same time, we implement the necessary changes and just notify our stakeholders later"* (Respondent 15, sub-theme LN).

Also, in examining the types of changes that are performed and the initiators of change, in three organisations, B, C and D, responses revealed that most changes are primarily a reaction to citizens' feedback, while organisation A indicated citizens' feedback is just a secondary trigger for changes at their level. The responses to questions A6 and A7 (Appendix B) in relation to this matter were:

*"Most changes are a result of feedback from users; when they encounter a problem they report it back to us, and we then notify the system development people to make the necessary changes"* (Respondent 7, sub-theme CC).

The excerpts above indicate that most changes are ad-hoc changes, a result of citizens' feedback or challenges in using the services provided.

However, in terms of change scheduling, responses corresponding to questions A6.3 and A7.3 (Appendix B) indicate that in most cases it is carried out on ad-hoc basis, reactive rather than proactive, as said by one respondent:

*"There is no fixed time scheduled for implementing changes"* (Respondent 3, sub-theme ADI).

The quotes from the responses indicate that change on m-government service provisioning is not centralized; that is, it is initiated and carried out by the individual stakeholders with some limited communication and coordination. However, with such a provision structure with multiple stakeholders, high coordination and synchronisation of stakeholders' activities that affect m-government services are required. One respondent, in responding to question A9 (Appendix B), further affirmed this shortfall as follows:

*"However it is noted that interoperability across service applications and legacy systems is still a challenge mostly due to lack of access and ownership of the software sources codes as many were funded and developed through private consultancies"* (Respondent 2, sub-theme IC).

### 5.5.1.3 Service Delivery Practices

Responses on m-government service delivery practice revealed two major themes, service quality descriptors and service support system, corresponding to interview schedule questions A8, A8.1, A8.2, A8.3 and A9 (Appendix B).

#### Service Quality Descriptors

Regarding service quality descriptors and practice in delivering of m-government services to the citizen, all four interviewed organisations indicated technical descriptors such as ‘network quality (speed/availability)’, ‘server availability/accessibility’ and ‘security’ as essential in determining the quality of service. Responses to question A8, A8.1 and A8.3 were:

*“Main requirements for us about mobile service provision include ensuring network availability, service accessibility, equipment performance and that our servers are secured and operational”* (Respondent 2, sub-themes NQ, SA, SS).

*“A service is regarded satisfactorily completed when payment is reflected on our systems and the token is sent via SMS back to the user”* (Respondent 7, sub-theme SC).

*“At all times we strive to ensure our network, servers and service application databases are accessible and secured”* (Respondent 11, sub-themes NQ, SA, SS).

The excerpts above show that much focus of service providers is generally on technical aspects of service, contrary to the quantitative findings in section 5.4.3.5, which shows socio-technical factors to significantly affect citizens’ decisions on m-government service adoption.

#### Service Support Systems (Citizen Support)

Another aspect of service provision that was investigated was the service support system for assisting citizens. Responding to question A8 and A8.2, all four organisations acknowledged supporting their clients individually. Some responses that were noted include:

*“There is not much of staff-citizen contact at our organisation on mobile provided service; employee contact points are only at the help desk and technical support, however not on specific service needs”* (Respondent 3, sub-theme LCS).

*“When citizens face challenges on our services they either notify us or the mobile*

*company to for assistance, where they obtain either technical assistance or get directed to the stakeholder responsible with the required assistance” (Respondent 7, sub-theme LCS, IHD).*

*“Citizens physically visit our offices for assistance. In the case the fault is not on our part we direct them to our partners where they can be assisted” (Respondent 15, sub-theme IHD.)*

Also, respondents, in addressing question A9, noted challenges facing m-government services provisioning that affects service support. They noted:

*“Lack of ICT experts within the Government structure hence limited experience to support m-government service provisioning” (Respondent 7, sub-theme LSP).*

*“There is no centralized citizen support system in place, and this may be a result of the limited capacity within government structures, especially at the district level” (Respondent 14, sub-theme LCS).*

The responses above indicate that much focus is on technical aspects related to m-government service provisioning, with minimal if any attention on socio-technical aspects. This finding explains the currently limited adoption of m-government services; while the quantitative results (section 5.4.3.5) indicate citizens are more concerned with socio-technical aspects in making adoption decisions, service providers are oblivious to these aspects and are more directed towards achieving technical functionalities of the service.

### **5.5.2 Interview Findings from Management**

This section presents qualitative findings from interviews with management representatives from the four organisations. Table 5.20 presents categories and themes that emerged from interviews with management representatives from participating organisations. It was necessary to interview management in order to examine managerial practices regarding m-government service provisioning in Tanzania. The responses correspond to section B questions of the interview schedule (Appendix B). Three main categories emerged, which were classified as awareness or knowledge creation management, collaboration management and service positioning.

**Table 5.20:** Emergent Themes from Interviews with Management Representatives

Clusters	Main Themes	Sub-themes	Code
Awareness Creation Management	Content development and delivery	Limited funding	LF
		Competing priorities	CP
		Non-citizen focused	NCP
		Limited programs	LP
		Third-party	TP
		Citizen exclusion	CE
Collaboration Management	Leadership	Lack of strategy	LS
		Conflicting roles	CR
		Lack of guidelines	LG
	Resource sharing and ownerships	Distributed ownership	DO
		Partnership agreements	PA
		Proxy agreement	PXA
Service Positioning	Service pricing strategies	Operational cost pricing	OCP
	Citizen inclusion /exclusion	Lack of consultation	LC
		Consultation through proxy	LTP
		Lack of guidelines for consultation	LGC

#### 5.5.2.1 m-Government Service Awareness Creation Management

The research examined the management practices on awareness creation for which content development and dissemination strategies were assessed. The major themes identified related to practices on content development and delivery as discussed below.

#### Content Development and Delivery

The response presented corresponds to question B1 and B1.1 (Appendix B). Two of the four organisations investigated, that is organisation A and B, indicated that they have several initiatives in creating awareness on m-government services. However, the awareness creation for the citizen is achieved through the third party:

*“Advertisements that we conduct are mostly focused on our primary services such as utility connection and emergency services; our mobile-enabled services are advertised by our partners, the mobile operators”* (Respondent 8, sub-themes TP).

Other organisations indicated limitations in budget and competing priorities with other projects on awareness creation.

*“There is no fund to conduct extensive awareness on various ICT related initiatives”* (Respondent 12, sub-themes LP, LF).

And,

*“With the limited funding resources available, much priority is on creating awareness on matters like education, eradication of diseases and poverty”*  
(Respondent 16, sub-themes LP, LF, CP).

In terms of the audience targeted for the awareness programs for the two organisations A and B, it was revealed that awareness programs do not directly address citizens. Responding to question B1.2 (Appendix B), one respondent indicated:

*“The television segments aired provide advice on business operation re-engineering that the agency can do to facilitate effective and efficient operation in public service provisioning. Mostly, we provide advice on business operation re-engineering that the agency can provide. We do have some programs that target citizens; however, they are on basic ICT usage”* (Respondent 4, sub-theme NCP, CE).

Also,

*“We do not have specific awareness programs that focus on our mobile-enabled services, but we are planning to do so soon. Currently, our third-party partners such as VODACOM, TiGo and MAX MALIPO who get a commission for every transaction carried out on their networks, mostly advertise our services that are available on the mobile platform”* (Respondent 8, sub-themes LP, TP).

The findings above indicate limited efforts on creating citizens' awareness towards m-government services. Furthermore, the findings indicate limited citizen involvement in awareness creation for m-government service in Tanzania. These findings complement and explain the limited citizen awareness as indicated by the quantitative results in section 5.4.3.

#### **5.5.2.2 Collaboration Management**

m-Government service provisioning involves several stakeholders, thus it was essential to examine collaboration management practices. The responses indicated two main themes, leadership and resource sharing and ownerships, discussed below.

##### **Leadership**

Responding to questions B2 and its B3 (Appendix B), all four organisations acknowledge the presence of leadership in ICT implementation in the public sector; however, three organisations, C, B and D, indicated a lack of strategy and conflicting roles in coordinating such initiatives.

*"In most cases, we take up the advisory and coordinating role in the ICT implementation in the government. However, in some cases, we also take up the design and development role for various ICT applications in the government"* (Respondent 4, sub-themes CP, CR).

And,

*"While there is an apex organisation that is mandated to coordinate and manage all ICT implementations in the government, there no clear guideline on how various partners should work together"* (Respondent 8, sub-theme LG, LS).

*"We engage and relate differently with different partners depending on the project and our role in the project"* (Respondent 16, sub-theme LG, LS).

The responses above imply that while there is an established leader for coordinating and managing collaboration, the operationalisation is still a challenge. Moreover, taking multiple roles, overseeing implementation and at the same time taking a direct role in implementation and provisioning impairs the objectivity of the two roles.

### **Resource Sharing and Ownerships**

Apart from leadership in coordinating provisioning stakeholders, the nature and type of collaboration were examined in terms of resource sharing and ownership. Findings correspond to responses to questions B3, B3.1 and B3.2 (Appendix B). All four organisations indicated individual ownership among partners, of various resources that support m-government service provisioning.

*"The mobile platform is a client-server architecture whose components include an infrastructure and service application. We own and manage the infrastructure part while the service application is under our clients' management and ownership"* (Respondent 4, sub-theme DO).

*"Various partners with capacities host a number of our service applications, however, they are solely under our ownership. No changes are made without our directives"* (Respondent 12, sub-theme DO).

Also, the four organisations acknowledged the presence of partnership agreements in accessing resources across partners. Responses to question B2.1 and B2.2 (Appendix B) included:

*“For a service application to be connected on the mobile government platform, the service hosting organisation needs to enter into a formal agreement”* (Respondent 4, sub-theme PA).

*“All our externally hosted service applications have an agreement signed to that effect between us and the hosting partner”* (Respondent 16, sub-theme PA).

However, organisations B, C and D, in responding to question B2.1 (Appendix B), indicated some agreements are under a proxy by other intermediary organisations, thus limiting their direct influence on the quality of service.

*“To ensure our services reach citizens, there several key players involved. We have an agreement with one that provides the infrastructure for which the service application connects who then consults and negotiates with other stakeholders such as mobile operator on our behalf”* (Respondent 8, sub-theme PXA).

The findings above show that while there is a practice of formalizing partnership agreements among m-government service provisioning organisations, there is no forum that brings stakeholders together. Proxy agreements, while they minimize the cost of operation and empower government organisations to negotiate better deals with telecommunication service providers, minimize the influence of the represented organisation on the demands for quality services.

### **5.5.2.3 m-Government Service Positioning**

This section presents the results regarding m-government service positioning practice. Service positioning refers to the uniqueness of the service in comparison to similar competing services (Lovelock & Wirtz, 2011). It reflects the provisioning management practice; thus, decisions on attributes considered necessary to citizen were assessed. The responses revealed two main themes that were relevant to practice and management, that is, ‘service pricing strategy’ and ‘citizen inclusion/exclusion strategy’.

### Service Pricing strategies

In m-government services, citizens tend to make their own purchasing decisions, sometimes without prior knowledge regarding the price of the service they purchase. Thus, it was critical to investigate the pricing strategy adopted by provisioning organisations. All four organisations indicated a service cost–pricing strategy, whereby m-government service price takes into consideration the cost incurred in providing the service. Responses to question B4 (Appendix B) included:

*“To determine the price of our services, we aim to ensure that we meet the operational costs incurred in providing the services”* (Respondent 4, sub-theme OCP).

*“We incur costs that must be met, such as mobile phone operators’ charges, Internet operators’ charges and service hosting costs. However, we try in our pricing to target covering our costs and not make a profit”* (Respondent 8, sub-theme OCP).

*“We are a public organisation, in as much as we do not aim for profit, we have to cover our operational costs in the price we charge citizens”* (Respondent 12, sub-theme OCP).

*“For us, as an organisation to sustainably continue providing our services, we need to meet our operational cost; thus we determine the price to charge based on the cost”* (Respondent 16, sub-theme OCP).

The quotes above indicate a challenging situation whereby government organisations are attempting to balance between being sustainable and yet provide quality service to the citizens. The difficulty in determining an efficient price for public services in a not so transparent market environment, which is a global challenge, is ever more evident in Tanzania. Furthermore, as verified by quantitative results (section 5.4.3.5), Tanzanians are very sensitive to prices when making their decision to adoption m-government services. Thus, measures need to be put in place to ensure a balance between sustainability for provisioning of quality public services.



## **Citizen Inclusion /Exclusion**

Three organisations, A, C and D, confirmed that there is no primary consultation with citizens on issues concerning public service pricing. Responses to question B4.1 (Appendix B) were:

*“In setting up the prices of our services, two other parties apart from ourselves are crucial in the process, that is the mobile phone operators and the service application hosting organisation (the custodian of the public service embedded on our infrastructure)”* (Respondent 4, sub-theme LC).

*“To determine the price to charge for m-government services, we deliberate with our partners to determine the price to charge to recover the real cost of providing the services”* (Respondent 12, sub-theme LC).

However, organisation B indicated there is a secondary consultation with citizens on service pricing through a particular regulatory body.

*“Once we established our costs and set the proposed price, we forward the proposal to the regulatory body that conducts several public consultations with citizens and sometimes provides revisions before confirming the prices. However, we do not have direct consultations with citizens on any matter of service pricing”* (Respondent 8, sub-theme LTP).

Moreover, all four organisations, in responding to question B4.2 (Appendix B), noted there is no specific scheduled time for price reviews, noting that reviews are only on an ad-hoc basis due to changes in cost variables or policies. One respondent noted:

*“There is no specific scheduled price review plan in place; however, currently a consultant is engaged to review the pricing of our service after three years of service provision”* (Respondent 4, sub-theme LGC).

The quotes suggest minimum involvement and thus the influence of citizens on m-government service pricing. The practice is contrary to the quantitative findings, which indicated that citizen adoption decisions are significantly influenced by financial matters, including the price of the services (section 5.4.3.5).

## **5.6 Summary**

The research findings discussed in this chapter indicate that attitudes, subjective norms, technology and financial influences are the most significant factors when Tanzanians are making decisions to adopt m-government services. Moreover, in examining provisioning practices for m-government services in Tanzania, findings revealed that the current practice constrains citizens' adoption of m-government services. Notable practices such as limited awareness creation, conflicting priorities and roles, limited funds and exclusion of citizens in the provisioning process constrain citizens' adoption of m-government services in Tanzania. The chapter provided a holistic examination of the m-government services adoption in Tanzania. Conclusively, the findings show that while the quantitative results provide the dynamics and status of adoption, the qualitative findings help explain the trend and thus complement each other in explaining the citizens' adoption challenge for m-government services in Tanzania. Therefore, this chapter presented findings that reflects citizens' adoption practices and organisational provisioning practices, which eventually leads to uncovering challenges that hinder citizens' adoption of m-government services in Tanzania, discussed in chapter six.

# CHAPTER SIX

## M-GOVERNMENT SERVICE ADOPTION CHALLENGES IN TANZANIA

### 6.1 Introduction

This chapter presents a discussion of the results from both quantitative and qualitative analysis presented in chapter five. An in-depth discussion that refers to or substantiates the literature, models or theories on individual adoption associated with the m-government phenomenon is presented. This chapter aims to establish whether the research objectives were achieved and whether the research questions were addressed. The research objectives that guide the discussion include:

- RO1.** To assess the status of citizens' adoption of m-government services in Tanzania.
- RO2.** To examine the m-government services provisioning practices in Tanzania.
- RO3.** To identify factors influencing citizens' adoption of m-government services in Tanzania.
- RO4.** To examine the influence of the identified citizens' adoption factors and the provisioning practice on the adoption of m-government service in Tanzania.

Additionally, the chapter provides a detailed account of whether the study findings confirm or contradict the existing literature on m-government services adoption. The discussion integrates both quantitative and qualitative results to explain the links between citizens' perceptions and provisioning practice in exploring citizens' adoption of m-government services (Figure 4.1). Thus, section 6.2, corresponding to objective RO1, provides a discussion on the status of citizens' adoption of m-government services, that is, both the trend and explanations of the identified trend on adoption. Section 6.3, corresponding to objectives RO2 and RO3, presents a discussion on the determinants of m-government services adoptability by exploring results from citizens' perceived factors and contrasting these factors with provisioning practices. Section 6.4, corresponding to objective RO4, details the implications of the study findings; that is, the status of adoption, effect of provisioning practices, and the perceived determinants of adoption, thus identifying challenges inhibiting citizens' adoption of m-government services in Tanzania.

## 6.2 Citizens' m-Government Service Adoption Status

Citizens' m-government services adoption is a critical determinant of service provisioning; however, it has persistently remained a challenge nationally and globally. This section then discusses the findings emanating from both qualitative and quantitative results. It is essential to understand the status of adoption as it provides the basis upon which a strategy for enhancing citizens' adoption draws its justification and relevance.

### 6.2.1 Citizens' m-Government Service Adoption Trend

The statistical results in section 5.3 regarding the status of m-government services adoption indicate that citizen adoption is low. A significant majority of the respondents indicated that they had accessed either *once a year* (265 cases) or *never accessed* (77 cases) m-government services (Table 5.9). Table 5.9 indicates that a significant proportion of the sample has never accessed mobile-enabled government services ( $\chi^2 (5) = 801.046, p < 0.0005$ ). This result confirms that citizens' adoption of m-government services is still a challenge to most developing nations as attested by several other researchers (Abdelghaffar & Magdy, 2012; Ahmad & Khalid, 2017; Al-Hujran, 2012; Almarashdeh & Alsmadi, 2017). Despite acknowledging the potential benefits of the m-government service channel, Al-Hurjran (2012) still noted limited utilisation levels in Jordan. Abdelghaffar & Magdy (2012) noted that 23% of the participants that had accessed the Egyptian portal used only one service. Such low rates of utilizing m-government services defeat the purpose of providing public services via mobile technologies, and thus, Tanzania must take initiatives to address the challenge. In Tanzania, several reasons are attributed to the low adoption trend on m-government services, including the infancy of services, especially the mGov platform launched in 2015. However, under such circumstances, it was critical to assess if sufficient awareness campaigns were conducted to create knowledge of its benefits.

Quantitative results indicate that more than half (63% in Table 5.7) of the respondents *have not heard of Government services offered through mobile phones*. Thus, this result implies that the majority of the respondents is unaware of the existence of the mGov platform. According to Dwivedi et al. (2018), limited awareness of the presence and the potential benefits of m-government services significantly affect its adoption. Also, while Abdelghaffar

& Magdy (2012) established that awareness significantly influences citizens' intention to use m-government services, results indicate low awareness among Tanzanians on the presence and benefits of m-government services. The Jordan home survey reports similar findings, that only a small proportion, 38% of the participants, heard about such services (MoICT, 2010). Mukonza (2013) also noted in South Africa, peoples' poor awareness of the presence of government electronic services. Likewise, Dwivedi et al. (2018) in India noted low awareness among citizens on the presence and benefits of m-government services. Despite acknowledging benefits of similar such services from the private sector, the same sentiment is not transposed to m-government services. Therefore, investing in providing appropriate knowledge to citizens regarding government's electronic presence is crucial for successful provisioning of m-government services. Aspects like target groups, content and media for disseminating knowledge to the masses are critical in determining the success of m-government service provisioning. In terms of media of choice whereby most Tanzanians hear about government innovations, findings revealed that most respondents hear through television, with 221 observed cases (Table 5.8).

### **6.2.2 Provisioning Practices Contributing to Adoption Status**

The qualitative aspect of the research that examined the practice behind m-government service provisioning in Tanzania identified several practices that explain the low adoption status (section 5.5). Awareness, which implies peoples' knowledge of technology, its benefits and availability, was established by Abdelghaffar & Magdy (2012) to drive the desire to adopt m-government services significantly. However, quantitative results in section 5.4.2 indicate low citizen awareness on m-government services. Qualitative findings note limited efforts towards awareness creation due to *limited funding* and *competing budget priorities with other services* (section 5.5.2.1). This finding confirms Mtingwi's (2015) observation that ICT related implementations are not among priority areas like poverty, education and health in most least developed governments; thus they hold a low budget line in the nation-approved budgets. Also, findings indicate the content for various awareness campaigns undertaken focuses on organisational adoption and not individual citizens' adoption of m-government services. For instance, one response was "...provides advice on business operation re-engineering that the agency can provide". This finding affirms Savoldelli, Codagnone & Misuraca's (2014) attestation that only relevant and focused information

disseminated to the right audience stimulates adoption. Consequently, while organisational adoption for provisioning purposes has improved, with over 117 public organisations registering their services on the m-government service platform (URT, 2017), citizens' adoption is still low (Section 5.4.2). Based on the type of media used for awareness creation, findings indicated traditional channels, including the television, radio and magazines, are still effective. A significant majority (221 cases) indicated they hear about government innovations via the television (Table 5.8). However, the potentials of new platforms, such as social media platforms including Facebook, Instagram and WhatsApp applications in awareness creation, should not be ignored (Al-Hurjran, 2012; Ishengoma, Mselle & Mongi, 2019; Burksiene, Dvorak & Duda, 2019).

Furthermore, findings show that the practices upon which m-government services are developed and delivered contribute to the low citizen adoption status. Applying the software life cycle lens, Misar, Sirshar & Nawaz (2015) attest for requirement elicitation, the process of identifying users and systems' needs and specifications as an essential determinant of service quality, user satisfaction and consequently service success. Practices such as relying on already existing services' requirements and exclusion of citizens in the re-engineering of traditionally provided services affect the quality of the resulting m-government service (Section 5.5.1.1). Statements like *"requirements are already known hence no need to involve users"* and *"since service requirements are already known from our existing services that were provided through physical channels"* are noted. These findings align with Ibrahim & Mohammed's (2008) and Mawela, Ocharab & Twinomurinzi's (2017) findings that most m-government services are implemented based on assumed citizens' needs. Consequently, the resulting m-government services are not reflective of citizens' needs; citizens become dissatisfied, thus discouraging adoption (Mpinganjira, 2014; Ishengoma, Mselle & Mongi, 2019).

Regarding applications development, findings in section 5.5.1.1 showed that most organisations achieve it through outsourcing, noting *limited capacity within the organisation* as the main reason. Limited ICT skills within government structures is a significant challenge in most developing states (Alshehri & Drew, 2010; Mawela, Ocharab, & Twinomurinzi, 2017). Mawela, Ocharab & Twinomurinzi (2017) acknowledge similar shortages in ICT skilled personnel in South African municipalities. Unfortunately, government organisations

have shortages of ICT skilled personnel that are critically needed for successful m-government service provisioning. Thus, governments need to significantly invest in training and learning of ICT skills (Alshehri & Drew, 2010). Furthermore, findings regarding service applications verification and testing revealed the exclusion of citizens in the process.

Additionally, qualitative findings in section 5.5.1.2 revealed the m-government service delivery to involve a multi-tier structure with multiple stakeholders involved. Three stakeholders within the multi-tier structure are *e-Government Agency* (eGA) as infrastructure access provider, *public service hosting organisation* as service custodian, and *mobile phone operators* for access to public mobile networks as noted in section 5.5.1.2. Contrary to this finding, the OECD/ITU (2011) m-government service value chain acknowledges additional stakeholders, including Internet service providers, mobile service regulators and service content providers. In such an environment, cooperation and collaboration between partners are critical for successful provisioning (Alshehri & Drew, 2010). However, collaboration management practices such as *lack of guidelines*, *conflicting roles* and *proxy agreement* between stakeholders affect the quality of the resulting m-government services. Consequently, cultivation of beneficial working relationships with private sector partners is essential to ensure access to plans, resources, skills, and experience that most often government organisations lack.

### **6.2.3 Overview of Citizens' m-Government Service Adoption Status**

Generally, the discussion in section 6.2.1 indicates low citizen adoption of m-government service in Tanzania, with over 63% of the respondents claiming to have either accessed the services only once or never before. Further findings in section 6.2.2 indicate that the low citizen adoption corresponds to the current m-government service provisioning practices, which has been shown not to support adoption. Aspects of practice that are contrary to enticing citizens' adoption of m-government services included lack of awareness campaigns, attributable to limited funding or lower priorities assigned to ICT in public sector; lack of focus on citizens in the m-government service knowledge provided; and narrow range of m-government service dissemination channels used. Also, contrary practices are noted concerning m-government service development and provisioning approaches, including requirement establishment practices, application development, and testing and verification, which completely exclude citizens. Consequently, the prevailing practice in m-government

service provisioning triggers low citizen adoption of m-government services in Tanzania. Therefore, undertaking deliberate and regular efforts to review implementation strategies and provisioning practices will ensure any citizen adoption challenges are addressed as they arise.

### **6.3 m-Government Service Adoption Factors**

Responding to the challenges causing low citizen adoption of m-government services, one needs to understand citizens' perceptions on what significantly influences their adoption decisions. Thus, this section discusses the quantitative result of citizens' perceived important factors for m-government service adoption in Tanzania. It also discusses the qualitative results to indicate practices that support or constrain achievement or realisation of the identified factors for m-government service adoptability.

#### **6.3.1 m-Government Service Adoption Factors**

The literature proposes several factors for citizens' adoption of m-government services. However, only four factors were statistically confirmed to affect Tanzanians in their adoption decision significantly. While all eight independent factors modelled on the conceptual framework, the unified model of technology adoption for mobile-enabled services (UMTAMES) loaded on the structural model, results in section 5.5.6 only confirmed four factors; technology influence (TI), attitudinal influence (AI), financial influences (FI) and subjective norms (SN) to significantly influence citizen's adoption decision on m-government services. Other variables like performance expectancy (PE), hedonic value (HV), self-efficacy (SE) and facilitating conditions (FC) exhibited an insignificant effect on citizens' behavioural intention to use m-government services in Tanzania. Among the four factors confirmed, the most significant factor is financial influence ( $\beta = 0.416$  at  $p < 0.001$ ) followed by subjective norms ( $\beta = 0.261$  at  $p < 0.001$ ), technology influences ( $\beta = 0.226$  at  $p < 0.001$ ) and finally attitudinal influences ( $\beta = 0.109$  at  $p < 0.01$ ) (Table 5.17).

These findings are consistent with Almuraqab's (2016) findings that noted a similar contradiction on the influence of perceived usefulness and perceived ease of use on citizens' behaviour intention to adopt m-government services in the United Arab Emirates. The UAE users were found to be more benefit-oriented in adoption decision-making than either the mobile provision channels or its usability. However, these findings contradict with causality results previously established between performance expectancy, self-efficacy, facilitating



conditions, hedonic values and citizens' behavioural intention to adopt m-government services (Abdelghaffar and Magdy, 2012; Wang, 2014; Smit, Roberts-Lombard & Mpinganjira, 2018; Ishengoma, Mselle & Mongi, 2019). For instance, Smit, Roberts-Lombard & Mpinganjira (2018) found perceived ease of use to have an insignificant effect on behavioural intention, while Abdelghaffar & Magdy (2012) established a similar insignificant relation between perceived usefulness and behavioural intention to adopt m-government services among Egyptians.

#### **6.3.1.1 Financial Influences**

Financial influences (FI) such as service costs and affordability statistically had the most significant effect ( $\beta = 0.416$  at  $p < 0.001$ , Table 5.17) on citizens' decisions on m-government services adoption. This result confirms that in deciding to adopt, people weigh the service benefits against costs to be incurred (Susanto & Goodwill, 2011; Al-Hujran, 2012; Isagah & Wimmer, 2018). Findings are consistent with Venkatesh, Thong & Xu (2012), Abu-Shanab & Haider (2015), Al-Hujran (2012), and Chong, Chan & Ooi (2012), who also found service costs to influence behavioural intention and ultimately usage behaviour significantly. For instance, Abu-Shanab & Haider (2015) established that among reasons that citizens reject m-government services was that the cost incurred was more than standard simple text costs. In contrast, Almuraqab & Jasimuddin's (2017) and Yang et al.'s (2012) findings do not support the causality relationship of cost on behavioural intention to accept and use m-government services. However, since findings indicate Tanzanians are cost-sensitive, then the cost incurred in accessing m-government services needs to be affordable to the majority, with service benefits widely known by the citizens.

#### **6.3.1.2 Subjective Norms**

A subjective norm (SN) was second in ranking according to the strength of effect on behaviour intention to adopt m-government services ( $\beta = 0.261$  at  $p < 0.001$ , Table 5.15). This finding is consistent with a wide body of literature that has shown SN, which includes the influences of others opinion, experience, as well as interpersonal experiences to significantly affect behavioural intention to adopt (Venkatesh, Thong & Xu, 2012; Liu et al., 2014; Pellas, 2014; Almarashdeh & Alsmadi, 2017; Dwivedi et al., 2018; Isagah & Wimmer 2018). For instance, Abdelghaffar & Magdy (2012) and Almarashdeh & Alsmadi (2017) found social influence to have a great contribution on citizens' behavioural intention towards m-

government services, therefore classifying it as a direct determinant of adoption. Also, Abdelghaffar & Magdy (2012) demonstrated that citizens' interaction with the m-government service system is defined by cultural compatibility, social interaction and level of experience. This finding indicates that family, friends, role models and colleagues influence users' behaviour and perceptions towards adopting m-government services. Opinions and shared experiences are valued as perceptions regulating citizens' decision to adopt m-government services (Almarashdeh & Alsmadi, 2017; Ahmad & Khalid, 2017; Isagah & Wimmer 2018). Consequently, adoption of m-government service needs to reach a critical mass-point for its acceptance and use to swiftly snowball in the society.

#### **6.3.1.3 Mobile Technology Effect**

Statistical findings evidenced the effect of technology on citizens' behavioural intention to accept and use m-government services in Tanzania ( $\beta = 0.226$  at  $p < 0.001$ , Table 5.17). This result confirms the effect of technology on adoption as hypothesized by the OECD/ITU (2011), Al-Debei & Avison (2011), and Al-Lozi & Al-Debei (2014). This aligns with the technology use and gratification theory, where it indicates the derived pleasure from accomplishing a mobile task as an advantage derived from the characteristics of mobile and wireless technologies (Chen, 2014). Moreover, findings reveals that the mobility aspect serves as an integrator of mobile technologies in daily life as postulated by the technology domestication theory (Vuojärvi, Isomäki & Hynes, 2010). It is established that the mobility feature of m-government services associated with mobile technologies entices users to adopt, as it significantly relates to service value systems such as utilitarian, hedonic, economic and epistemic values (Al-Lozi & Al-Debei, 2014). Correspondingly, Debei & Avison (2011) found mobile technology as a value architecture significantly enables mobile data services (MDS) as a value proposition, for which m-government services is an example. Relatedly, Liu et al. (2008) demonstrated technology as a critical predictor of value dimension for MDS. These arguments concur with the study findings, implying Tanzanians perceive mobile technologies' application in government processes to have the potential to save cost and time in accessing government information and public services.

#### **6.3.1.4 Attitudinal Influences**

Additionally, the quantitative results confirmed the hypothesized effect of attitude in predicting behavioural intention to adopt m-government services. Attitudinal influences

proved to have a significant positive effect on Tanzanians' decisions to adopt m-government services. Likewise, Venkatesh, Thong & Xu (2012), Pellas (2014), Almarashdeh & Alsmadi (2017), and Ahmad & Khalid (2017), among many others, found similar findings. Almarashdeh & Alsmadi (2017) report to have found that users' attitudes towards usage of services predominantly influenced intention to adopt. However, this finding refutes prior assertions by Taylor & Todd (1995), Venkatesh & Davis (2000), and Venkatesh et al. (2003) that the inclusion of attitudinal influences in adoption studies is meaningless. Furthermore, the hypothesized effect of subjective norms on attitude was found to be positively significant ( $\beta = 0.337$   $p < 0.001$ , Table 5.17). The significant positive result implies that subjective norms or social influences are powerful in mediating the relationship between attitudes and behaviour intention to use m-government services. Thus, it is essential to ensure a positive government image to citizens as this triggers positive attitudes toward acceptance and use of government services.

### **6.3.2 Provisioning Practices' Effect on Citizens Perceived Factors**

This section presents findings on provisioning practices that either support or hinder the accomplishment of factors discussed in section 6.3.1, to be significant in influencing citizens' adoption of m-government services. While the quantitative results confirm the factors, the qualitative findings establish the practices to facilitate identification of possible challenges on citizens' adoption intentions. Quantitative findings indicate four factors, FI, SN, TI and AI, as significant predictors of Tanzanians' behavioural intention to adopt m-government services. Correspondingly, qualitative findings indicate there are provisioning practices that either positively (support) or negatively (hinders) affect the adoption factors. Relevant provisioning practices affecting the achievement of the identified factors, as noted in section 5.5, include those themed under service development practices, service delivery practices, service positioning, awareness creation management, and lastly, collaboration practices and management.

#### **6.3.2.1 Practices Affecting Financial Influences**

Considering financial influence (FI), statistical evidence shows it significantly affects citizens' intention to adopt; several practices under the service positioning themes were identified to affect its attainment. All the four government organisations interviewed indicated their service prices are set based on the cost incurred in provisioning; statements

such as “*meet the operational costs incurred*”, “*we incur costs that must be met*” and “*at least cover operational costs*” were prominent responses from participating government organisations, as indicated in section 5.5.2.3. Therefore, the findings indicate the use of utility pricing strategy. The utility pricing strategy that uses costs for pricing has proven a challenge to most governments. This finding is associated with difficulties in determining the balance between sustainability in service provisioning while at the same time adhering to principles of public service provision. While organisations rely on the cost of operation to establish m-government service prices, this approach is contested.

For instance, Bertrand (2015) challenged Coase’s (1970) utility pricing strategy arguing that it ignores the effects of structure and thus it fails to account for resource misallocations resulting from additional taxation for subsidizing public services. Bertrand (2015) is for the redistribution of income mostly in favour of citizen; arguing that if m-government services are charged based on full costs coverage, they become costly, which implies the social exclusion of individuals who cannot afford to cover access costs. However, relying on marginal costs for pricing as well requires a government subsidy to compensate for any additional costs, compromising the sustainability of quality service provision. Consequently, the government is urged to ensure m-government services benefits are known, and they outweigh costs, for citizens to derive value for money services (Susanto & Goodwin, 2011; Al-Hujran, 2012; Isagah & Wimmer 2018). Also, it is essential for government organisations to note the diversity of users in relation to costs; while some are concerned with money spent, others are more concerned with the benefits realized, such as effort and time, to determine m-government service value (Wang, 2014).

Additionally, findings in section 5.5.2.3 indicate citizens are either totally excluded, or if included in m-government service pricing processes, it is through a proxy agency. Three of the four interviewed organisations indicated there are no consultations with any citizens on prices charged for m-government services. Consultation and negotiations are only carried out among provisioning partners. Some responses to this effect were, “*we deliberate with our partners to determine the price to charge*” and “*two other parties apart from ourselves are crucial in the process, that is, the mobile phone operators and the service application hosting organisation*” (section 5.5.2.3). Citizens’ inclusion in public service provisioning is a critical factor in defining public service value, which consequently influences citizens’ acceptance

and use (Bertot, Jaeger, Munson, & Glaisyer, 2010). Government organisations need to rethink the role of citizens in public value creation and change the role of citizens from value recipient to value co-creators (Linders, 2012; Grönroos & Voima, 2013). According to Turki, Foster & Rahim (2018), citizens are critical for deriving public value. Moreover, with finance being verified as significant in citizens' adoption decisions for m-government services, the government organisations providing m-government services need to devise mechanisms and forums for citizens' inclusion, especially in service costs negotiations and price setting.

#### **6.3.2.2 Practices Affecting Subjective Norms**

Subjective norms (SN) account for the implications of other people's opinions, experiences within a context of self-reflection, and societal reflections of the experience, with m-government services (Dwivedi et al., 2016). In section 5.4.3.5, SN is quantitatively evidenced to have significant predictive power on citizens' behaviour intention to adopt m-government services in Tanzania. Furthermore, findings established that despite a direct effect on behaviour intention, SN also significantly influences people's attitudes (Table 5.17). This result implies attitude, that is, a formed opinion, is a result of the experiences and the evaluation thereof of an individual or of people in the society whose opinion matters. Practices that affect one's level of understanding, ability or skills affect both their attitudes and their perceptions of opinions of others who matter (Venkatesh, Thong & Xu, 2012; Dwivedi et al. 2016). In line with this attestation, awareness creation practices affect both societal opinion and judgment of m-government services as well as individual's attitudes. This finding implies that where there is a lack of awareness, society and individual citizens are likely to develop negative opinions of m-government services, resulting in low adoption.

Section 5.5.2.1 exemplifies the limited awareness campaigns on m-government services whereby *limited funding*, *competing priorities* and *non-citizen focused programs* are noted among the reasons. Also, qualitative findings establish that it is a common practice among interviewed organisations to exclude citizens in m-government service provisioning processes, including price determination and m-government service knowledge development and dissemination. Then the noted low adoption is thus explained by the limited and ineffective m-government service awareness practices that trigger negative attitudes to both individuals and the society. Consequently, embarking on knowledge building campaigns that empower citizens with the right information, necessary skills and ability to use m-

government services is essential towards adoption. While awareness stimulates initial intention, knowledge and capability building need to progress before, during and after service provision.

### **6.3.2.3 Practices Affecting Attitudinal Influence**

Literature shows that practices related to service delivery have an effect on peoples' attitudes as well as on societal opinion (Hung, Chang & Kuo, 2013; Ham, Jeger & Ivković, 2015). Qualitative findings in section 5.5.1.3 present two main themes under m-government service delivery practices, namely, the service quality descriptors and citizen support systems. Regarding service quality descriptors, qualitative findings indicate that m-government service providing organisations are more concerned with service factors that ensure achievement of service functionality. For example, "*ensuring network availability, service accessibility, equipment performance and that our servers are secured and operational*", "*satisfactorily completed when payment is reflected on our systems and the token is sent via SMS back to the user*" and "*we strive to ensure our network, servers and service application databases are accessible and secured*" (Section 5.5.1.3). This finding confirms Wanjau, Wangari & Ayodo's (2012) findings that most governments, especially in developing countries, dwell much on completing electronic transactions grounded within the e-business concept, that is, technical requirements, while ignoring socio-technical requirements which are critical for adoption. However, the focus on only technical factors for service quality is contested in the literature (Robert & Lesage, 2010; Ogunleye, 2017; Wanjau, Wangari & Ayodo, 2012). Robert & Lesage (2010) affirm that functional factors alone do not adequately predict adoption. Thus, a broader view of service quality descriptors that include emotional, cognitive and functional factors will enhance citizens' adoption of m-government services

Additionally, findings in section 5.5.1.3 indicate there is no centralized service support system for m-government service users. User support is carried out at different levels, from the respective government organisation hosting the service, the infrastructure access point (for example, eGA), or at the mobile phone operators' level. For instance, the respondents noted that when citizens' face challenges, they *notify the service providing organisation or the mobile company* for assistance (Section 5.5.1.3). Moreover, citizen support for m-government services and m-government knowledge transfer within government structures is noted to be among the challenges affecting adoption. Consistent with Mawela, Ocharab &

Twinomurinzi's (2017) argument, the limited ICT experts within government structures contribute to the limited support for m-government service provision thus further affecting citizens' adoption of m-government services. This finding is a consequence that has been commonly related to the limited budget for ICT departments in the public sector (Capgemini, 2010; Henningsson & van Veenstra, 2010). Thus Alshehri & Drew (2010) acknowledge the need to expand budgets of ICT departments and invest in recruitment, retention and training to build ICT capabilities within government organisations for service provision and user support.

#### **6.3.2.4 Practices Affecting Technology Influences**

Quantitative findings also demonstrated that the effect of technology in predicting citizens' adoption behaviour is significant. Technology influences, such as time efficiency, location independence and movement ability while interacting with m-government services, were assessed (Appendix A). Correspondingly, several provisioning practices were noted to affect technology influences, including service development practices and collaborative practices and management. Reliance on *existing service requirements*, *service re-engineering*, and *user exclusion* in the design and development of m-government services coupled with *limited skilled personnel* within government structures typical of m-government services development practice (Section 5.5.1.1), affects the quality of the resulting m-government services offered to citizens.

Additionally, section 5.5.1.2 indicates three main partners, *the government organisation hosting the service* (service provider), the *mobile infrastructure access provider* (example eGA) and *the telecommunication operators* for Internet and mobile services. The noted multi-stakeholder structure implies a high level of synchronisation and coordination in provisioning processes is required. Moreover, section 5.5.2.1 notes *conflicting roles*, and *lack of strategy* and *guidelines* for coordinating stakeholders' activities are part of the collaboration management practices in Tanzania hindering smooth coordination and cooperation among stakeholders. However, OECD/ITU (2011) identifies several other partners in the m-government service value chain, such as regulatory, funders and hardware vendors. Consistent with Cable (2011) and Alshehri & Drew (2010), it is thus necessary to recognize a broader spectrum of strategic partners critical and advantageous in achieving an integrated end-to-end solution. Likewise, cultivation of collaborative working relations with

various stakeholders, both public and private, is essential to facilitate access to resources and assure technological aspects necessary to citizens, like network speed, availability and security.

### **6.3.3 Overview of Citizens' m-Government Service Adoption Factors**

This section presents a summary of the identified factors for m-government service adoption. In contrast, the quantitative findings in section 6.3.1 indicate only four factors, financial influences (FI), subjective norms (SN), attitudinal influences (AI) and technological influences (TI), which were significant in predicting citizens' adoption decisions. However, it is essential to note that all the eight hypothesized factors for citizens' adoption of m-government services loaded significantly on the structural model (Appendix I). While these four, that is, FI, SN, AI and TI, were significant in predicting citizens' intention to adopt m-government services, the other four had an insignificant effect. Literature establishes factors like performance expectancy (PE), hedonic value (HV), self-efficacy (SE) and facilitating conditions (FC) which were also statistically shown to affect intention to use m-government services; their effect was prominent in the context of Tanzania. Thus, to implement adoptable m-government services, all eight factors must be considered; however, much more focus should be on the four prominent ones.

The section also presented various practices that affect the achievement of these factors. Qualitative findings from the analysis of interview data from technical personnel and management from m-government service provisioning organisations revealed several practices that hinder the achievement of the identified factors, thus further explaining the low adoption phenomenon discussed in section 6.2. Findings in section 5.5.2.1 reveal that current practices exhibit limited awareness and knowledge building effort. This includes, for instance, citizens' exclusion in critical processes such as service requirement elicitation and service pricing (Section 5.5.2.3); narrow scoping of m-government service quality descriptors for which functional factors are considered while excluding socio-technical factors, that is, emotions and cognizance (Section 5.5.1.1 and Section 5.5.1.3); and limited collaborations and synchronisation with strategic provisioning partners (Section 5.5.1.2). Section 6.3.2 has explained how these practices and others affect the achievement of the identified critical success factors for citizens' adoption in Tanzania. However, identifying critical success factors for citizens' adoption and the corresponding provision practices that



affect the attainment of these factors only provide foundational information for understanding citizens' adoption. It is important to then understand the implications of the identified factors and corresponding practices in either supporting or hindering citizens' adoption in order to generate knowledge that informs the development of the m-government service provisioning framework that aims to enhance citizens' adoption.

#### **6.4 Findings' Implication on m-Government Service Adoptability**

This section responds to research objective four (RO4) by examining and explaining the overall implications of the findings on the adoptability of m-government services in Tanzania. The section seeks to establish the consequences of the research findings, to explain the proven low citizens' adoption of m-government services in Tanzania as indicated in section 5.4.2. While section 6.2 has extensively discussed relevant factors of adoption, and section 6.3 the prevailing provisioning practices, it is critical to understand how these conditions affect the adoptability of m-government services by citizens. This knowledge is critical for the development of the provisioning framework that addresses citizens' challenges in accessing and using m-government services and, in turn, enhancing adoption. After uncovering knowledge on the implications of these findings, it is essential to note that these implications serve as hindrances to citizens' adoption of m-government services, thus are clustered and discussed in the context of challenges to citizen's adoption of m-government services. The challenges identified are based on the findings in the previous discussions on factors of adoption (Section 6.2) and provisioning practices (Section 6.3), in light of the problems that explain the limited citizens' adoption of m-government services in Tanzania.

The study findings draw implications on three aspects in relation to citizens' adoption of m-government services, which are emotions, cognitive and functional aspects. Taherdoost (2016) attests that factors of adoption either produce an emotional, cognitive or functional effect, which drives users to adopt. Kourouthanassis et al. (2015) argue that cognitive, functional processes and emotional elements regulate adoption behaviour. While functionality factors remain critical in determining service performance, the study findings discussed in section 6.2 and section 6.3 highlight the importance of non-technical factors in m-government service provisioning and adoption. Therefore, to entice citizens' adoption, positive emotional and cognitive effects need to be invoked over and above accomplishing functional objectives.

#### **6.4.1 Emotional Implications**

According to Taherdoost (2016), these factors – subjective norms (SN), financial influence (FI), attitudinal influence (AI) and technological influence (TI) – affect users' emotions. Attitudes have an emotional effect, the feeling of likes or dislikes, on adopters. Ham, Jeger & Ivković (2015) define attitudes as the mental willingness to accept or reject an object, a person or a situation as a result of direct or indirect experience. According to Beaudry & Pinsonneault (2010), attitudes relative to a particular behaviour are the emotions related to particular consequences, attributes and outcomes that are evaluated either positively (desirable) or negatively (undesirable). Negative emotions towards technology adoption include fear, anxiety and worries, while positive emotions that are said to support adoption include happiness, joy, contentment, enthusiasm and interest (Venkatesh et al., 2003; Kourouthanassis et al., 2015; Taherdoost, 2016).

An emotion reflects the mental state of willingness to act, thus promoting the activation of certain behaviours and priorities that optimize an individual to adjust to their environment (Bagozzi, 2007; Beaudry & Pinsonneault, 2010; Rodger & Gonzalez, 2013). Emotions develop in response to the internal evaluation of an event considered essential and relevant to an individual. Raffaelli, Glynn & Tushman (2017) attest that technology triggers emotional responses when it assists or disrupts a sequence of events in a routine, thus may inhibit or motivate adoption. Beaudry & Pinsonneault (2010) conclude that emotions bridge the gap between the instant a routine is interrupted, with or without knowledge on future interruptions, and the time either new or old routines are re-established. According to Rodger & Gonzalez (2014), emotion and memory affects technology adoption and diffusion. Therefore the mobile technology influences (TI) of mobility, time, and location efficiency shape an individual's emotions towards intention to use, especially in cases where m-government services affect routines.

Additionally, subjective norms (SN), which reflect an individual's perception of significant others' approval and support of particular behaviours, affect adopters' emotions. Similar to Abaza & Saif (2015), Almarashdeh & Alsmadi (2017), and Ham, Jeger & Ivković (2015), findings in section 5.4.3.5 indicate that SN significantly affects Tanzanians' adoption intentions for m-government services. Ham, Jeger & Ivković (2015) posit that social pressure from significant others invokes emotions through its ability to regulate behaviour and

motivate compliance. When deconstructing SN, it yields actual actions and behaviours of others (descriptive norms), as well as others' opinion on how one ought to behave (social norms). Furthermore, the cost of acquiring the device (mobile phone) and the services, namely Internet access and SMS services, significantly predicts adoption behaviour through its effect on adopters' emotions (Beaudry & Pinsonneault, 2010; Venkatesh, Thong & Xu, 2012; Al-Hujra, 2015). Beaudry & Pinsonneault (2010) argue that perception over cost results in formation of emotions that either positively or negatively influence adoption. For instance, when the cost is perceived affordable or the pricing strategy is perceived to be socially inclusive, it triggers positive emotions towards adoption, thus encouraging more citizens to accept and use m-government services.

Therefore, with the adoption of new technology being complex and multifaceted, emotions of the new technology become powerful in determining its adoption. Consequently, emotions are critical in modelling provisioning for enhanced citizen adoption. The above discussion elaborates how the influence of AI, SN, FI and TI on behaviour intention navigates as emotions, emphasizing the need to incorporate emotional invoking attributes in m-government service provisioning for an enhanced citizen adoption.

#### **6.4.2 Cognitive Implications**

According to Taherdoost (2016), attitudes have a cognitive effect on adopters; that is, the information held regarding an object, person or issue. Cognitive factors refer to individuals' characteristics regarding information and abilities they hold about an object, a situation or a person, which affects their performance and learning. Raffaelli, Glynn & Tushman (2017) assert that the behavioural regulating effect of cognitive factors facilitates technology adoption. Technology adoption is associated with learning and using; therefore, its success largely depends on how the cognitive component is positively affected. Furthermore, the cognitive component is fundamental, invoking and facilitating one's capacity to self-regulate emotions, thoughts, instincts and actions (Gurbin, 2015; Rana & Dwivedi, 2015; Raffaelli, Glynn & Tushman, 2017). Relevant information about m-government service initiatives and services affects users' cognizance (Henningsson & van Veenstra, 2010). Therefore, access to information regarding service attributes and support mechanisms regulates the effect of emotions on adoption. Savoldelli, Codagnone & Misuraca (2014) ascertain that access to relevant information and facilitating conditions affects citizens' mental willingness to adopt

m-government services. While triggering positive emotions is crucial in influencing adoption, stimulating user's cognizance about m-government services is also essential. Users' cognizance entails both users' awareness and knowledge capabilities acquired through m-government services orientation and training. The more socio-inclusive and transparent the m-government service provisioning process is, the more the desirable emotions are formed on m-government services; thus more users are attracted to adopt (Savoldelli, Codagnone & Misuraca, 2014; Henningsson & van Veenstra, 2010).

Likewise, Abaza & Saif (2015) affirm the importance of awareness on adoption of m-government services; they established that increasing awareness increases the chances of positive emotions being formed, thereby significantly affecting behaviour intention to use m-government services. Awareness marks the first step for a user to know about m-government services. Awareness building approaches may include public announcements, posters, and advertisement in newspapers, on television or on radio. However, while awareness stimulates initial intention, knowledge capability building needs to progress before and during service provision. The knowledge capability component reflects activities aimed at imparting basic skills sets for operating or navigating through m-government services as well as capturing and providing user experience feedback for m-government services. Orientation or a knowledge capability building phase must be reflective of issues concerning manageability, affordability and interest building for m-government services. To enhance m-government service adoption, user cognizance, that is, awareness and knowledge capabilities, are essential components for both design and provisioning of m-government services.

#### **6.4.3 Functionality Implications**

Functional factors related to service performance are essential and are the pinnacle of any service provisioning. While findings identify four factors as significant in predicting adoption, they also support the influence, although insignificant, of other factors related to service performance, which loaded on the structural model (Appendix I and Appendix J). The postulated factors include performance efficiency (PE), self-efficacy (SE), hedonic value (HV) and facilitating conditions (FC). Venkatesh, Thong & Xu (2012) posit that factors related to performance are critical for the technology to be meaningful and useful. However, e-government deployment and provisioning have focused mostly on functional issues (technological and operational), ignoring non-technical aspects that might favour adoption

(Savoldelli, Codagnone & Misuraca, 2014). Also, Ogunleye & van Belle (2014) noted that most m-government service deployment fails as a result of negligence of non-technical factors in service designing and provisioning.

User emotions and their cognizance need to be integrated with primary functionality motives in order to enhance adoption of m-government services. Functionality traits or instrumentality traits encompass both usefulness and usability motives for m-government services. Abaza & Saif (2015) argue that awareness needs to be complemented with positive emotions on service functionality for adoption to take place. Similarly, Almarashdeh & Alsmadi (2017) and Venkatesh, Thong & Xu (2012) confirm the significance of functionality attributes on adoption by demonstrating the significant effect of perceived usefulness or performance expectancy on user intention to use m-government services. Contrary to study findings on performance expectancy, the proposed solution also incorporates functionality attributes, as they are the basis upon which services are developed and evaluated.

Thus, from the discussion above, three components, emotions, cognizance and functionality, are essential to be considered in designing a solution to enhance m-government service adoptability. The effect of not achieving these factors becomes a hindrance to adoption; it is thus critical to identify challenges facing citizens as a result of the implications of the study findings. Identifying components upon which adoption decisions are based on is one step; however, there is a need to understand further the implications of these findings as a hindrance to citizens' adoption of m-government services.

### **6.5 Challenges to Citizens' m-Government Service Adoption**

This section discusses barriers to citizen adoption of m-government services resulting from the implication of the study findings noted as results integration in Figure 4.1. Literature notes several barriers, including limited access to required infrastructure, lack of skilled personnel within government structures, lack of personalized services, and expensive mobile Internet services (Al-Hadidi & Rezgui, 2010; Al-Hujran, 2012; Oreku & Mtenzi, 2012; Yonazi, 2013; Ogunleye & van Belle, 2014; Munyoka & Manzira, 2014; Alssbaiheen & Love, 2015). However, barriers presented in this section are a result of the implications drawn from the identified factors of adoption and the corresponding provisioning practice in Tanzania. Wanjau, Wangari & Ayodo (2012), in investigating the quality of public service

delivery, identified six-consumer dissatisfaction gaps categorized as users, providers or user-provider context. By applying a similar gap analysis technique, three barriers to citizens' adoption of m-government services in Tanzania are identified and discussed in the following sections.

#### **6.5.1 Citizens' Unpreparedness**

The first barrier, citizens' unpreparedness for m-government services, is demonstrated through limited awareness of the presence and the benefits of m-government services, and the lack of the necessary skills set to navigate through m-government services (Section 6.2.1). Similarly, Henningsson & van Veenstra (2010) identify limited awareness as a persistent hindrance to governmental IT transformations. Likewise, in Tanzania, Yonazi, Sol & Boonstra (2010) note citizens' unawareness of e-government as a significant challenge towards its adoption. Section 6.2.2 counts limited public awareness campaigns and lack of user-focused awareness campaigns as results of limited budgets, competing priorities, limited citizen support and limited ICT skilled personnel within government structures as reasons perpetuating citizens' unpreparedness in Tanzania. Thus, citizens' preparedness, which manifests itself in two perspectives –user readiness and system readiness to accommodate users' level of readiness –, is among the significant challenges to m-government service adoptability in Tanzania.

According to Ogunleye & van Belle (2014), mobile readiness (m-readiness) is defined as the citizens' competencies and the extent of accessing mobile technologies, including mobile devices, networks and applications. In line with Mtingwi & van Belle (2012), m-readiness can be assessed in four dimensions, namely, motivation, individual competencies, usability and obstacles. Transposing Ogunleye & van Belle (2014) and Mtingwi & van Belle (2012), contextualisation of technology readiness in the context of m-government service adoption translates to citizens' readiness; that is, the willingness and the state of being equipped with knowledge and skills to receive public services via mobile devices, especially mobile phones. However, findings revealed the un-readiness of Tanzanians to take up m-government services because existing provisioning practices do not cater to existing levels of citizens' preparedness. This finding reveals a mismatch between expected and actual citizen level of preparedness. Yonazi, Sol & Boonstra (2010) point out that citizens' perceptions of public

service provision still lean towards physical contact, which affects citizens' trust and confidence in alternative public service provision channels.

Compared to similar services from the private sector, Lubua (2017) notes that using mobile phones to complete online transactions is a common practice among Tanzanians. This discovery raises the question of why not m-government service? This implies that while Tanzanians may possess the minimum skills required in utilizing m-government services, government organisations need to focus on visibility and advocate the benefits of using m-government services to the public. Consequently, with current provisioning practices that focus on service usability, usefulness and accessibility, citizens' adoption is unlikely to become a reality (Ogunleye & van Belle, 2014). m-Government service adoption in Tanzania and elsewhere is only a possibility if citizens' preparedness is enhanced; that is, citizens' awareness and adequacy in technological skills, and also the government's ability to match actual and expected preparedness, is enhanced.

#### **6.5.2 Mismatched m-Government Service Requirements**

The second barrier to citizens' adoption of m-government service initiatives is the mismatch between citizens' expectations and m-government providers' service quality specifications. According to Jinhua, Yong & Peng (2010), service quality significantly affects its adoption as it influences consumers' satisfaction, retention and loyalty. Consumers' satisfaction or dissatisfaction is derived from the comparison between expectations and actual perceptions of a service experience. Literature establishes that public services that are perceived of high quality are those that are geared towards producing meaningful and desirable public values (Mousa, 2013; Rose & Grant, 2010). Moreover, Feeney & Welch (2012) posit that the quality of public service delivery is evaluated through public opinion of the value and transparency of the process. Correspondingly, Savoldelli, Codagnone & Misuraca (2014) acknowledge that quality and public values should not be defined self-referentially by public administrators but must incorporate the needs, views and values of the targeted group. However, the current provisioning practices that exclude citizens is unlikely to support this requirement, thus causing a hindrance to adoption.

Findings in section 6.2.2 indicate current m-government service provisioning practices, namely service need establishment, requirements elicitation and service testing processes, are characterized by limited citizen involvement. Ibrahim & Mohammed (2008) affirm that the

unfortunate practice of working with assumed citizens' needs in the development and provision of new or innovated existing public services is common among government organisations. Thus, citizens' emotional, functional and cognizance needs are neglected in the resulting m-government services. Also, the limited involvement of citizens in activities such as m-government service testing and service access pricing or costing affects both citizens' emotions and cognizance of service interactivity and affordability. With the resulting perception of the quality m-government services being unsatisfactory, citizens tend to revert to traditional physical channels for accessing public services.

### **6.5.3 Mismatched m-Government Service Provision-Consumption Focus**

The third barrier that contributes to poor citizens' adoption of m-government service initiatives in Tanzania is the m-government service provision focus. The current m-government service provision is focused on achieving system and service functionalities with minimal effort on experience, which is vested in emotional and cognitive aspects (Sections 6.2 and Section 6.3). Interviews with respective government organisations involved in the m-government service provision indicated current practice on requirements establishment, service development, service positioning and delivery are characterized by minimum citizen engagement. Current m-government service provisioning practices in Tanzania can thus be generally contextualized as following the business process re-engineering principles; however, with established practices of excluding the users in the process (Section 6.3). For instance, service requirement establishment focuses on extracting service requirements from the physical service provisioning, and re-engineering these requirements directly into electronic services to be offered through the mobile platform (Section 6.2.2 and Section 6.3.2). Consequently, with such practices, citizen's needs are excluded from the existing m-government service initiatives, and as a result, a wide gap exists between citizens' expectations and their perceptions of m-government services.

Furthermore, Wanjau, Wangari & Ayodo (2012) note that most government organisations concentrate on accomplishing electronic transactions that provide services with an e-business focus. The e-business focus is centred on achieving technical functionalities for completing a transaction through electronic platforms, and has been widely contested for its omission of socio-technical requirements, including emotional, aesthetic and cognition attributes (Abro et al., 2015; Stamenkov & Dika, 2015). Abro et al. (2015) posit that in citizen-involving



services, citizens' service experience plays a vital role in how they react to services, and for that matter, service provision focus needs to shift towards e-service where both technical (functionality) and socio-technical (cognizance and emotional) attributes are considered.

## **6.6 Summary**

This chapter provides a discussion of findings that integrated quantitative and qualitative research findings, thus accomplishing the holistic research view described in section 3.2. The integration of findings revealed the practices that explain the current trend in citizens' adoption of m-government services (Section 6.2) and practices that hinder the accomplishment of citizens' perceived factors of adoption in Tanzania (Section 6.3). For instance, section 6.2.1, addressing objective RO1, established low citizen adoption of m-government service, which is explained in section 6.2.2 by practices such as limited awareness campaigns, limited funding, and competing priorities. The low adoption trend established is consistent with Lubua's (2017) findings. Also, section 6.3 presents the factors affecting citizens' adoption decisions and the practices hindering achievement of these factors. Section 6.3.1, addressing objective RO3, discusses the adoption factors, which are financial influences (FI), subjective norms (SN), attitudinal influences (AI) and technological influences (TI), while section 6.3.2, addressing objective RO2, identified the practices including non-inclusion of citizens in core m-government service processes; lack of centralized citizen support mechanisms; conflicting roles of stakeholders; and reliance on existing service requirements. The noted provisioning practices are standard practices among government organisations in developing nations (Ibrahim & Mohammed, 2008; Mawela, Ocharab, & Twinomurinzi, 2017).

The implications of the research findings corresponding to objective RO4, discussed in section 6.4, were found to traverse through citizens' emotions (Section 6.4.1) and cognition (Section 6.4.2), and m-government's service functionality (Section 6.4.3). Based on the implications of the findings, three barriers to citizens' adoption of m-government services are identified, namely, citizens' unpreparedness, mismatched m-government service requirements and mismatched m-government service provision-consumption focus (Section 6.5). Consequently, to improve citizens' adoption of m-government services in Tanzania, the identified barriers must be addressed, in addition to other systemic and environmental provisioning barriers. Thus, the discussion presented in this chapter responded to the four

research objectives the research set out to achieve.

**Table 6. 2:** Summary of Major Research Findings

Research Objectives	Research Findings
Research Objective 1	Low citizen adoption of m-government service, which is explained by practices such as limited awareness campaigns, limited funding, and competing priorities. Refer section 6.2 and subsequent subsections
Research objective 2	Identified provisioning practices included non-inclusion of citizens in core m-government service processes; lack of centralized citizen support mechanisms; conflicting roles of stakeholders; and reliance on existing service requirements. Refer section 6.3.2 and corresponding subsections.
Research Objective 3	Identified significant factors influencing citizens' adoption of m-government services to include financial influences (FI), subjective norms (SN), attitudinal influences (AI) and technological influences (TI), Refer section 6.3.1 and corresponding subsections.
Research Objective 4	The findings traversed through citizens' emotions (Section 6.4.1) and cognition (Section 6.4.2), and m-government's service functionality (Section 6.4.3). Refere section 6.4 and subsequent subsections
Barriers to adoption	Citizens' unpreparedness, mismatched m-government service requirements and mismatched m-government service provision-consumption focus. Refer section 6.5 and subsequent subsections

# CHAPTER SEVEN

## A USER INTERACTIVE SERVICE-PROVISIONING FRAMEWORK FOR M-GOVERNMENT SERVICES IN TANZANIA

### 7.1 Introduction

The discussion of the findings in chapter six reveals that there are challenges that inhibit citizens' adoption of m-government services in Tanzania. The identified challenges in section 6.5 include citizens' unpreparedness, mismatched m-government service requirements and the mismatched m-government service provision-consumption focus. These challenges result in an incongruity between the m-government services offered and what the citizens expect or have knowledge of. Chapter five presented the statistically confirmed factors that influence citizens' adoption of m-government services. Likewise, it presented the practice in m-government service provision using the mGov platform by the e-Government Agency (eGA) as a study case to capture the provisioning practices of four government organisations in Tanzania. Upon identification of factors for m-government service adoption and the practice, chapter six provided a discussion that consolidated the findings and demonstrated how the mismatch between provision intentions and consumption expectations hinders citizen's adoption of m-government services. Based on the identified challenges, this chapter presents phase 2, as noted in Figure 4.1, which focuses on prescribing a solution to these challenges, a response to research objective RO5 (section 1.5), that is:

**RO5.** To develop a service provision framework for enhancing citizens' adoption of m-government services in Tanzania.

The recommended solution consisted of three framework-modelling processes. First, the modelling process in section 7.2 begins by conceptualizing the existing gap, given the challenges identified in section 6.4. Research findings discussed in chapter six are integrated and interpreted to visualize the existing citizen adoption problem. Modelling or visual displays of an adoption problem is a useful approach towards dealing with technology adoption (Langley & Truax, 1994). Moreover, modelling allows an in-depth understanding of the adoption problem, thus facilitating the prescription of appropriate solutions to specific

citizen adoption challenges (Yonazi, 2010; Langley & Truax, 1994; Bakari, 2007). The public organisation m-government service supply focus is contrasted with the citizens' expectations to understand the m-government service adoption gap. The models are to assist public organisations that provide m-government services to identify the existing gap in service provision to meet citizens' expectations.

Second, the study focuses on modelling a strategy on how to address the identified citizen adoption gap for m-government services in Tanzania. Section 7.3 presents a candidate solution for enhancing citizens' adoption of m-government services. The candidate solution recommended is to assist public organisations to align with citizens' expectations towards m-government services provision. Additionally, it allows public organisations to identify factors that influence citizens' decisions towards m-government service adoption and hence devise strategies towards enhancing its adoptability (Yonazi, 2010).

Third, the recommended strategy for aligning m-government service provision with citizens' expectations is modelled into a framework in section 7.4. The candidate solution is modelled into a framework to facilitate m-government service provisioning organisations to identify critical stakeholders, factors, processes and their interaction. Moreover, recommending a solution in the form of a detailed framework provides implementing organisations the opportunity to visually comprehend the interaction of various components, thus facilitating crafting of the implementation strategy. According to Farley et al. (2013), a framework constitutes of a narrative or graphical representation of vital factors, variables or processes indicating sequence and interaction in explaining implementation. The user-centred m-service framework for m-government service adoptability is further discussed in terms of its components, that is, stakeholders, mG2C interactivity factors, and the m-service processes, in subsections 7.4.1, 7.4.2 and 7.4.3, respectively. Moreover, the user-centred m-service processes component of the framework is incrementally developed by capturing specific activities within the three processes, namely m-service modelling, provision and appraisal, presented in subsections 7.4.3.1, 7.4.3.2 and 7.4.3.3, respectively. Finally, a consolidated framework is presented and discussed in section 7.4.4 to provide a holistic compilation of the implementation framework with all the components and processes.

## **7.2 Modelling Citizens' Challenges towards m-Government Service Adoption**

The consolidation of qualitative and quantitative results in section 6.5 identified three challenges to citizens' adoption of m-government services in Tanzania; these are citizens' lack of preparedness, mismatched service requirements and mismatched service provision-consumption focus. In section 5.4.3.5, findings reveal that Tanzanians, when making adoption decisions, consider their attitudes, subjective norms, the effect of technology and their financial position; these are factors that affect their cognitive and emotions towards the service. Edvardsson (2005) and Edvardsson, Tronvoll & Gruber (2010) note that experience has a significant impact on customers' perception of service quality. Moreover, adoption is a function of citizen satisfaction achieved – if m-government service provision targets meet citizens' expectations. However, any mismatch in the two perspectives leads to citizens' lack of satisfaction, hence limited adoptability.

### **7.2.1 Functional Satisfaction Vs Experiential Satisfaction**

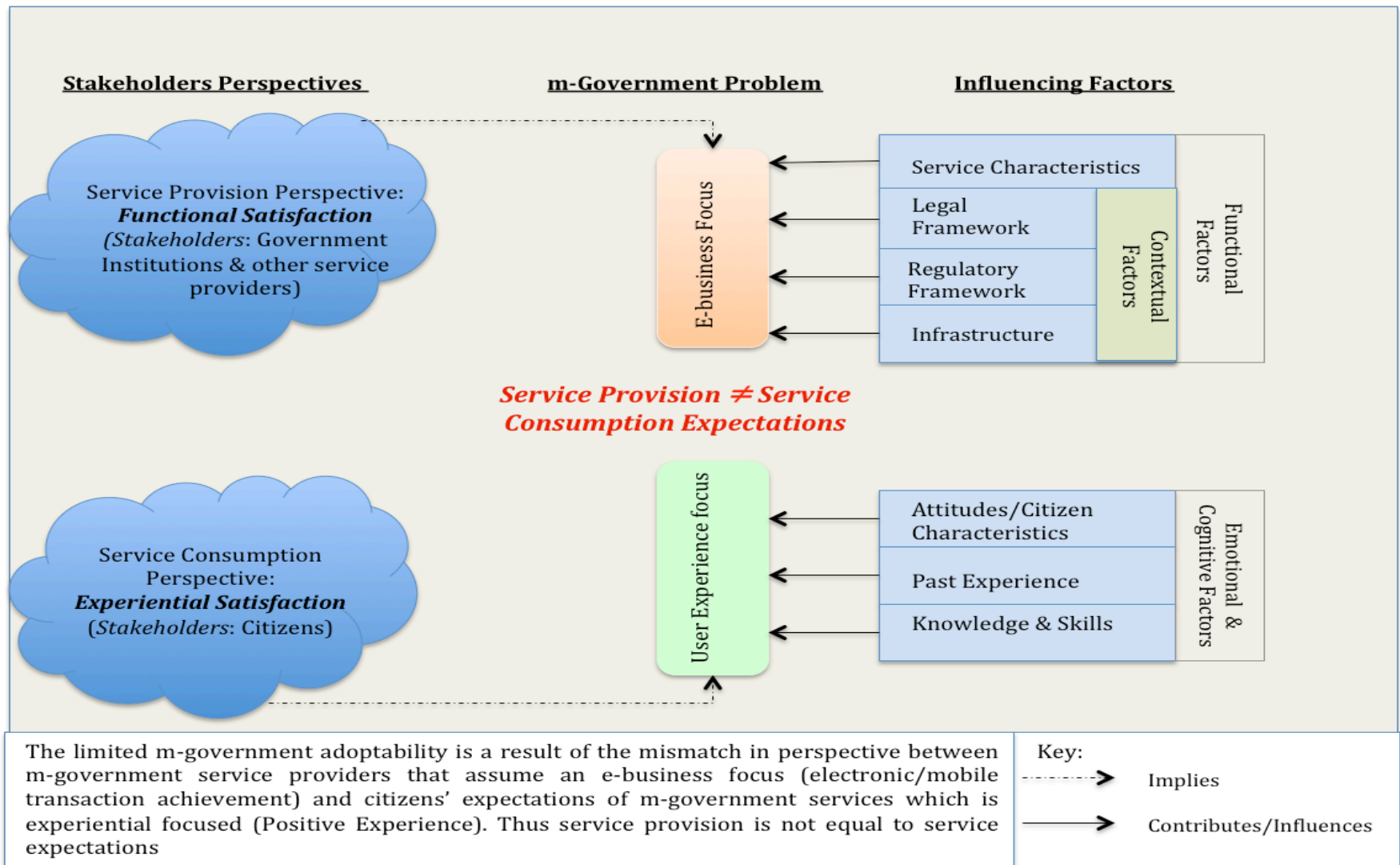
In the m-government service context in Tanzania, discussion on section 6.5 reveals a mismatch in what constitutes service quality between citizens and government organisations, resulting in mismatched service requirements. Similar to Edvardsson, Tronvoll & Gruber (2010), findings in section 6.2.2 indicate that government organisations are reliant on assumed citizen expectations when determining and defining service needs and requirements. Similarly, Bakunzibake, Grönlund & Klein (2016) found a gap between citizens' service expectations and service outcomes as a result of greater focus on technical aspects during implementation. Also, while functional factors only describe possibilities for achieving an online transaction, an m-government service consists of other requirements crucial for its fulfillment like security, aesthetic appeal, reliability and data integrity (Wanjau, Wangari & Ayodo, 2012). Also, section 6.3.1 reveals that while functional achievement is necessary, meeting citizens' emotional and cognitive needs motivates new adoption and repeat use of m-government services. Thus, while citizens are concerned with the overall experience of consuming m-government services (experiential satisfaction), government organisations tend to focus on achieving technical functionalities (Functional Satisfaction) and assumed citizen expectations.

According to Buckley (2003), an e-business focus aims at ensuring electronic transaction completion that is, achieving functional requirements of the service. Accordingly, the current m-government service provision perspective in Tanzania is centred on the e-business focus that prioritizes the achievement of service functionalities (technical aspects), that is, ensuring transaction success. However, the consumption perspective extracted from the findings in section 5.4.3.5 and the discussion in section 6.4 prioritizes experiential focus, whereby the experience that affects citizens' cognitive and emotional aspects when engaging with the services defines their satisfaction. A user-experience or an experiential focus, although it is inextricably associated with the e-business focus, aims more towards influencing citizens' cognition and emotions towards the service (Luarn & Liu, 2003). Therefore, currently, there is a mismatch in perspective between m-government service provision and citizens' expectations. Consequently, citizens experience challenges, as identified in section 6.4, when attempting to adopt m-government services.

Figure 7.1 provides a visualisation of the m-government service adoption problem in Tanzania, showing the mismatched perspectives between service provision and consumption and how this influences citizens' adoption decisions. The m-government service provision perspective in Tanzania is dominated by the e-business focus, which predominantly prioritizes the achievement of functional factors (Buckley, 2003; Luarn & Liu, 2003; Bertor, Estevez & Janowski, 2016). With this focus, the m-government service provision strategy in Tanzania currently only focuses on achieving functional or transactional factors. These are grouped into two categories, contextual factors and service characteristics, as noted in Figure 7.1. Contextual factors include infrastructure and the legal and regulatory frameworks upon which m-government services are provided, while service characteristics include all features related to service performance. The consumption perspective, on the other hand, constitutes the user-experience focus (experiential focus); as noted in Figure 7.1, experiential satisfaction arising from a positive citizens' experience is regarded by citizens as a critical determinant for m-government service acceptance and use. Experiential focus entails prioritizing factor that affects citizens' cognizance and emotions; this includes attitudes or user characteristics, past experience as well as citizen knowledge and skill level (Luarn & Liu, 2003). Figure 7.1 indicates that currently in Tanzania, the m-government service provision does not match citizens' expectations, consequently hindering citizens' adoption of

m-government services. Therefore, to enhance citizens' adoption of m-government services in Tanzania, the service-provisioning focus needs revision in order to accommodate elements of citizens' expectations, that is, to ensure functional, cognitive and emotional factors are optimally achieved.

Identifying challenges and conceptualizing the problem hindering citizens' adoption of m-government services, as in Figure 7.1, provides a crucial stepping-stone towards solving the m-government service adoption problem, consequently enhancing its adoptability. However, knowing the problem is but one stage, the focus thus migrates towards how and on what basis the proposed solution to address the mismatch between m-government service provision focus and consumption expectation, identified in Figure 7.1, is formulated and justified. For m-government service adoption in Tanzania to be a reality, a strategy to mediate this hindrance has to ensure congruence of the two perspectives; most importantly the providers' perspectives must accommodate and address factors critical to consumer satisfaction. The proposed strategy must ensure that service functionality factors, including usability and usefulness factors grounded within the e-business focus, are coupled with a user-experience focus that aims to achieve emotional and cognizance factors that trigger a positive users' experience in order to overcome these challenges. The following discussion captures the context in which the strategy towards enhancing citizens' adoption of m-government services in Tanzania is proposed and modelled.



**Figure 7.1:** Limited m-Government Service Adoption-Problem Modeling



### **7.3 Solution Modelling towards Citizens' Adoption of m-Government Services**

Section 6.4 and section 7.2 substantiate that any form of a solution towards enhancing m-government service adoption in Tanzania and elsewhere with a similar socio-political economy and culture must address citizens' concerns towards service satisfaction. This section presents and discusses the solution to address these challenges.

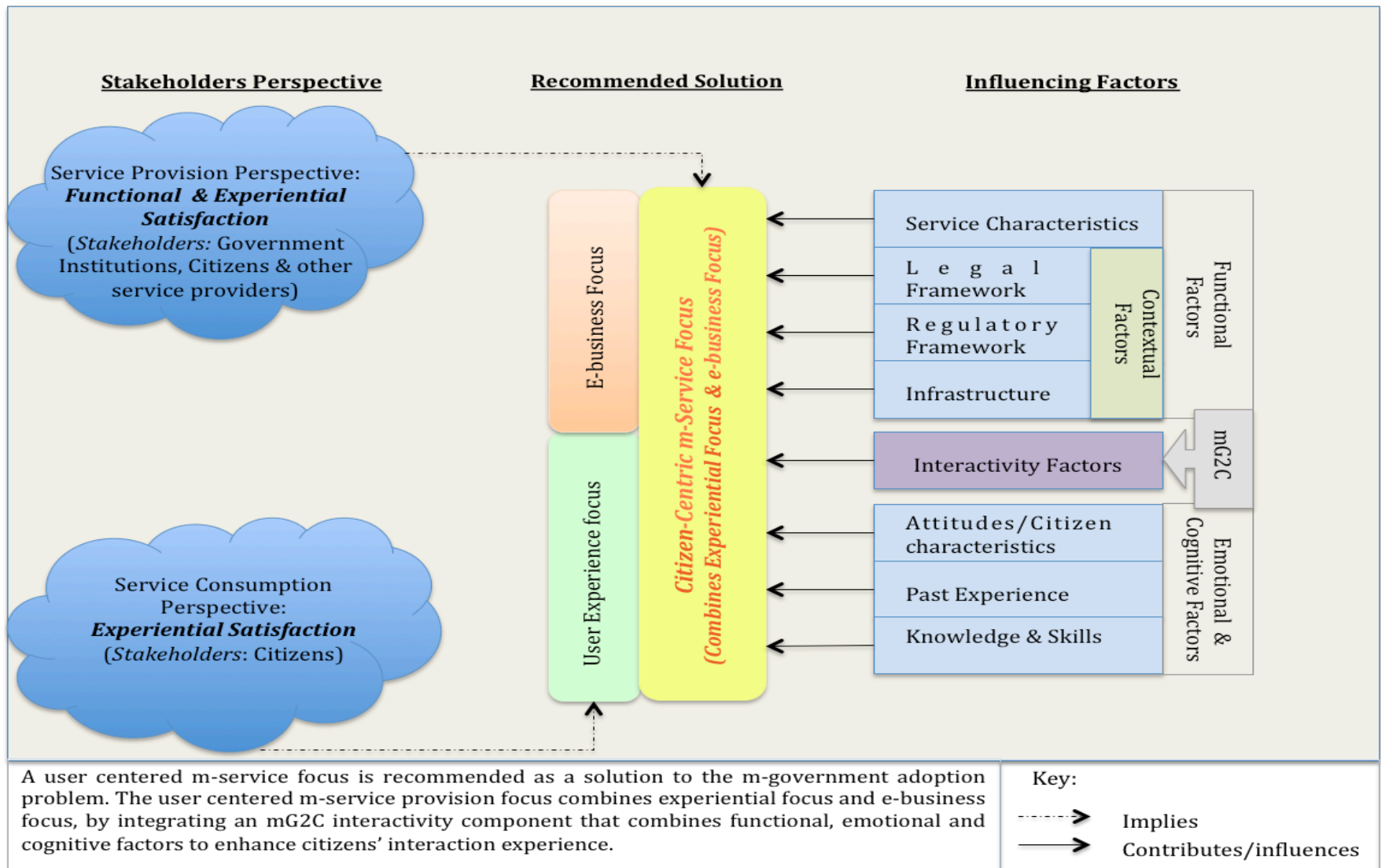
The recommended solution represents a service-provisioning strategy that advocates for the consideration of citizens' or a consumption perspective when providing m-government services in Tanzania (Figure 7.2). According to the consolidated implications from both qualitative and quantitative results discussed in section 6.5, citizens are concerned with attributes that trigger their emotions and cognitive faculties rather than the traditional system or service functionalities. Modelling these challenges revealed a mismatch in perspective such that service provision targets do not match citizens' expectations of m-government services (Figure 7.1). Consequently, in any recommendation towards a solution in addressing citizen adoption, citizens must be the focal point for service provisioning. Similar to Sigwejo & Pather (2016), the study recommends a citizen-centric m-service approach to complement m-government service provisioning in addressing the identified citizens' challenges. The proposed solution is centred on the m-service focus grounded within the citizen-centric concept for m-government service provisioning. Thus, the m-government service implementing organisations must embrace and involve the citizen in the service-provisioning process. The recommended solution takes up a service-provisioning focus to facilitate implementation in a structured environment, as opposed to unstructured implementation with citizens, if it is to assume an adoption perspective (Yonazi, 2010).

The first component of the recommended strategy constitutes a citizen-centric approach. A citizen-centric approach in m-government service provisioning represents a transformed focus, such that service development and delivery is accomplished in a manner that citizens' needs come first relative to operational and other government needs (Gupta, 2007; Sigwejo & Pather, 2016). In Figure 7.2, a citizen-centric m-service approach that combines an experiential and e-business focus is recommended as an m-government service-provisioning approach. In applying citizen-centricity, Bertor, Estevez & Janowski (2016) propose a service co-creation strategy for government services. Osborne (2018) argues that for

successful service provision, the user must become part of the provisioning process, as service production and consumption processes take place simultaneously.

Moreover, Sigwejo & Pather (2016) emphasize that applying citizen-centricity will improve citizen satisfaction with government services, thus encouraging citizens' adoption of m-government services. It is then argued that for m-government service adoption to be enhanced, the citizen should not be excluded from m-government service provisioning processes. Citizens must be viewed as partners or co-producers in m-government service designing and development, at the same time as the ones to be served during consumption of the co-produced services (Bertor, Estevez & Janowski, 2016). Therefore, it is proposed that m-government service provision should be carried out under the public service co-creation approach that advocates for collaborative designing, development and delivery processes between government organisations, citizens and the private sector (Linders, 2012; Bertor, Estevez & Janowski, 2016). The citizen-centric m-service focus in Figure 7.2 suggests strategies must be made to ensure that actual citizens' needs together with other operational considerations for adoptable m-government services to guide provisioning, and not assumed needs, as noted in section 6.2 and 6.3, as common practice among governments.

The second component in the candidate solution constitutes an m-service provisioning strategy. The recommended strategy in Figure 7.2 is to have a provisioning framework that takes into account not only functional requirements but also citizens' cognizance and emotional requirements. As-Saber et al. (2007) emphasize that the success of e-government rests neither on technology nor people alone but rather on a socio-technical approach coupled with a citizen-centric focus. Wanjau, Wangari & Ayodo (2012) argue that to facilitate user acceptance and use, the focus in service provision needs to change from a transaction-centred (e-business) to experience-centred (e-service) focus. E-service, referred to as an m-service focus in the context of mobile services, is an approach that considers citizens' experience with their encounter with service, that is, all encounters occurring before, during and after the transaction (Rust & Kannan, 2002; 2003). Thus, traditional concerns of functionality, such as usability and usefulness, can no longer effectively predict nor explain patterns of adoption and use of interactive information systems, but rather the experience derived from use (Robert & Lesage, 2010).



**Figure 7.2:** Candidate Solution for m-Government Service Adoption – Solution Modelling

This attestation is consistent with the quantitative findings presented in section 5.5.6 which indicate that non-functional factor such as attitude influences, financial influences, subjective norms and technology effects are significantly more crucial than functional factors when making adoption decisions. According to Robert & Lesage (2010), one's experience is either an effect (psychological effect) or a knowledge gain (cognitive effect) that occurs either through direct observation by a passive user or through participation by an active user. Technology maturity concerns like fashion, fascination and desire, over and above usefulness and usability, are more and more occupying centre stage in consumer adoption decision-making processes for interactive information systems (Robert & Lesage, 2010).

Several researchers (Hazlett & Hill, 2003; Rust & Kannan, 2002; 2003; Stamenkov & Dika, 2015) suggest that service success and acceptance is increasingly becoming reliant on the quality of service and not service outcome. Hazlett & Hill (2003) argue that while the success of e-business centres on service outcomes such as transaction completion, m-services' success centres on complex services experiences, with human interaction at its centre. Narrowly viewed, m-service implies IT-driven services, infrastructure or web services; while a broader view combines the IT view, service or product, the environment and the delivery mechanism. The m-service continuum signifies that experience is more important than the technical transaction completion. Service experience is an all-encompassing concept in that it constitutes the technical quality (what/outcome), functional quality (how/process) and the image quality (who) of the provider (Wanjau, Wangari & Ayodo, 2012). Thus, citizens' experience resulting from their encounters with m-government services (the mobile application, service provision process and its support mechanisms), coupled with their perception of the image of service providing organisations, affects their mental reasoning, emotions and behavioural reactions to m-government service. According to Stamenkov & Dika (2015), the success an e-service experience depends entirely on the quality of interaction between the service, the user and the technology, in this case, the mobile technology.

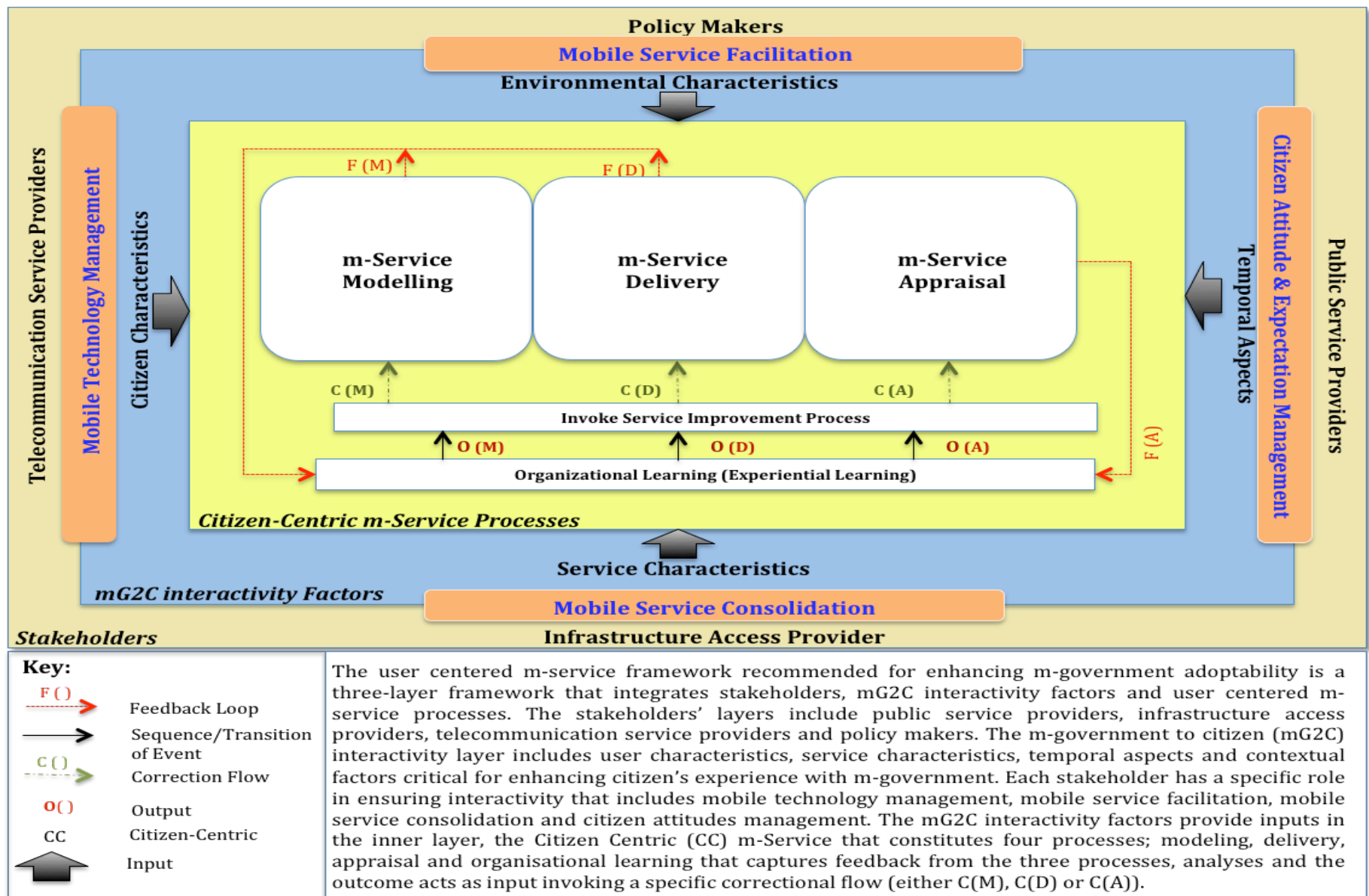
The strategy prescribed in Figure 7.2 signifies the importance of taking into account citizens' experiences when interacting with m-government services, and thus the consideration of m-government service to citizen (mG2C) interactivity factors within the provision approach. The mG2C interactivity component comprises both aesthetic and functional aspects, which

are essential parameters toward achieving a satisfactory user-experience when interacting with m-government services (Abro et al., 2015; Stamenkov & Dika, 2015). Consequently, to enhance m-government service adoptability in the Tanzanian scenario, it is recommended to incorporate principles of citizen experience that are grounded within the philosophies of citizen-centricity and m-service, as presented in Figure 7.2, in implementing m-government services.

#### **7.4 Framework for Enhancing m-Government Service Adoptability**

In this section, the candidate solution in section 7.3 that addresses the modelled adoption problem is presented in the form of a framework to facilitate service provision. A framework provides a detailed description of the solution; it indicates different components, processes as well as the sequence of execution of the processes, thus aiding provisioning (Farley et al., 2013). The solution in Figure 7.3, while in essence, capturing the focus that m-government service provisioning organisations need to adopt, that is, the citizen-centric m-service approach, it highlights neither the stakeholders and their vital roles nor the processes and the sequence upon which execution should take place. Since citizen experience is a critical parameter for adoption decision-making (Robert & Lesage, 2010), the proposed framework captures several elements critical for a positive citizen experience. The proposed user interactive service-provisioning framework is based on the candidate solution recommended in section 7.3 (Figure 7.2).

Moreover, the framework is informed by five streams of knowledge namely, the empirical findings of the research (section 6.3 and section 6.4), the diffusion of innovation theory by Rogers (1995), the m-government service value chain model by Susan Cable (OECD/ITU, 2011), the e-service domain by Rust & Kannan (2002; 2003) and the citizen-centricity philosophy (Gupta, 2007; Abro et al., 2015; Bertor, Estevez & Janowski, 2016; Zarour & Alharbi, 2017). The framework in Figure 7.3 is an interplay of three building blocks, that is, the stakeholders, the m-government service to citizen (mG2C) interactivity factors critical in defining the quality of interaction (citizen experience), and lastly, the citizen-centric m-service processes.



**Figure 7.3:** User Interactive Service-Provisioning Framework for m-Government Services

The central premise on which the user interactive service-provisioning framework in Figure 7.3 is proposed is that adoption is a result of a positive citizen experience; citizens' experiential satisfaction with m-government services is what attracts new and retains existing users (Robert & Lesage, 2010; Abro et al., 2015; Stamenkov & Dika, 2015; Zarour & Alharbi, 2017).

Findings in section 6.2 and 6.3 indicate that the current mismatch between the service providers' focus and citizens' expectations on m-government service is what inhibits mass adoption of m-government services in Tanzania. In a service environment, citizens are more interested in both functional successes and the experience they obtain from utilizing the service, to judge the quality of service (Rust & Kannan, 2003; Hassenzahl & Monk, 2010; Stamenkov & Dika, 2015). The user interactive service-provisioning framework (Figure 7.3) is centred on achieving the experiential focus. Factors like past experience with the service provider (government and other implementing stakeholders), level of optimism or discomfort in a service usage or the technology that the service is embedded in are critical in defining the citizen's experience (Abro et al., 2015). Apart from defining citizens' experience, these factors are also what translate to users' attitudes towards an array of service elements, including security, performance, user knowledge and skill level as well as the available level of support.

The proposed user interactive service-provisioning framework in Figure 7.3 consists of three layers; stakeholders, mG2C interactivity factors and the citizen-centric processes. The first layer, that is, the outer layer, comprises stakeholders that are critical to positive citizen experience with m-government services. While there are many stakeholders, as identified in the m-government service value chain (OECD/ITU, 2011), in the recommended framework (Figure 7.3), they are grouped into four groups, with a focus to serve citizens. These are policymakers, public service providers, infrastructure access providers and telecommunication service providers. However, the stakeholders' layer in Figure 7.3 indicates explicitly only four categories of stakeholders. It is important to note that the entire user interactive service-provisioning framework is centred on the citizen who is implicitly accounted as a critical stakeholder for m-government service adoption. The second layer, an intermediate layer, comprises the interactivity factors that influence the m-government-to-citizen interactions, which according to Abro et al. (2015) include citizen characteristics,

service characteristics, context and temporal aspects (past experiences). Lastly, the third layer, the innermost layer of the framework, consists of the citizen-centric m-service processes in the sequence of execution. The citizen-centric m-service processes comprise processes involved in implementing m-government services, such as modelling, delivery and appraisal. While Figure 7.3 provides an abstracted version of the user interactive service framework, the detailed discussion of the framework layers is presented and discussed in sections 7.4.1 to 7.4.3. Section 7.4.1 discusses the stakeholders, section 7.4.2 presents the mG2C interactivity factors, section 7.4.3 and its subsections (7.4.3.1 to 7.4.3.3) unpacks and discusses the citizen-centric processes, and finally, section 7.4.4 presents the consolidated user interactive service-provisioning framework.

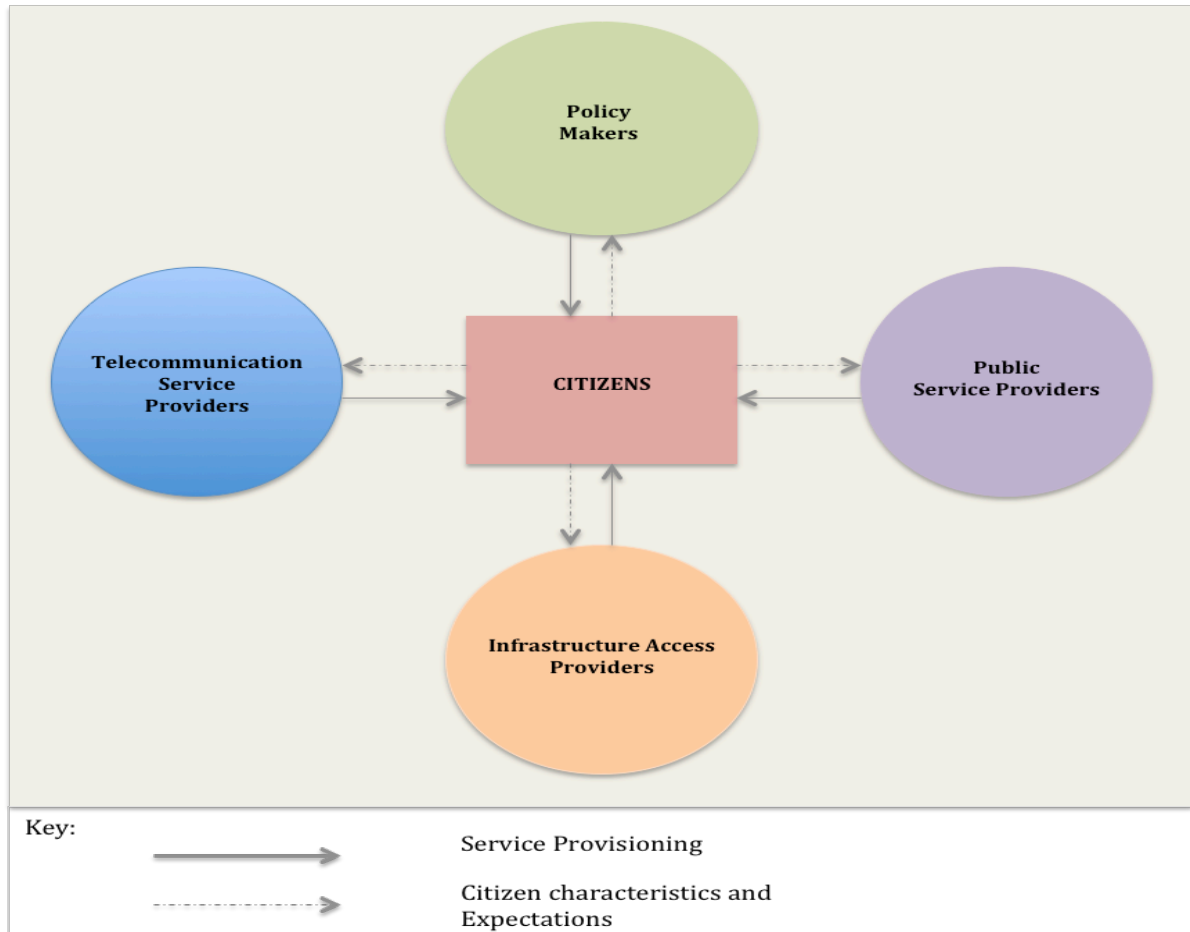
#### **7.4.1 Stakeholders for m-Government Service Adoptability**

This section presents and discusses the outer layer, the stakeholders' layer of the user interactive service framework presented in Figure 7.3. The value derived from consuming a service is an essential determinant of service quality. However, the quality of value creation and delivery processes is dependent on the contributions of various parties involved. It is thus critical to consider stakeholders involved in the m-government service value creation process. In Figure 7.4, the study recommends four categories of stakeholders that are critical in providing satisfactory m-government services to citizens, which include policymakers, public service providers, infrastructure access providers and telecommunication service providers.

The mobile value chain model by Cable in the OECD/ITU (2011) report identifies stakeholders in the creation of value for mobile services. However, in this study, the stakeholders critical in facilitating m-government service adoptability are clustered into five categories. While citizens are recommended as the centre upon which m-government service value creation should focus, Cable's value chain model for mobile services only considers the citizen as the recipient of value (OECD/ITU, 2011). The mobile value chain is, however, silent on the inclusion of citizens in the provision processes. Considering citizens as mere service value recipients, and not stakeholders within the value creation processes, obstructs the ultimate citizen experience in the resulting m-government service. Several researchers stress the importance of citizen inclusion in deriving the ultimate citizen experience achievable through service co-creation within citizen centricity philosophies (Bertor, Estevez



& Janowski, 2016; Grönroos & Voima, 2013; Linders, 2012). They argue that service production and consumption are inseparable processes at the moment of consumption. Consequently, the role and contribution of each party in the provisioning process leads to the creation of the desired service value. Therefore, the proposed framework identifies five stakeholders, of whom four focuses on serving citizens on the provisioning of m-government services; these include telecommunication service providers, infrastructure access providers, public service providers and policymakers.



**Figure 7.4:** Stakeholders for m-government service Adoption

#### 7.4.1.1 Citizens

Citizens are an essential element in deriving public value for public services (Althaqafi, Foster & Rahim, 2018; Merickova, Svidronova & Nemec, 2016; Grönroos & Voima, 2013; Osborne, 2018). Similar to Klievink, Bharosa & Tan (2016), citizens are instrumental in the realisation of public value for public-private information platforms. Citizens assume various

roles in public service delivery, including value creation (Grönroos & Voima, 2013), collaborative partners (Baumer, Sueyosh & Tomlinson, 2011; Voorberg, Bekkers & Tummers, 2015) and as active agents (Gebauer, Gustafsson & Witell, 2011). Excluding citizens in m-government service provisioning deprives service designers, developers and administrators of the necessary knowledge critical for defining service and interaction requirements between citizens, technology and service during the provision-consumption moment. Grönroos & Voima (2013) argue that service firms can only provide value propositions or mechanisms which citizens can utilize through co-creation approaches to create their desired value. Likewise, Merickova, Svidronova & Nemec (2016) assert that through value co-creation, citizens can utilize provided service value schemes to derive their desired value thus influencing their level of satisfaction. In a non-physical product environment with service as the main product, citizens are a critical part of the value production process. The proposed user interactive service-provisioning framework in Figure 7.3 considers citizens as a vital provisioning member within the value chain process for m-government service adoption. However, while other stakeholders are explicitly indicated in the proposed framework, citizens are not explicitly indicated in the framework as they form the central point upon which the entire framework is designed, thus the name user interactive service framework. Consequently, in order to achieve a positive citizen experience, the actions and activities of other stakeholders must be centred on serving citizens as the focal point as depicted in Figure 7.4.

#### **7.4.1.2 Telecommunication Service Providers**

Telecommunication service providers (TSP), on the other hand, include both Internet service providers (ISP) and mobile service providers (MSP). In a public sector setting, these are usually two different stakeholders; however, there are some instances where they may be one company. According to Olla & Patel (2002), ISPs facilitate connectivity to the Internet and the world at large, MSPs are responsible for facilitating mobile network connectivity, including wireless and mobile phones. The telecommunication service providers' cluster has direct access to citizens, as opposed to any other group of stakeholders. Telecommunication service providers affect the quality of m-government services in two ways; first, the ISPs are responsible for the connectivity between access infrastructure and public services providers; and second, the MSP is the one with the extensive network of the mobile technology

subscribers, thus a gateway to accessing citizens. Telecommunication service providers directly influence the quality of the channel for delivering m-government services to citizens (OECD/ITU, 2011). The mGov platform needs to subscribe to a wide range of telecommunication service providers to ensure that the m-government services are accessible to a diverse range of citizens. In Tanzania, major telecommunication providers in Tanzania include Tanzania Telecommunication Company Limited (trading as TTCL), Vodacom Tanzania Limited (trading as Vodacom), MIC Tanzania Limited (trading as tiGo), Zanzibar Telecom Limited (trading as Zantel), and Viettel Tanzania Limited (trading as Halotel) (URT, 2015).

#### **7.4.1.3 Infrastructure Access Providers**

In Figure 7.4, infrastructure access providers (IAP) provide connectivity between public service providers and the telecommunication companies. These include government organisations or outsourced private entities charged with the responsibility of administering the infrastructure for mobile connectivity to existing government electronic platforms. In the case of Tanzania, the mGov platform provides connectivity between the existing electronic government systems and public networks (URT, 2015). According to OECD/ITU (2011), for security purposes to government systems, the government provides an additional layer of access or connectivity with the public domain. The infrastructure access platform is a gateway for m-government services to connect to public telecommunication networks for public accessibility (refer to Figure 7.4).

Moreover, mobile infrastructure access platforms provide the structure in which government services are embedded to provide services through the mobile channel to public networks. For instance, the mGov platform acts as an infrastructure for which public services tailored for mobile phone provision are embedded on it to allow connectivity to public telecommunication networks (URT, 2015). As a government gateway to the public domains, infrastructure access providers influence the quality of m-government services (OECD/ITU, 2011). Thus, the proposed user interactive service-provisioning framework in Figure 7.3 considers infrastructure access providers as crucial stakeholders for m-government service adoptability as they connect m-government service providers and telecommunication companies to host citizens, as indicated in Figure 7.4.

In the case of Tanzania, eGA is an example of an IAP as it is responsible for providing connectivity between various government organisations via the mGov platform to mobile phone networks in the provision of m-government services. The mGov platform is an example of infrastructure access, which connects several public services to mobile networks subscribers. The public services include the voters register from the National Electoral Commission (NEC) and LUKU service for electric bill settlement from Tanzania Electric Supply Company Limited (TANESCO), while the mobile subscribers may subscribe to mobile companies like Vodacom, TTCL, tiGo, Zantel and Halotel in Tanzania (URT, 2015; URT, 2017). Moreover, as findings in section 6.2 indicate there is neither a centralized nor a structured citizen support system for m-government services, eGA is recommended to take the leading role in establishing and facilitating coordinated efforts in supporting citizens in using m-government services. The leading role can be in the form of establishing a centralized citizen help desk that receives and routes citizens' queries from m-government services. The help desk can also serve as a point for assessing citizens' service experience for future improvements.

#### **7.4.1.4 Public Service Providers**

Public service providers (PSP), these are government organisations custodian of a given public service to be channelled and provided via a mobile platform. Public service providers are responsible for specific public services such as the voters' register, LUKU or the public sector recruitment portal, which are available on the mGov platform. Consequently, in Figure 7.4, the public service provider layer connects to the gateway, the infrastructure access layer, to access public networks. Public service providers include government organisations and third-party organisations commissioned to provide certain public services on behalf of the government (OECD/ITU, 2011). The responsibility of designing, development and administration of m-government services lies with the public service providers; thus, their role is critical in m-government service adoption. Tasks like identification of citizen needs, service requirements identification and government-to-citizen interaction needs are the sole responsibility of public service providers. Moreover, they have the responsibility of overseeing the daily administration and delivery of public services. Due to their role, public service providers influence the quality of the resulting m-government service, either

internally or externally developed through outsourcing, thus affecting its adoptability (EOCD/ITU, 2011).

In Tanzania, public services are attached to a specific public office that includes ministries, departments or agencies (MDAs). These MDAs exhibit different resource levels in facilitating m-government services provisioning, such as finance and a skilled workforce to support provisioning (URT, 2017). However, variation in the success of various provided m-government services in Tanzania is noted. While some m-government services record success, such as the secondary examination results service by the National Examinations Council of Tanzania (NECTA), others have recorded limited if not non-existent success (Ishengoma, Mselle & Mongi, 2019). These variations in success are partly associated with the resources within MDAs (Ishengoma, Mselle & Mongi, 2019). However, while the proposed framework does not address the variation in resources among MDAs, it creates awareness of the resource requirements and thus advocates for collaborative and partnerships among stakeholders in provisioning m-government services.

#### **7.4.1.5 Policy Makers**

The prescribed user interactive service-provisioning framework in Figure 7.3 acknowledges that m-government services are operated and consumed within a regulated context. Consequently, the framework acknowledges policymakers as essential stakeholders in m-government provisioning. Policies, regulations and laws that guide the conduct of provision and consumption also guide the environment in which m-government service is provided, thus influencing value definition and creation for m-government services (EOCD/ITU, 2011). The Tanzania Communications Regulatory Authority (TCRA) established in 2003, is the authority regulating the ICT sector in Tanzania (TCRA, 2015). TCRA, together with other law-enforcing organs, use policy instruments such as the National ICT policy of 2003, the cybercrime act of 2015, the Electronic and Postal Communications Act (EPOCA) of 2010 and other policy instruments to regulate and define the m-government service environment in Tanzania (Esselaar & Adam, 2013). Currently, the e-Government Agency (eGA) coordinates ICT implementation activities within MDAs. Despite acknowledging successfully coordinated activities, in line with Lubua (2017), more collaboration and coordination is required to build internal capacities of public organisations to manage the utilisation of ICT tools for public service provision. Similarly, as finance influences emerge as a critical

determinant of citizens' adoption criteria, it is recommended that TCRA review and institute pro-competitive measures towards reliable mobile services at cost-effective yet affordable rates.

#### **7.4.2 mG2C Interactivity Factors for m-Government Service Adoptability**

The proposed solution to citizens' challenges in m-government service adoption proposed in section 7.3 highlights that to enhance m-government service adoptability; a positive citizen experience during and after interaction with m-government services is necessary. Thus, it is crucial to identify and ensure achievement of factors that define the interaction between citizens and m-government services. This section discusses specific factors that are critical in citizen–m-government service interaction. In line with Zahidi et al. (2014), factors influencing citizens' experience during and after interaction with m-government service are essential determinants of the quality of service provisioning. Consequently, the user interactive service-provisioning framework's (Figure 7.3) second layer proposes consideration of the m-government to citizen (mG2C) interactivity factors in the provisioning process. According to Abro et al. (2015), citizens' experience evolving during and after interaction with public services is influenced by factors that relate to citizens, public service, service provider and the environment in which the service is provided or consumed.

Several classifications of interactivity factors exist; however, the similarity between the different classifications led the proposed user interactive service-provisioning framework in Figure 7.3 to combine these factors. For instance, situational factors by Karapanos et al. (2010) and context by Abro et al. (2015) both reflect policies, laws and regulations defining the environment of public service provision and consumption; likewise individualistic factors and user characteristics both relate to citizens' diversity, such as skill levels and readiness to access and use services provided through mobile phones. Thus, mapping interactivity factors based on their description yielded four main factors; citizen characteristics, service characteristics, context and temporal aspects (Figure 7.3). To allow for a broader consideration of service issues that span beyond technical and technological issues, such as partnerships and collaborations among provisioning stakeholders, a service characteristics perspective is adopted. A service characteristic combines aspects related to system characteristics and product characteristics, thus addresses a diverse set of factors. Moreover, the proposed framework in Figure 7.3 recommends specific stakeholders' roles

(responsibilities) to ensure the achievement of these interactivity factors. Mapping stakeholder-to-interactivity factors, four specific roles are identified, which include mobile technology management, mobile service consolidation, citizen attitudes and expectation management, and mobile service facilitation. However, it is essential to note that these roles are not mutually exclusive to a specific stakeholder, but the mapping only recommends the leading and facilitating stakeholder. The four factors within the mG2C interactivity layer as well as the leading and facilitation roles of stakeholders in ensuring the achievement of these interactivity factors are extensively discussed in subsections 7.4.2.1 to 7.4.2.4.

#### **7.4.2.1 Citizen Characteristics**

The user base for m-government services is extensive, spanning all works and classes of people, due to its minimal requirements in technological knowledge, skill, as well as a minimal financial investment compared to other e-government services (Shareef et al., 2016). Citizens require money to invest in purchasing a mobile phone and loading airtime or credit to be connected either to voice or data services, which in most cases is significantly lower compared to other e-government services that require investment in computers. Therefore, m-government services attract a diverse set of users with different emotions and cognitive abilities associated with their personality, demography, income, and functional and affective goals and needs which collectively build a natural capacity for interactivity with systems (Abro et al., 2015). Thus, an m-government service user may fit in any of the four profiles; namely a novice, an expert, experienced, or a focus group. Whereas the broader user base coverage is advantageous in the provision of public services, it presents altogether a new set of complexities in capturing and addressing the diverse user perceptions and expectations of mobile-enabled public services (Abro et al., 2015; Shareef et al., 2016).

However, it is based on user characteristics or profiling that the quality of public service, as well as mobile technology used, that m-government services should be designed and provisioned. Yonazi, Sol & Boonstra (2010) and Dawe & Zlotnikova (2014) revealed low income, low digital literacy or human capital index, limited awareness, limited trust in government electronic services, and high preference of face-to-face communication rooted within the culture, to be dominant characteristics describing citizens of Tanzania. Thus, the recommended framework in Figure 7.3 emphasizes that the design and provision process for m-government services should make a critical and considered analysis of the intended or

envisaged m-government service users – the citizens. Based on user characteristics, it is recommended that quality descriptors for service as well as the technology in use for delivering the service should be defined. Thus, for m-government service adoption, it is recommended that the interaction between telecommunication services providers and service user characteristics should form the basis for formulating mobile technology management guidelines. These guidelines must take into account the characteristics of various users of m-government services in order to define determinants of telecommunication quality that telecommunication services providers will be expected to accomplish as minimum, or acceptable mobile service quality, for m-government services provision.

#### **7.4.2.2 Service Characteristics**

The user interactive service-provisioning framework in Figure 7.3 recommends consideration of service characteristics when defining m-government-to-citizen interactions. Service characteristics comprise a combination of system characteristics or product characteristics and stakeholders' collaboration and partnership aspects. In line with Xu (2014), the proposed framework gives attention to descriptors of service quality as critical factors for enhancing citizens' experience and not just system characteristics. According to Knijnenburg et al. (2012), system characteristics are an essential aspect of enhanced user experience. System quality characteristics include both physical and software related characteristics. The physical characteristics include the physical descriptions of the system that may include system aesthetic, shape, size or the orientation of the system. Software characteristics, on the other hand, reflect the ability of what the system can do, such as the processing ability. Karapanos et al. (2010) argue that these factors directly or indirectly limit the interactivity capabilities of users, which affect their performance and behaviour towards an interactive system, thus influencing their adoption decision.

However, while system or product characteristics are critical in determining citizens' experience in an interactive system, it only describes a narrower context, especially in a public service environment. To accomplish a public service, in most cases, it involves collaboration and partnerships between government organisations and private entities in the process. For instance, to implement LUKU, a service by Tanzania Electrical Supply Company Limited (TANESCO), it involves collaboration and partnerships between TANESCO a government organisation, eGA for the mGov infrastructure, the government



electronic payment gateway (GePG) hosted by the Ministry of Finance, and mobile phone operators. Thus, issues of collaboration, cooperation, partnerships and systems' interoperability among implementing stakeholders are crucial over and above the physical and software capabilities of the system. A service consolidation strategy for m-government services arising from the interplay between service characteristics and infrastructure access providers is recommended for m-government service adoption. Since infrastructure access providers act a government gateway to the private sector and the public, they are therefore at the ideal position to effectively and efficiently consolidate service inputs between public service providers, telecommunication providers and the policymakers. Reflecting on the current m-government service provision, eGA, the coordinating organ for all ICT implementation within the government of Tanzania, is strategically situated to facilitate and coordinate cooperation and collaboration among various service-provisioning organisations. Consequently, it is recommended that infrastructure access providers take up the role of developing and implementing a mobile service consolidation strategy to facilitate and manage issues related to provisioning partners' system interoperability, collaborations and partnership.

#### **7.4.2.3 Environmental Characteristics**

To ensure citizen satisfaction with m-government services arising from positive experiences and thus adoption, consideration must also be made on the environment or context regulating its provision and consumption. The citizen-centric model in Figure 7.3 recommends consideration of context defining factors while provisioning m-government services. In line with Engl & Nacke (2013), the context in which m-government services are provided and consumed plays an essential role in influencing the derived experience. Context can be viewed in different perspectives including socio-cultural context, which implies users' personality such as attitudes, lifestyle, self-image, values and prior experience; and the service context which implies system qualities such as availability, security, network connectivity and privacy (Reiter et al., 2014). Considering these perspectives, context is thus defined as the conditions of the environment in which interaction takes place, which may include the physical environment, time, use purpose as well as policies, rules and regulations (Abro et al., 2015; Engl & Nacke, 2013; Reiter et al., 2014). Collectively these conditions contribute to citizens' adoption through the creation of various types of experiences (Engl &

Nacke, 2013).

In designing, developing and providing m-government services for a positive citizen experience, government organisations must consider the context in which services will be provided and consumed. Currently, the limited awareness indicated in section 6.2 reflects poorly on the socio-cultural context of m-government services. Thus, the proposed framework recommends a consumption facilitation role for policymakers in ensuring the context for m-government services is supportive and encourages citizens' adoption. Policymakers must take into consideration several context-defining variables for m-government services, to ensure they are incorporated in policy tools like cyber policies, rules, regulations and laws. Reflecting on the case of Tanzania, a consideration of policy instruments like the national ICT policy (2003), the cybercrime act of 2018, the national e-government strategy (2013), the Tanzania Communication Regulatory Authority Act (2003), the Electronic and Postal Communication Act (2010) and other related legal and regulatory tools, must be harmonized such that a positive citizen experience is ensured. Regulatory agencies such as the Tanzania Communications Regulatory Authority (TCRA) and similarly e-Government Agency (eGA) must ensure that the legislative environment facilitates consumption while at the same time eliminates any possibility of criminal acts. It thus recommended for policymakers to establish a mobile service facilitation strategy that ensures an adaptive environment for m-government services. To enhance citizens' adoption, the political, economic, social and technological context must be supportive of m-government service consumption.

#### **7.4.2.4 Temporal Aspects**

The last mG2C interactivity factor that the citizen-centric m-government service provisioning framework (Figure 7.3) recommends is the temporal aspect. This factor accounts for the influences of time on citizens' experience with interactive services. Experience is associated with time; thus, time is a critical factor in determining citizens' experience with m-government services. According to Karapanos et al. (2010), the experience is a reflection of change over a time interval.

Furthermore, Hassenzahl & Monk (2010) argue that experience cannot be described without being related to a timeframe. Time provides a reference point for one's experiences; that is,

past, present or future experience. Abro et al. (2015) argue that history or past experiences one has of a public service or a government organisation affects their current perceptions and decisions about service, thus shapes their current experience. Negative past experiences discourage future access and use of the service, as it builds negative pre-conceived opinions and expectations of public services, thus limiting expectations of positive experiences in current or future services cycles.

The citizen-centric framework recommends a mechanism to capture citizens' temporal experiences with public service and government organisations, to ensure issues are addressed as they affect citizens' overall experience with m-government services. Consequently, to enhance the overall m-government service experience, consideration of citizens' past encounters with government organisations and perception of the public service and the overall government must be made. In line with Roto et al. (2011), it is recommended that there be a mechanism that allows for a shorter time to capture citizen's emotional feedback, and more extended periods for providing information on the cumulative impact on user-experience. Thus, m-government service provisioning partners need to implement feedback mechanisms that trace periodic as well as summative citizens' experiences within the m-government service provisioning process. Capturing of citizens' past or temporal experiences with m-government services will facilitate predictions of adoption decisions, and thus instigate the necessary measures to enhance adoption.

The citizen-centric m-government service provisioning framework thus recommends for citizen attitude and expectation management that focuses on managing citizens' past encounters and perceptions of government organisations, government as a whole, and public services provided. In Figure 7.3, implementation of citizen attitudes and expectation management is the responsibility of public services providers, arguing that they should strive to ensure a positive image and perception of their operations. Consequently, government organisations (public service providers) are urged to strive and use past/historical experiences and perceptions to shape and improve future citizen experiences. In addition to the stakeholders, their roles and the mG2C interactivity factors, identified as the citizen-centric framework in Figure 7.3, guides the m-government service provision processes, that is, m-government service modelling, delivery and appraisal processes. Stakeholders, stakeholders' roles and the mG2C interactivity factors identified as crucial for m-government service

adoption, act as inputs to these processes. A detailed discussion of the three processes is presented in section 7.4.3.

### **7.4.3 Citizen-centric m-Service Processes for m-Government Service Adoptability**

The proposed framework (Figure 7.3), apart from identifying stakeholders and mG2C interactivity factors as well as the stakeholders' roles in achieving the mG2C interactivity factors, also describes provisioning processes for enhanced citizen adoption of m-government services. This section presents user interactive service-provisioning processes for m-government service provision, as mapped on the inner layer of the recommended framework, to complement existing processes in m-government service provision. Three processes recommended are m-government service modelling, delivery and appraisal processes. The proposed processes address the identified problem in Figure 7.1, that is, the mismatch between provision focus and consumer expectations as a result of challenges facing citizens, as discussed in section 6.4. In the candidate solution in Figure 7.2, it is recommended that an m-service focus centred on citizens' needs, that addresses functional, cognizance and emotional requirements for m-government services, will address the mismatch and thus enhance its adoption. This section unpacks the various processes to be undertaken in ensuring the provision of m-government services. These processes are to be executed by m-government service provisioning stakeholders, each with specific roles as identified in section 7.4.1. Citizens' needs should guide the processes for enhanced m-government service adoption; that is, the service needs should be centred on achieving a positive citizen experience in interacting with m-government services, as discussed in section 7.4.2. m-Government services are but a type of interactive systems whose user-experience is vital in developing a strategy to attract new users and retain existing users.

In line with Grönroos & Voima's (2013) and Bell & Nusir's (2017) arguments on adapting m-service focus, coupled with the foundations provided by Rogers (1995) of considering factors that influence technology diffusion at early stages in the development of an innovative solution, three citizen-centric processes in Figure 7.3 are recommended. Rogers (1995) described an innovation model as a simple linear model with three sequential phases, namely, idea innovation, development and diffusion. Rogers (2003) argues that consideration must be made, as early as idea conception, for the innovative solution in order to influence diffusion and hence adoption. An innovative solution begins with an idea, usually to solve a

social problem, which is refined into a design and developed into an artefact (a product or a service); the artefact is then tested against the idea before being made available for use (Rogers & Scheemaker, 1971). Applying similar thinking, the framework in Figure 7.3 argues that stakeholders must ensure incorporation of the mG2C interactivity factors within a citizen-centric approach, throughout the provisioning process for m-government services.

Bell & Nusir (2017) propose co-designing that evolves in five stages, namely, co-discover, co-define, co-design, co-develop and co-deliver, as an alternative approach for m-government service provision. However, implementing citizen-centricity presents several challenges in terms of time and finance in that it takes a longer time, and it is expensive to ensure active citizen involvement in development processes (Bell & Nusir, 2017). In m-government service provision, several important questions must be attended to in applying this approach; such as at what stages or events is it necessary to involve citizens, which citizens to involve, how and when to involve them in the provisioning process? To strike a balance on these challenges, the framework in Figure 7.3 recommends and captures three critical processes in which citizens must be engaged; requirements identification, definition and confirmation. In the requirements definition stage, techniques such as citizen shadowing and diaries, both functional and aesthetic citizens' needs, are elicited and defined. Likewise, in the service interactivity designing, citizens should be involved through the use of techniques such as use case definition and citizen service journey simulations to capture interactivity requirements for m-government services. Finally, citizens should be involved in the requirements confirmation stage through techniques such as service prototype testing and evaluation to confirm citizens' aesthetic needs, functional needs as well as interactivity needs. Thus, the recommended citizen-centric m-service modelling processes can be achieved. The co-provision process provides a learning opportunity to parties, citizens and other stakeholders, for further improvement of the service experience. Therefore, the proposed framework clusters these processes into three phases; the citizen-centric m-service modelling, delivery, and appraisal processes.

Figure 7.3 thus recommends three clusters of processes that are centred on the combination of the principles of citizen-centricity in m-service focus. The m-service focus argues that m-government service provisioning processes must ensure achievement of functional, cognitive and emotional requirements of service (Abro et al., 2015; Robert & Lasage, 2010;

Stamenkov & Dika, 2015; Wanjau, Wangari & Ayodo, 2012). However, to achieve the m-services focus, a citizen-centric approach, whereby citizens become the centre for designing the provisioning processes, is necessary (Gupta, 2007; Bertor, Esteves & Janowski, 2016). Under the user interactive service-provisioning approach, citizens' needs become the organizing principles around which public needs and interests are determined, and the appropriate delivery channels are planned for public services. The recommended framework promotes a deeper understanding of psychological, organisational, social and ergonomic factors that affect citizens' adoption (Bell & Nusir, 2017). The various processes within the phases of citizen-centric m-service modelling, m-service delivery and m-service appraisal, are unpacked and discussed in subsections 7.4.3.1, 7.4.3.2 and 7.4.3.3, respectively.

#### **7.4.3.1 m-Service Modeling Processes**

This study recommends that citizen adoption issues need addressing as early as during m-government service designing. To complement existing designing and modelling strategies for m-government services, the user interactive service-provisioning framework proposes citizen-centric m-service modelling processes. Figure 7.5 indicates processes recommended to ensure achievement of the identified mG2C interactivity factors for a positive citizen experience. In the proposed provisioning framework for m-government service adoptability, citizens are critical for m-government service success. A citizen-centred approach that is jointly bringing together elements that lead to value creation for m-government service is essential in enhancing m-government service adoptability (Bell & Nusir, 2017; Grönroos & Voima, 2013). Moreover, Sharma & Pandey (2013) suggest that requirements engineering processes, which include elicitation, analysis and negotiation, documentation, validation and management of requirements, is a critical stage in determining system success. Consequently, Yang (2016) fundamentally contends that for real public value to be derived, citizens' participation and not representation is essential. Therefore, to influence citizen adoption of m-government services, four processes are recommended for a citizen-centric m-service modelling phase (Figure 7.5); that is, citizen-centric (CC) requirements elicitation, requirements definition, service interactivity, requirements definition and requirements confirmation processes.

A citizen-centric requirement elicitation process proposed in Figure 7.5 advocates for citizens' inclusion in the idea identification and justification for implementing the innovative

idea. The citizen-centric requirements definition process involves the inclusion of citizens in determining functional, emotional and cognitive needs for m-government services. The process for collecting service interactivity requirements advocates a citizen inclusion in defining user-system interaction requirements for a positive citizen experience. Collaborative techniques such as brainstorming, joint application development (JAD), and prototyping are useful approaches for involving citizens in establishing service requirements (Sharma & Pandey, 2013). Specific prototyping techniques like low fidelity prototyping or throwaway paper prototyping (Sharma & Pandey, 2013) are recommended for capturing citizens' and service needs. Likewise, citizen walkthroughs, citizen shadowing, and citizens' service journey diaries (van Velsen et al., 2009) are recommended for profiling and establishing service interactivity requirements.

**Figure 7.5: m-Government Service Modelling Processes**

needs as users, as well as against technical services needs. The output of this phase (denoted as connector 1 in Figure 7.5) is a set of service requirements, which is a combination of citizens' requirements and system requirements that acts as an input in the service development and delivery phase.

The proposed m-government service modelling phase in Figure 7.5 is in a constant evaluative state against citizens' expectations. In line with Kirwan's (2016) attestation of the benefits of organisational learning, it is recommended to have a feedback loop  $F(M)$  that allows various provisioning stakeholders to assess the modelling processes through their experiences with the process and its outcomes. The gathered unmet service needs, including unmet citizen expectations noted as output  $O(M)$  of the organisational learning process in Figure 7.5, invokes a service improvement process that sends a correction flow  $C(M)$  to trigger a citizen-centric requirement elicitation process for the unmet needs.

#### **7.4.3.2 m-Service Delivery Processes**

Figure 7.6 describes processes complementing existing m-government service development and delivery processes to enhance citizens' adoption. This phase takes output noted as 1 from the modelling phase as input. Among the identified challenges hindering citizen adoption noted in section 6.4 is the citizen unpreparedness, that is, limited knowledge regarding m-government services. Thus, the recommended processes in this phase address this challenge. Three processes are recommended in relation to m-government service development and delivery; these are service knowledge commodification, citizen-centric knowledge dissemination and citizen-centric value propositions delivery (Figure 7.6).

The delivery phase processes are centred on empowering citizens with knowledge for general awareness and skills building regarding using m-government service, within the value co-creation premise. According to William & Dickinson (2010), codification and contextualisation of knowledge required for technology use facilitate the adoption of the resulting innovation. Therefore, a knowledge management strategy that guides the development and dissemination of knowledge is necessary to manage citizens' expectations (Melin & Axelsson, 2009; Williams & Dickinson, 2010). Traditional knowledge management models adhere to a supplier-centred focus with limiting the contextual definition of the knowledge generated and a non-interactive dissemination strategy grounded



within the broadcaster-receiver approach (Harfouche & Robbin, 2015; Bui & Levy, 2017). Practice shows that suppliers tend to oversimplify knowledge, with a great deal of emphasis on implementation and the advantages thereof, such that adopters adopt with very little understanding (Bui & Levy, 2017).

Nevertheless, the contribution of these models is on highlighting the importance of social networks for knowledge development and dissemination (Newel, Swan & Gallier, 2000). Actively involved citizens in unpacking and designing m-government services and the required knowledge about the service, become active knowledge disseminating agents as a result of the process that ownership has built. Thus, delivery phase processes proposed are citizen-centred, whereby citizens are involved from the point of knowledge generation, to knowledge dissemination, and finally in the service value creation.

The first process in the m-government service delivery phase is the service knowledge commodification process. In line with Melin & Axelsson (2009), a service knowledge commodification for m-government services is proposed as the first stage of knowledge and skills management (refer Figure 7.6). Service knowledge commodification entails a knowledge building process through socially constructed meanings and understandings, as well as skills related to the practical use, performance and efficiency derived from using m-government services (Newel, Swan & Gallier, 2000; Melin & Axelsson, 2009). The recommended m-government knowledge development process centres on the generation of shared meanings among citizens and m-government service stakeholders; this includes the definition of perceived and actual fundamental operational related attributes (that is affordance) that determines what a given m-government service can do and how one can use it. The proposed processes emphasize the collective cognitive outlook of m-government services among stakeholders.

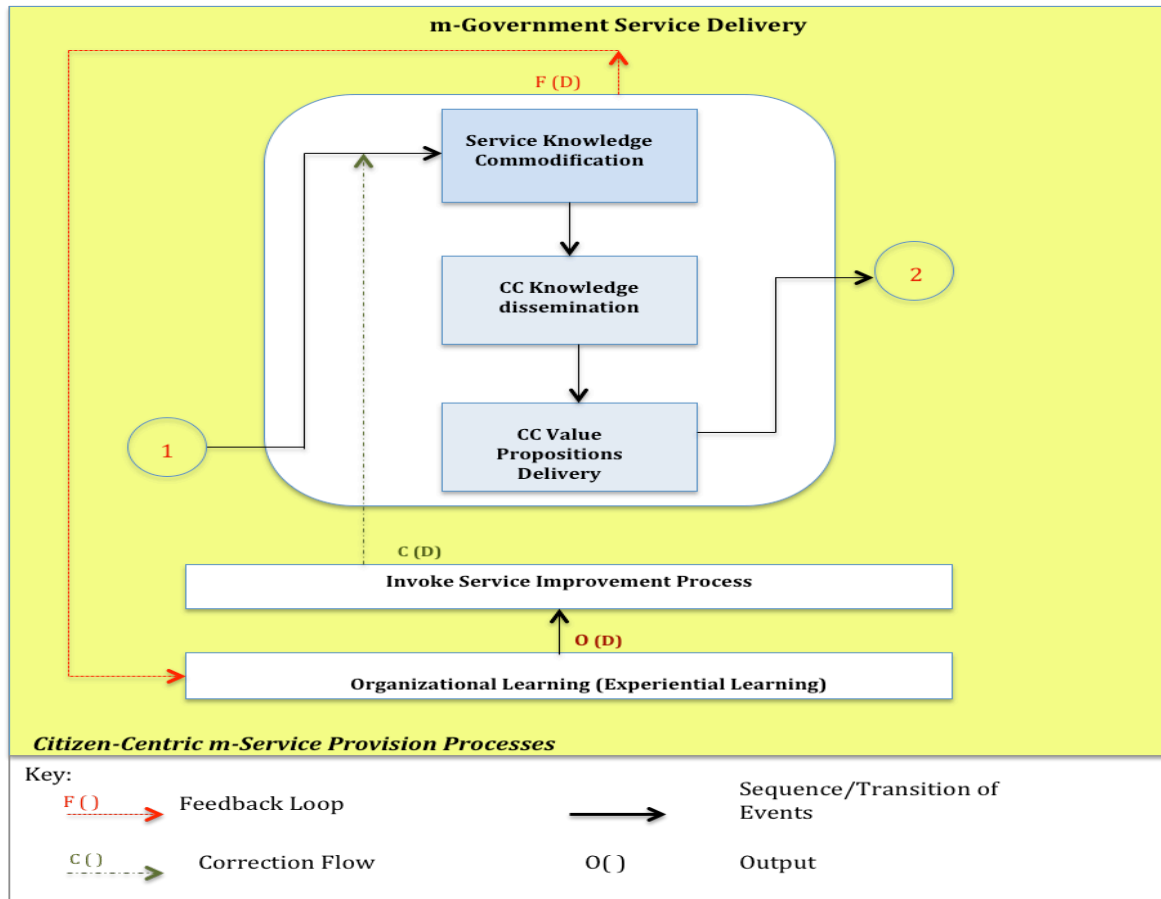
The commodified jointly-constructed knowledge regarding m-government services then flows to the second process in the m-government delivery phase, that is, the citizen-centric knowledge dissemination processes, to be distributed (Figure 7.6). The knowledge dissemination process proposed in Figure 7.6 centres on utilizing social networks that are using social change agents both within and beyond the boundaries of implementing organisations. Thus, it is recommended to utilize social change agents, both robust ones (leaders) on a contractual basis, as well as the non-contractual ones. The non-contractual

ones are those identified through exploring social links among individuals across communities or organisations that would generally make business contact daily. The non-contractual change agents are essential for promoting rapid diffusion of innovation, as a result of the built confidence and trust in the advocated innovative solutions (Newel Swan & Gallier, 2000; Harfouche & Robbin, 2015; Bui & Levy, 2017). Findings in section 5.5.6 indicate subjective norms to be among factors that significantly influence citizens' adoption decisions for m-government services in Tanzania, thus supporting the need to utilize social change agents for knowledge generation and dissemination.

Citizen-centric value propositions delivery is the third process recommended within the m-government service delivery phase. In Figure 7.6, while Bell & Nusir's (2017) co-designing process excludes citizens in the service delivery stage, the proposed framework recommends for their inclusion based on Grönroos & Voima's (2013) value co-creation strategy for a positive citizen experience. Service value is never delivered, but provisioning stakeholders can only provide mechanisms or propositions for citizens to create their desired values (Grönroos & Voima, 2013). However, the resulting value, as well as the process creating it, affects citizens' level of satisfaction (Merickova, Svidronova & Nemec, 2016). Thus, the citizen-centric value propositions delivery process in Figure 7.6 advocates for a scenario whereby provisioning stakeholders and citizens jointly bring together elements that lead to value creation. In order to facilitate service value creation, provisioning stakeholders must provide propositions such as mobile-enabled applications, governmental information and mobile infrastructure access (the mGov platform), to mobile networks. Similarly, for citizens to create value, they must be equipped with the necessary skills to operate the services, must have some basic information to trigger a specific m-government service request, and also have sufficient funds on their phones to cover the cost of accessing the services. A limitation on any part within the value co-creation strategy hinders the overall targeted or expected citizen experience.

The output of the design phase, that is, the citizens' experience with the service noted with connector 2 in Figure 7.6, is the input in the appraisal phase. Similar to the m-government service modelling phase processes, the delivery phase in Figure 7.6 is also in a constant evaluative state against citizens' expectations concerning awareness and skills development.

The evaluation process attempts to align the m-government service information and skills needed with citizens' preparedness.



**Figure 7.6:** m-Government Service Delivery Processes

A feedback loop  $F(D)$  captures any mismatch between m-government services, knowledge need and citizen preparedness. The feedback is then analysed through the organisational learning process to determine what specific improvement is required, thus the output  $O(D)$  to trigger improvement in the design phase (refer Figure 7.6). In the case the experiential learning output requires improvement at the service delivery phase, a correction flow  $C(D)$  will be initiated to trigger a review of the m-government service development and delivery processes to incorporate the unmet citizen expectations in terms of knowledge and service value creation.

#### 7.4.3.3 m-Service Appraisal Processes

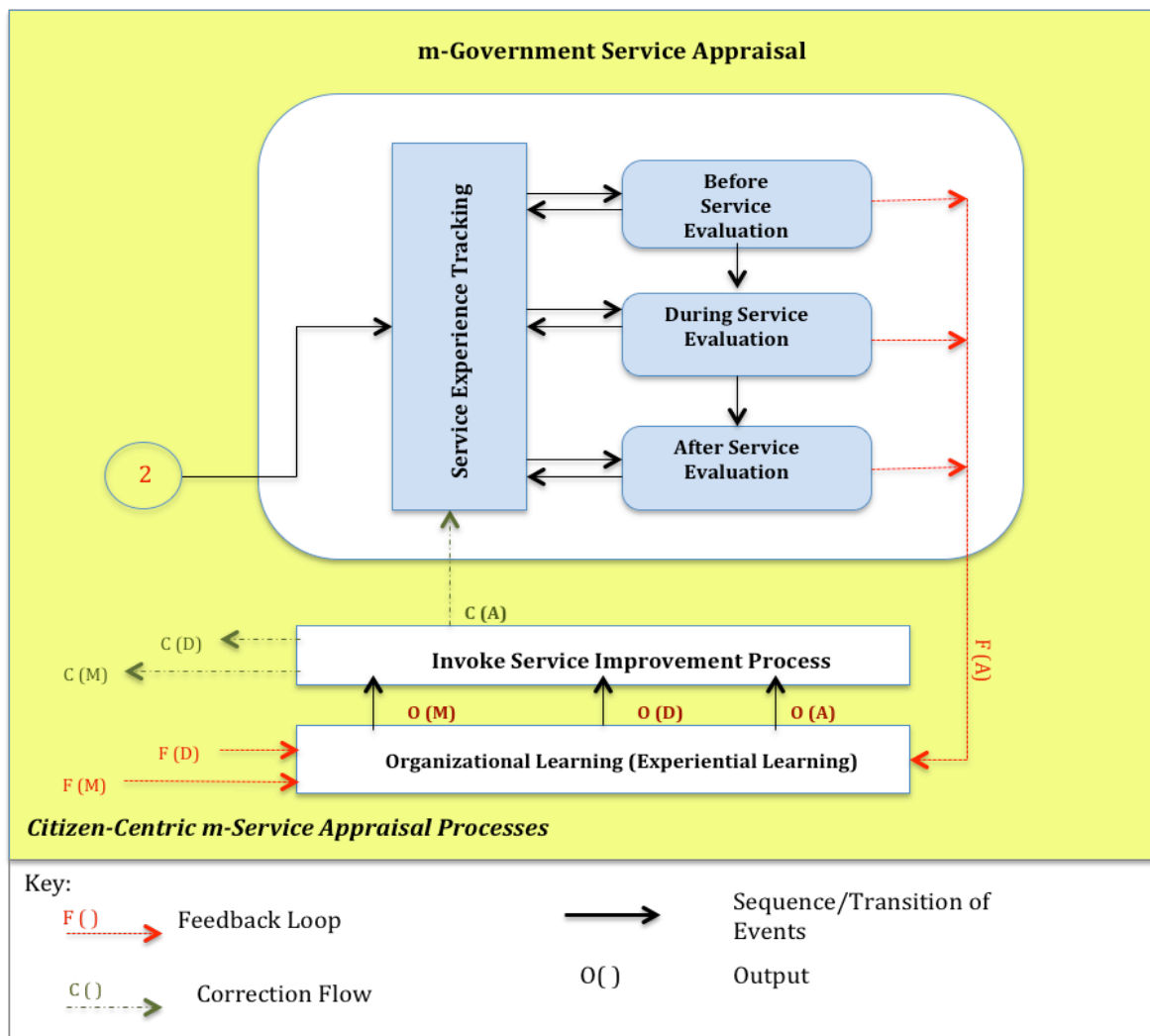
The proposed user interactive service framework in Figure 7.4, apart from m-government service modelling and delivery, also captures the m-government service experience appraisal.

Figure 7.7 provides a visual description of the process in the third phase of the citizen-centric m-service processes, that is, the m-government service appraisal phase. The m-government service appraisal phase is composed of one process, the service experience tracking process, and three sub-processes that capture citizen's experience before, during and after accessing m-government services.

This section recommends a service appraisal mechanism to form part of the m-government service provisioning processes in Figure 7.7, due to the dynamic and time-dependent nature of citizens' experience (Hassenzahl & Monk, 2010). Additionally, an experience can either be a psychological effect (affect) or a cognitive effect (knowledge gain) that occurs through passive or active citizen participation (Robert & Lesage, 2010). Due to the nature of experience and its effect on citizens' adoption decisions for m-government services, it is then essential to continually assess citizens' experience with m-government services to manage the overall citizen experience. Service experience is a continuous feeling that includes all relevant core service encounters or discrete interactions that occur at the moment of truth or point of interaction between the user and the service (Voorhees et al., 2017). It is the accumulation of citizens' impressions and satisfaction of m-government service. In line with Bernhaupt & Pirker (2014), a service experience tracking process component with three sub-processes, before, during and after service access evaluation, is recommended for m-government service provisioning. The processes in this phase are also centred on citizen-centricity philosophy, such that evaluations processes are done in collaboration with other implementing stakeholders and citizens. The service experience tracking process (Figure 7.7) makes decisions on which sub-processes to invoke and also register the established citizen experience to define future temporal aspects necessary for interactivity improvement.

The three sub-processes recommended in the service appraisal phase in Figure 7.7 target different aspects that cumulatively account for the entire citizen experience. The 'before use' citizen experience appraisal sub-process in Figure 7.7, targets at establishing citizen's m-government service readiness in terms of their awareness, knowledge, skill levels, as well as their attitudes and perceptions of service, infrastructure access (mGov platform), telecommunication platforms and government organisations. The 'during service consumption' citizen experience assessment in Figure 7.7, aims to establish aspects that support or disrupt a positive service experience. The service experience aspects evaluated

comprises functional and aesthetic aspects of services including but not limited to, faults, system breakdowns, service unavailability, abrupt service cut-offs and service interface appeal. Similar to Ross, Ruiz & Samadzadeh (2014), it is argued that in an interactive service, once citizens come into contact with and enter the m-government service cycle, other implementing stakeholders must retain them within the cycle until service comes to an end. Therefore, it is critical to continually capture citizens' experience while within the m-government service cycle and alter service accordingly to ensure a positive experience. Finally, the 'after consumption' service experience assessment in Figure 7.7, captures vital information regarding the overall citizen's experience with the m-government service; this may include an account of functional, cognizance and emotional satisfaction or dissatisfaction.



**Figure 7.7:** m-Government Service Appraisal Processes

Additionally, as experience is cumulative (Voorhees et al., 2017), the framework captures this as indicated in the flow of citizens' 'before use' experience into the 'during service acquisition' evaluation process as well as the incorporation of the 'during service acquisition experience' to the evaluation of the 'after-service acquisition citizen experience'. Thus, the proposed framework in Figure 7.4 recommends a mechanism to capture citizen's experience in all the three stages and allows a corrective mechanism to address any shortcomings to ensure positive future experiences.

Related to the m-government service modelling and delivery phases, the organisational learning process provides a corrective mechanism to facilitate analysis of any shortcomings to be addressed. Feedback collected from the three sub-processes yields vital information for service providers to align m-government services to the level of preparedness of citizens or empower citizens to uplift their knowledge and skills to meet m-government service skills requirements. The knowledge generated informs both how the service provider should be tailored to citizens' level of preparedness, as well as build knowledge on the general organisational learning. A feedback loop  $F(A)$  acts as input to the organisational learning process, where it is to be analysed and its output  $O(A)$  used to trigger an appropriate improvement process for the appraisal phase (refer Figure 7.7). For an organisational learning output  $O(A)$  that calls for re-designing of the experience appraisal process, a corresponding correction flow  $C(A)$  will be initiated.

#### **7.4.4 Consolidated User Interactive Service-Provisioning Framework**

This section presents the consolidated user interactive service framework that could be executed in an m-government service provision environment to enhance citizens' adoption of the resulting services. It is vital to note that this provision framework is driven by the results emanating from data collected for the identification of determinants of citizens' adoption decisions for m-government services. The framework integrates three layers in capturing the necessary components for m-government service provision: The outer layer, 'm-government service stakeholders'; the middle layer, 'mG2C interactivity factors'; and the innermost layer, 'the citizen-centric m-service processes'. The consolidated framework provides a strategic tool for enhancing citizens' adoption by managing citizens' expectations. The framework facilitates implementing stakeholders to manage and coordinate the integration of

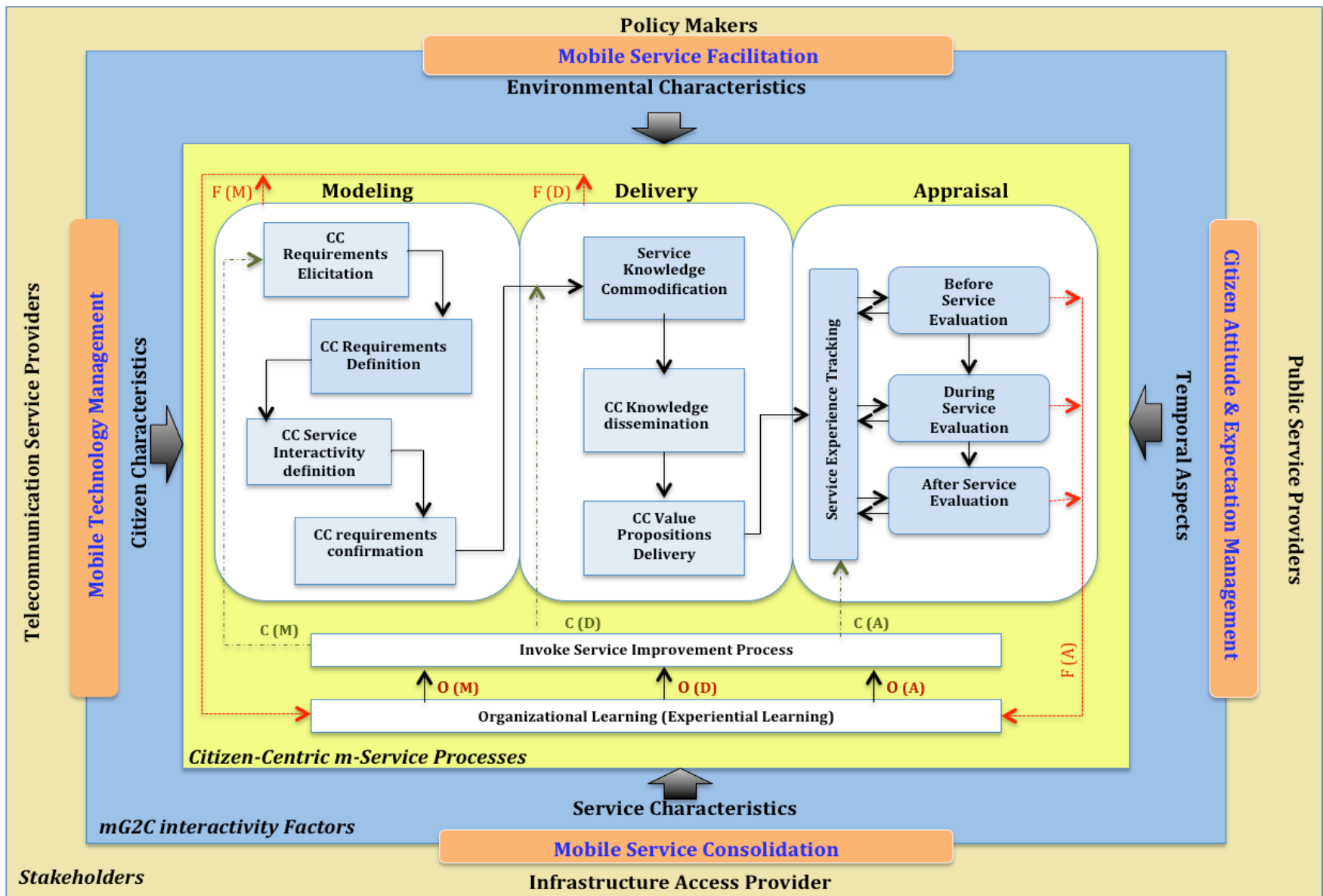
citizens in the m-government service provision process, including designing, development, delivery and appraisal for future service improvement.

As presented in Figure 7.8, the intersection between 'stakeholders' and the 'mG2C interactivity factors' defines the context in which stakeholders' roles are defined; roles like mobile technology management, mobile facilitation, citizen attitudes and expectation management, and mobile service consolidation, as discussed in section 7.4.2.

Additionally, the interplay between the 'mG2C interactivity factor' layer and the 'citizen-centric m-service processes' layer forms the input-process-output system for m-government service provision (Figure 7.8). As discussed in sections 7.4.2.1 to 7.4.2.4, the interactivity factors form the basis for input considerations. In contrast, the citizen-centric m-service processes discussed in sections 7.4.3.1 to 7.4.3.3 provide the mechanism for considering and ensuring achievement of the interactivity factors to enhance citizens' adoption (Figure 7.8). Moreover, the discussion in sections 7.4.3.1 to 7.4.3.3 also presents the incorporation of an organisational learning component to facilitate adjustments and improvements of the provisioning process across the three-provision phases. The consolidated framework in Figure 7.8, gives the m-government service-implementing stakeholders the ability to distinguish unmet citizens' expectations about m-government services, in that they can easily detect any negative citizen experiences and initiate provision process improvement strategies to a specific phase without affecting other provision phases (Kirwan, 2016).

## **7.5 Summary**

The discussion in this chapter presented the user interactive service-provisioning framework for enhancing citizen adoption of m-government services in Tanzania. Zhao, Shen & Collier (2014) assert that for any realizable impact of m-government services, citizens' adoption is necessary. Moreover, empirical studies by Ooi & Tan (2016) and Yonazi (2010) affirm the magnitude of citizens' challenges towards adoption tend to intensify as long as proposed solutions continue evolving without making holistic considerations of both provisioning and consumption for m-government services. Thus, Figure 7.1 models citizens' adoption challenges and reveals a mismatch between the m-government service-provisioning perspective and citizens' expectations.



**Figure 7.8:** Consolidated User Interactive Service-Provisioning Framework for m-Government Services



Based on the identified problem, Figure 7.2 describes a candidate solution, which proposes a citizen-centric m-service approach for m-government service provisioning. The consolidated framework (Figure 7.8) emphasizes the interdependence between citizens and m-government service provisioning stakeholders in enhancing m-government service adoption. It argues that through focusing on citizens' experiences with m-government services, citizens' adoption of m-government services is enhanced. Likewise, the literature suggests a strong influence of citizens' experience on their adoption decisions (Robert & Lesage, 2010; Wanjau, Wangari & Ayodo, 2012; Stamenkov & Dika, 2015).

Therefore, based on the findings of the study, a consolidated user interactive service-provisioning framework comprising of stakeholders, mG2C interactivity factors, and citizen-centric m-service processes is presented in Figure 7.8. The user interactive service-provisioning framework presents three components layered on top of each other to indicate the interconnectivity between the layers and the roles of the stakeholder. The interconnectivity between the stakeholders' layer and the mG2C interactivity layer is the accomplishment of each role identified in the intersections, which includes citizen attitude and expectation management, mobile service consolidation, mobile technology management and mobile service facilitation. Likewise, the mG2C interactivity factors acts as inputs in the citizen-centric m-service processes by guiding the identification of process aspects necessary for attaining a positive citizen experience. The consolidated framework in Figure 7.8 presents a constant evaluative service-provisioning state that incorporates organisational learning processes as part of the m-government service provisioning strategy. The evaluative state facilitates process adjustments to align m-government service-provisioning targets with citizens' consumption expectations. Conclusively, the proposed framework (Figure 7.8) was sent out for evaluation to determine whether it is relevant, feasible and usable in addressing citizens' adoption challenges. The justification for framework evaluation and the outcome are presented and discussed in chapter 8.

# **CHAPTER EIGHT**

## **EVALUATION OF THE USER INTERACTIVE SERVICE- PROVISIONING FRAMEWORK FOR M-GOVERNMENT SERVICES**

### **8.1 Introduction**

Evaluating a proposed solution to an observed problem is a critical step in design science. According to Yonazi (2010), evaluation is an important strategy for presenting a solution for application by allowing stakeholders to familiarize themselves with the artefact and provide recommendations for improvement. Accordingly, Sonnenberg & vom Bocke (2012) identify the purpose of evaluation in design science as the process of obtaining feedback on the quality of the artefact. In information technology adoption, evaluating a provisioning framework is a critical process by which evidence regarding framework quality is gathered and analysed against relevance, adequacy, usability and feasibility of its application in organisational settings (Sein et al. 2011). The results indicate a measure of relevance of the recommended framework in addressing the identified real-life problem of low adoptability of m-government services (Sonnenberg & vom Bocke, 2012). Therefore, to evaluate the quality of the developed user interactive service provisioning framework for m-government services, the opinions of participating government organisations (i.e. Managers and ICT personnel) and academics that are experts in technology adoption were gathered and analysed. This chapter is part of phase 2 of the research methodology process (Figure 4.1). It contributes to addressing objective six (RO6) by providing evidence to validate the recommended framework for m-government service provisioning in Tanzania.

The artefact evaluation follows a mixed-method design, whereby both quantitative and qualitative data were analysed to determine the applicability of the provisioning framework. As justified in the methodology in chapter four, the evaluation exercise involved twelve (12) participants: eight participants (four managers and four ICT personnel) from participating government organisations providing m-government services, and four ICT experts who are in academia from various universities.

Instrument 3, the evaluation questionnaire (Appendix C) with both closed and open-ended questions and the relevant consent forms, were emailed to the respective participants. The small number of the sample facilitated easy follow up; thus, all the twelve questionnaires were collected for analysis. The analysis for the artefacts' evaluation was carried out using descriptive analysis for quantitative data and thematic analysis for the qualitative explanations.

## **8.2 Evaluation Strategy**

To facilitate a rigorous assessment of quality and efficacy of the designed artefact, Yonazi (2010) and Hevner et al. (2004) propose that the evaluation method and the nature of the designed artefact must match. Yonazi (2010) identified two evaluation approaches; evaluation before application (ex-ante), and evaluation after application (post ante). This research applied an ex-ante naturalistic quantitative approach to facilitate incorporation of organisational elements as recommended by Sonnenberg & vom Bocke (2012). The choice for an ex-ante naturalistic quantitative approach was made to allow an extensive evaluation of the framework designs, from the conception of the problem to the solutions that is the recommended framework. Consequently, the three artefacts were evaluated to permit feedback from the reality paradigm of real users, and real systems against a real problem.

The evaluation process assessed participants' perceptions and attitudes on adequacy, relevance, usability and feasibility for applying the recommended user interactive service-provisioning framework for m-government services. While adequacy of the three developed artefacts was assessed based on 'Yes' or 'No' responses, relevance, usability and feasibility criteria were assessed using a 4-point Likert-scale rating. The artefacts evaluation made use of the evaluation question (Appendix 3) composed of both closed and open-ended questions. The open-ended questions provided qualitative explanations to explain one's perception of a given criterion of assessment. Thus, the evaluation results are presented along with the four criteria of assessment (i.e. adequacy, relevance, usability and feasibility), with descriptively analysed quantitative results presented first followed by thematically analysed qualitative explanations. Therefore, responses from twelve (12) respondents, each assigned a pseudonym Expert1 to Expert12, as described in Table 4.3, are analysed and presented as follows.

### **8.3 Problem and Solution Designs' Evaluation**

Important to note is that while the adequacy criterion was assessed against the three components of the artefact, that is, the m-government service provisioning problem design, the m-government service provisioning solution design, and the user interactive service provisioning framework for m-government services, the relevance, usability and feasibility criteria were assessed only against the user interactive service provisioning framework. This decision was made because the m-government service problem design and solution design only aided the construction of the framework but they do not have a direct practical application in the m-government service-provisioning environment.

Adequacy refers to the state of being acceptable or satisfactory. The artefacts' adequacy criterion was examined based on the completeness of the developed artefacts to ensure that there was no omission of essential aspects like stakeholders and factors or processes critical to improving citizen's experience with m-government services. Therefore, the adequacy of the three developed artefacts, that is, the problem design, the solution model and the user interactive service provisioning framework, were assessed, and findings were as discussed in the following sections.

#### **8.3.1 m-Government Service Problem Design's Adequacy**

Table 8.1 presents results corresponding to part A, questions A1-A9 of the questionnaire (Appendix C) that queries the adequacy of the modelled barriers to m-government service adoption in Tanzania. Results indicate that on average, participants found the modelled m-government service adoption problem to be adequate on all the eight (8) indicators assessed. Adequacy was assessed based on appropriateness and sufficiency (completeness) in identifying various components that define the m-government service adoption scenario.

Findings (Table 8.1) indicate that respondents perceived appropriateness in identification of functional satisfaction as a service provision perspective (83%), in mapping functional satisfaction as an e-business concept (75%), identification of experiential satisfaction as a service consumption perspective (83.3%), capturing citizens as the service consumption stakeholder is appropriate (75%) and in mapping of experiential satisfaction to a user experience focus (91.7%). These findings imply that participants have high confidence in the appropriateness of the identified components (i.e. stakeholders for provisioning, functional satisfaction and experiential satisfaction) in defining the citizen's m-government service

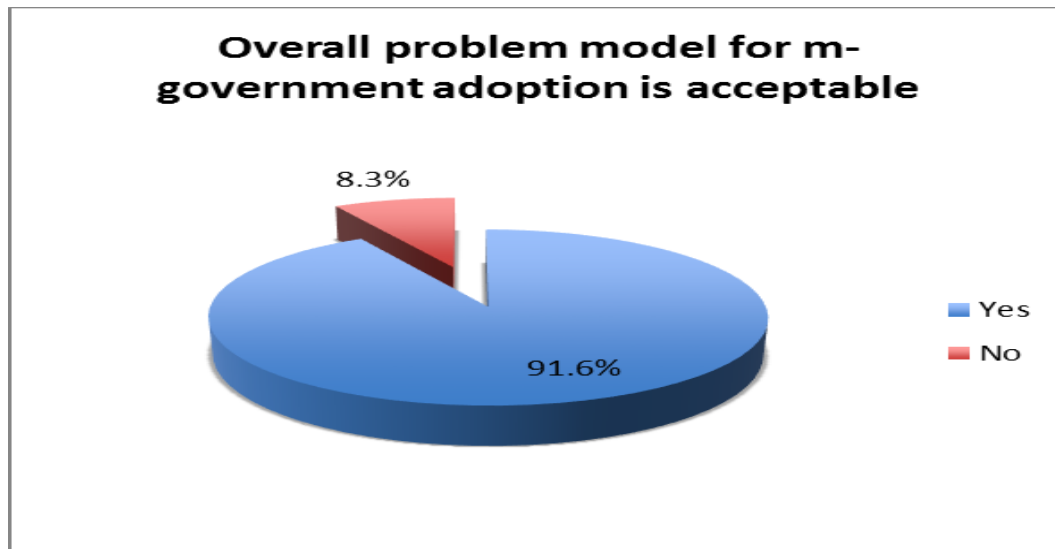
adoption context. Likewise, participants perceived sufficiency in the identification of stakeholders (91.7%), capturing functional factors (83.3%) as well as emotional and cognitive factors (100%). The positive perception of the sufficiency of the problem design implies confidence in the correctness and completeness of the conceptualized problem relative to the practical situation on m-government service adoption.

**Table 8.1:** m-Government service problem design's adequacy

Statement	Frequency (N)		Percentage (%)	
	Yes	No	Yes	No
Identification of functional satisfaction as a service provision perspective is appropriate	10	2	83	17
Stakeholders for service provision are sufficiently captured in the modelled problem	11	1	91.7	8.3
Mapping of functional satisfaction to an e-business focus is appropriate	9	3	75.0	25.0
Functional factor that influences e-business focus are sufficiently capture	10	2	83.3	17
Identification of experiential Satisfaction as a service consumption perspective is appropriate	10	2	83.3	16.7
Capturing citizen as the service consumption stakeholder is appropriate	9	3	75	25
Mapping of experiential satisfaction to a User Experience focus is appropriate	11	1	91.7	8.3
Emotional and cognitive factors that influence user experience focus are sufficiently captured	12	0	100	0

Figure 8.1 shows that the overall perception of the problem model for m-government service adoption is acceptable (91.7%). This finding indicates a positive attitude on the adequacy of moving the current citizens' adoption situation to comprehension and decision regarding m-government service provisioning. It implies confidence in capturing the m-government service adoption problem to facilitate the development of an appropriate solution towards enhancing citizens' adoption. In line with Yonazi (2010), a comprehensive conceptualisation of the problem facilitates the identification of an appropriate solution. It further implies that m-government service adoption is challenged due to the mismatch between service provision

and service consumption expectations. Equally, Bakunzibake, Grönlund & Klein (2016) the found gap between citizens' service expectations and service outcomes acts as a hindrance to service acceptance and use. Thus, with the perceived high degree of adequacy, the model serves as a foundation for understanding challenges to citizens' adoption of m-government services in Tanzania and consequently informs the development of a strategy to enhance adoption.



**Figure 8.1:** Perception of Problem Designs' Acceptability

In contrast, 8.3% of the participants indicated inadequacy of the modelled m-government **service** problem model. Reasons noted for the inadequacy was the insufficiency in capturing stakeholders for m-government service provisioning. One participant noted the need to:

*"Specify which stakeholders, for example, Public admin, government agencies, NGOs, politicians, suppliers and partners"* (Expert 1).

While another one noted the need to:

*"Expand stakeholders list to include municipalities, shops and churches."* (Expert 6).

It is essential to note that the evaluated model provides a high level of abstraction that only serves to identify clusters or groupings of critical stakeholders for m-government service provisioning within the service providers' perspective (Figure 7.1). However, to ensure clarity for implementation, the framework was revised to incorporate an explicit listing of the various stakeholders in their appropriate clusters (Figure 8.4).

Also, one respondent noted the need for government organisations to be cautious with

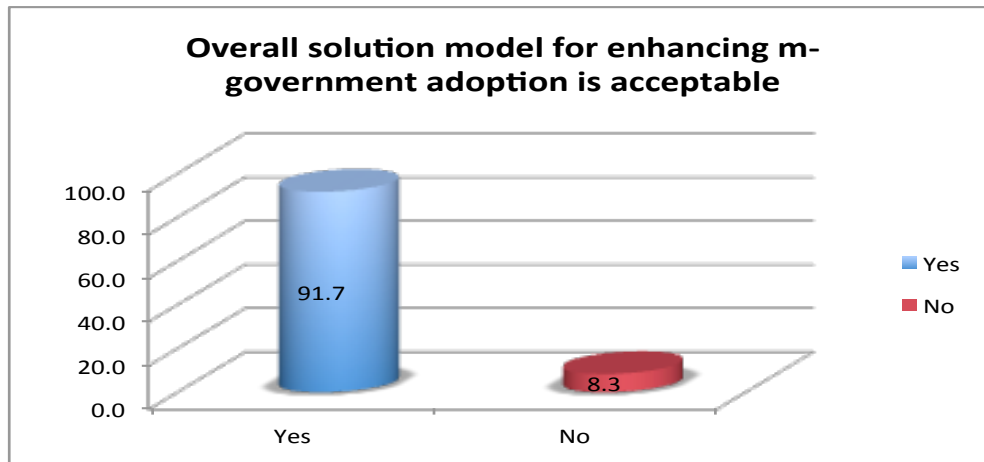
allowing direct connectivity and inclusion of stakeholders as provisioning partners in the absence of legal and binding contracts. The respondent acknowledged that currently, there are stakeholders, for example, mobile money operators (MMOs) that connect directly to m-government service while there are no direct contracts except through banks. The respondent noted:

*"For Other Service providers –all Mobile Money Operators (MMOs), e.g. Tigopesa, Mpesa and artel money should not be connected directly to m-government services (e.g. GePG) as the Government currently does not have contracts with them, the only contracts are with Banks. Thus, the connection available is Customer→MMOs →Banks→ GePG (m-government) →Banks→ MMOs →Customer"* (Expert 4).

The recommendation further emphasizes the noted challenges concerning collaborations and cooperation management among provisioning partners (section 5.5.2.2 and 6.3.2). Accordingly, Alshehri & Drew (2010) argue that in the absence of legally binding contracts, it is difficult for partners to be responsible and accountable, thus affecting the quality of service.

### **8.3.2 m-Government Service Solution Design's Adequacy**

Adequacy of the modelled solution reflects the level of confidence regarding completeness and satisfactoriness in addressing the identified adoption problem for m-government services. The results correspond to responses on questions in part B (B1 to B5) of the evaluation questionnaire (Appendix 4). Figure 8.2 indicates the majority (91.7%) of the participants perceived that the overall solution model is acceptable. These findings imply that participants perceive that the recommended solution model is adequate in addressing the persisting m-government service adoption problem of the mismatch between provision targets and consumer expectations.



**Figure 8.2:** Perception on Solution Model's Acceptability

Table 8.2 presents results on specific statements that were assessed in relation to the adequacy of the modelled solution. Overall, participants expressed a high level of confidence in the adequacy of the modelled solution. The percentage distribution of responses for which participants answered YES on the four assessed statements ranged from 91.7% to 100%. Specifically, the recommendation of combining both functional and experiential satisfaction as a service provisioning perspective, that is, m-service focus, was acceptable to all participants. This finding is in line with Abro et al. (2015) and Stamenkov & Dika (2015) who recommended an e-service perspective that integrates functional and experiential focus into one perspective. The findings imply that participants agree with the application of Abro et al.'s (2015) suggestion that yielded an m-service focus, which combines functional, cognitive and emotional attributes in the provisioning of m-government services.



**Table 8.2:** m-Government service solution design's adequacy

Statement	Frequency (N)		Percentage (%)	
	Yes	No	Yes	No
Recommending the combination of functional and experiential satisfaction as a service provision perspective is appropriate	12	0	100	0
Adding citizen as an implementing stakeholder for the recommended service provision perspective is appropriate	12	0	100	0
Mapping of functional and experiential satisfaction to citizen-centric m-service focus is appropriate	11	1	91.7	8.3
Mapping of functional, emotional, cognitive and m-government to citizen (mG2C) Interactivity as factors influencing citizen-centric m-service focus is appropriate	11	1	91.7	8.3

Additionally, participants provided several recommendations in support of the candidate solution. It was recommended that environmental factors such as policies and external funders be included in the modelled candidate solution. Some of the statements include:

*“Add environmental factors as they do influence provision”* (Expert 5).

And,

*“Political influences shall have to be assimilated. Donors sometimes enhance m-government service implementation”* (Expert 4).

Also, the participants recommended that the factors influencing adoption must combine functional and cognitive factors and must be integrated into the candidate solution to address the identified provision-consumption gap. These findings are noted in their responses to open-ended questions B6.1, B6.2 and B7, which were:

*“The modelled solution will be adequate if the influencing factors are interacting together”* (Expert 2).

And,

*“User-centred m-service should be integrated; it must combine function and cognitive factors to enhance citizen interaction”* (Expert 8).

Moreover, respondents recommended that citizens should be considered as part of the stakeholders in m-government service provisioning. One participant noted:

*“Citizens are part of stakeholders in m-government service implementation, must thus be included in the solution model as so”* (Expert 12).

While citizens are already incorporated in the m-government service solution model (Figure 7.2), it appears not be explicit. It is important to note that the solution model only provides a knowledge level abstraction describing the structure of the possible solution. In contrast, the framework provides an application-level abstraction that can be translated into guidelines for execution. Therefore, for clarity, the framework explicitly incorporates citizens as provisioning stakeholders through the citizen-centric m-service processes layer (Figure 8.4).

## **8.4 Framework Evaluation**

The suitability of the framework for implementation necessitated extending the number of criteria for its evaluation; thus, the framework was evaluated on adequacy, relevance, usability and feasibility criteria. The results and the discussion on the framework evaluation are as presented in the subsections that follow.

### **8.4.1 Framework Adequacy**

Results presented in Table 8.3 indicate a positive attitude and confidence on the adequacy of the recommended user interactive service-provisioning framework in addressing the persisting m-government service adoption challenges. The results correspond to answers provided by participants in part C of the evaluation questionnaire (Appendix 4), that is, questions C1 to C14. Adequacy of the framework was evaluated on two categories; its sufficiency in capturing essential components for citizens’ adoption and its appropriateness in describing relationships between components mapped. Results indicated sufficiency in capturing various components (those who respondent YES to the statements), including provisioning stakeholders (91.7%), interactivity factors (83.3%), modelling processes components (91.7%), delivery processes components (91.7%), service appraisal processes components (83.3%), organisational learning (100%) and improvement process (100%).

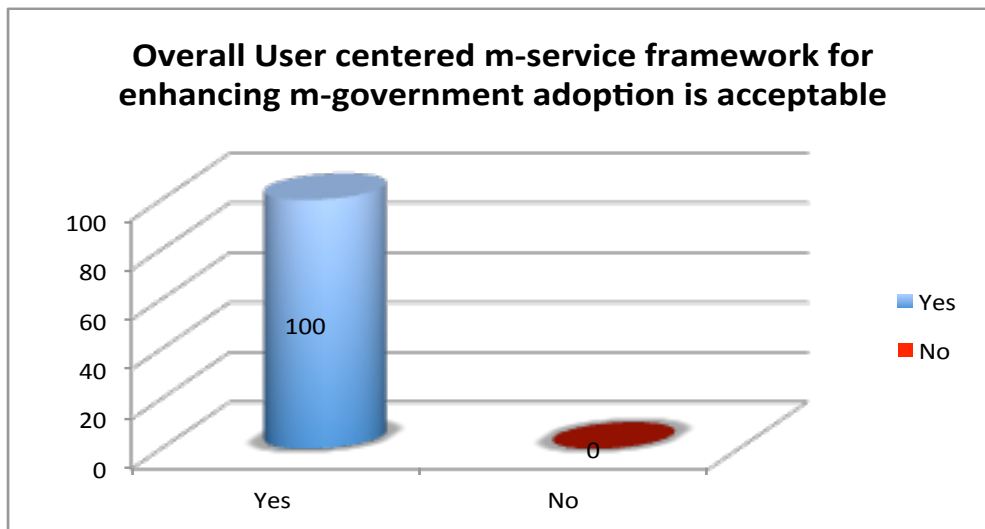
**Table 8.3:** Framework's adequacy

Statement evaluating adequacy	Frequency (N)		Percentage (%)	
	Yes	No	Yes	No
Provisioning stakeholders for m-government services are captured sufficiently	11	1	91.7	8.3
Factors facilitating m-government-to-citizen (mG2C) interactivity are captured sufficiently	10	2	83.3	16.7
Mapping the intersection between implementing stakeholders and mG2C interactivity Factors in terms of tasks/roles is appropriate	11	1	91.7	8.3
Citizen-centric m-service modelling processes are captured sufficiently	11	1	91.7	8.3
Citizen-centric m-service modelling processes, flow is appropriately represented	12	0	100	0
Citizen-centric m-service delivery processes are captured sufficiently	11	1	91.7	8.3
Citizen-centric m-service delivery processes, flow is appropriately represented	11	1	91.7	8.3
Citizen-centric m-service appraisal processes are captured sufficiently	10	2	83.3	16.7
Citizen-centric m-service appraisal processes, flow is appropriately represented	12	0	100	0
Citizen-centric m-service feedback loop is captured appropriately	11	1	91.7	8.3
Citizen-centric m-service organisational Learning Process is captured sufficiently	12	0	100	0
Citizen-centric m-service improvement process is captured appropriately	12	0	100	0
Citizen-centric m-service correction flow is captured appropriately	12	0	100	0

On the appropriateness of the framework in defining various relationships between the identified components, results indicated a positive attitude on mapping the interaction between stakeholders and interactivity factors (91.7%) and the flow of processes in the modelling stage (100%), delivery stage (91.7%) and service appraisal (100%). Moreover, participants also indicated confidence in the described flow of processes in the organisational learning component, including feedback loops (91.7%) and correction flow (100%).

Furthermore, participants expressed positive attitudes on the overall acceptance of the user interactive service-provisioning framework. Respondents unanimously agreed that the recommended framework adequately identifies and captures facets for enhancing citizens'

adoption of m-government services (Figure 8.3). This finding implies that the framework adequately identifies the stakeholders (actors), components (factors), and the processes necessary for m-government service adoption. The stakeholders for m-government service provisioning are consistent with the OECD/ITU (2011), which recommended an array of stakeholders in the m-government service value chain. The captured factors for m-government service adoptability are consistent with what Abro et al. (2015) attested to be critical factors in defining interactivity. In line with Rogers (1995), Grönroos & Voima (2013), and Bell & Nusir (2017), the citizen-centric m-service processes are recommended to guide m-government service modelling, delivery and appraisal. The positive attitude on completeness and appropriateness of the user interactive service-provisioning framework implies that participants are confident that the framework, if implemented, facilitates citizens' adoption of m-government services in Tanzania.



**Figure 8.3:** Perceptions on Framework's Acceptability

Participants also acknowledged the need for the framework to ensure that the citizens are empowered to utilize m-government services in Tanzania. One participant recommended citizen training;

*"Citizen should be trained on the framework for m-government service implementation for them to know how to use m-government services"* (Expert 2).

However, the citizens' knowledge and skills building is captured within the service knowledge commodification and dissemination within the m-government service delivery phase in the framework (Figure 7.8).

### 8.4.2 Framework Relevance

The framework was evaluated to determine its appropriateness in addressing the m-government service adoption problem for which participants were requested to rate statements D1.1 to D1.7 based on a 4-point Likert scale. Table 8.4 shows that participants' responses were either in agreement (statements D1.1, D1.2, D1.3 and D1.7) or strong agreement (statements D1.4, D1.5 and D1.6) with the statements that assessed the relevance of the framework. On average, the findings indicate that participants perceived the framework to be relevant in addressing the identified barriers to citizens' adoption of m-government service adoption, as stated in Table 6.1.

Participants agreed that the framework aligns with policies and procedures for provisioning m-government services (mean=1.6, mode=2, and median=2). Framework alignment with policies and procedures is an essential criterion for applicability and usefulness of the framework. Munyoka & Manzira (2013) argue that a framework that is not aligned to existing policies and procedures presents several challenges when executing it in real-life problem-solving. This result implies that the framework is perceived to be applicable in the context of the Tanzanian legal and regulatory framework for implementing m-government services.

Moreover, participants agreed that the framework enhances efficiency in provisioning of m-government services (mean=1.7, mode=2, and median=2). This result implies that the framework improves work relations among collaborating partners and streamlines processes in m-government service provisioning, thus efficiency. Apart from the quantitative findings, one respondent acknowledges this fact:

*“The framework is relevant as it enhances the efficiency of m-government service provision”* (Expert 10).

This finding is attributed to the identification of stakeholders and their roles, the critical mG2C interactivity factors, the processes and the interrelation between the three layers. Accordingly, Venkatesh, Thong & Xu (2012) argue efficiency, in terms of performance, is one among the core factors for service provisioning and adoption of technology. This attestation, by implication, applies to the adaptability of the framework, as it is perceived to bring about efficiency in m-government service provisioning.

Participants were also in agreement with the statement that the framework reflects actual provisioning challenges that hinder citizens' adoption of m-government services (mean=2, mode=2, and median=2). The finding implies that the framework aligns with the real-life problem and thus provides a real-life solution. This fact is supported by Heeks (2003), and Masiero (2016) argues solutions that reflect real-life situations have the highest potential of resolving a real-life challenge. The finding also denote that the recommended user interactive service-provisioning framework that is perceived to reflect citizen's adoption challenges demonstrates a high chance of resolving these barriers to m-government service adoption.

Correspondingly, participants agreed that the developed framework, apart from being a solution, also contributes to best practices in m-government service provision (mean=1.6, mode=2, and median=2). As Mutula (2012) states, it is essential that devised solutions align and contribute to best practices in order to have a broader application in addressing regional or sub-regional challenges. For the recommended framework, it was thus essential that it subscribes to best practices in m-government service provision in order to be accepted for implementation in the m-government service provisioning community.

Participants acknowledged that the framework improves the overall m-government service provisioning; they strongly agreed to its contribution towards enhancing citizen's awareness (mode=1), citizen's involvement (mode=1) and m-government services delivery (mode=1). One respondent, reflecting on the relevance of the overall framework, stated that:

*“Framework relevant to our government for efficiency and effectiveness”* (Expert 4).

The finding implies an overall positive attitude towards the framework's ability to address the identified challenges and thus enhance citizens' adoption of m-government services in Tanzania. However, one respondent cautioned that for the framework to be relevant, it is critical to ensure citizens understand the implemented initiatives and have the relevant skills and knowledge. The participant noted:

*“It will be relevant to citizens once the framework is implemented and that citizens understand it”* (Expert 9).

**Table 8.4:** Framework's relevance

Statements	Percentage (%)				Central Tendency			
	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Median	Mode	Standard deviation
<b>D1.1</b> Aligns with government policies and procedures for provisioning m-government services	42	58	0	0	1.6	2	2	0.5
<b>D1.2</b> Contributes to best practises in provisioning m-government services	42	58	0	0	1.6	2	2	0.5
<b>D1.3</b> Enhances efficiency in m-government services provision	42	50	8.3	0	1.7	2	2	0.7
<b>D1.4</b> Enhances citizens' involvement in m-government service provision	58	42	0	0	1.4	1	1	0.5
<b>D1.5</b> Can improve citizens' awareness of m-government services	75	25	0	0	1.3	1	1	0.5
<b>D1.6</b> Can improve the delivery of m-government services	83	8	8	0	1.3	1	1	0.6
<b>D1.7</b> Reflects actual challenges that have to be addressed in providing m-government services	42	50	8	0	2	2	2	0.7

### 8.4.3 Framework Usability

Table 8.5 shows the results of participants' perceptions on the degree of fit to use of the recommended user interactive service-provisioning framework for m-government service provisioning. Participants exhibited a positive attitude towards using the framework to guide m-government service provisioning. The results correspond to the rating of statements D2.1 to D2.5 on the evaluation questionnaire (Appendix D), for which participants expressed a strong agreement with statement D2.4, and an agreement with statements D2.1, D2.2, D2.3, D2.5 (Table 8.5).

The statements assessed framework usability on five components, namely, usefulness in development and provisioning m-government services, ease of use, ease of understanding, ease of application within resource constraints, and its facilitation for further improvement.

**Table 8.5:** Perception on framework's usability

Statements	Percentage (%)				Central Tendency			
	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Median	Mode	Standard deviation
<b>D2.1</b> Can be used in developing and provisioning m-government service initiatives	33	58	0	8	2	2.0	2	0.8
<b>D2.2</b> Is easy to understand and apply in developing m-government service initiatives	17	67	8	8	2.1	2	2	0.8
<b>D2.3</b> Is easy to communicate with other provisioning partners	42	50	0	0	2	2	2	1.1
<b>D2.4</b> Can be easily adapted with minimal changes within the government practices	75	17	8	0	1.3	1	1	0.7
<b>D2.5</b> Captures feedback for further improvement of m-government services	42	58	0	0	1.6	2	2	0.5

Participants showed a high level of confidence in the practicality of the framework in guiding design and provision of m-government services, with over 80% either strongly agreeing or in agreeing (33% strongly agree, and 58% agree). With such a positive attitude, it implies that the framework can be applied in the context of Tanzania and other areas with similar, cultural and socio-economic conditions. Also, results indicate the framework is perceived to be easy to understood and applied, with 67% indicating agreement on this aspect, while over 90% (42% strongly agree and 50% agree) indicated the framework could be easily communicated to other provisioning stakeholders. The result is further attested by one respondents' statement:

*“It is easy to understand and can be used in developing and implementing m-government services”* (Expert 10).



When asked to rate the framework's ability to capture feedback and facilitate improvement in m-government service provisioning, the majority either agreed (58%) followed by those that strongly agreed (42%). Participants strongly agreed (75%) that the recommended framework is sufficient and can be executed with very minimal changes. However, one respondent cautioned the ease of use would only arise if proper training is accorded to citizens:

*"It will be easier to use once citizens are well trained on m-government services. Therefore, regular training must be conducted on new developments on m-government services"* (Expert 9).

Therefore, regular training to both citizens and provisioning stakeholders on new developments on m-government services is recommended in order to facilitate adoption.

#### **8.4.4 Framework Feasibility**

Since the recommended framework is intended for practical application, it was necessary to collect expert opinion on its viability or likelihood for application. Table 8.6 shows statistical results on responses to questions D3.1 to D3.6 on the evaluation questionnaires (Appendix D). Results indicate that respondents unanimously agreed on the criteria that were assessed concerning the likelihood of applying the framework to the context of Tanzania. The criteria for assessing the feasibility of the framework included a reflection on implementation within organisational resources, funds, duration, sufficiency, professional capacity and the immediacy of implementation. On all the six criteria statements, participants indicated agreement with percentages ranging between 67% and 42% (Table 8.6). Moreover, respondents' statements also supported this statistical finding; however, they emphasized further the need for knowledge and skills building for both citizens and public officers providing m-government services:

*"Development/improvement of skills is a key factor before the implementation for security reasons"* (Expert 3).

And,

*"Framework can be used within minimum government requirements and with support from users/citizens who are good percentage aware of e-government applications"* (Expert 4).

However, a significant proportion of the respondents, although not the majority, disagreed (33%) that the implementation of the user interactive service-provisioning framework is cost-effective. Also, one respondent supports this statistic:

*“Despite the fact it is easy to understand, it is not cost-effective”* (Expert 10).

This observation is consistent with Bell & Nusir (2017), who argue that the implementation of citizen-centricity and value co-creation approaches is both labour and financially intensive. It takes a longer time, and it is expensive to ensure active citizen involvement (Bell & Nusir, 2017). This finding further emphasizes the need to increase budgets and prioritize m-government services provision strategies for an effective and efficient public sector.

**Table 8.6:** Framework’s feasibility

Statements	Percentage (%)				Central Tendency			
	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Median	Mode	Standard deviation
<b>D3.1</b> Can be implemented within available organisational resources	25	67	8	0	1.8	2	2	0.6
<b>D3.2</b> Can be implemented in a cost-effective manner	17	50	33	0	2.2	2	2	0.7
<b>D3.3</b> Can be implemented within a short period of time	17	67	17	0	2	2	2	0.6
<b>D3.4</b> Can be implemented as it is without any changes	17	67	8	8	2	2	2	0.8
<b>D3.5</b> Can be implemented immediately	33	42	8	8	2	2	2	0.9
<b>D3.6</b> Implementation can be achieved with the available professional support	25	58	0	8	2	2	2	0.8

## 8.5 Evaluation Findings’ Implication

The developed artefacts, including the model for the m-government service adoption problem in Tanzania, the proposed solution model, and the corresponding user interactive service-provisioning framework for m-government service were examined to determine their adequacy in capturing the m-government service adoption scenario in Tanzania. Furthermore, the user interactive service-provisioning framework was assessed to determine

its relevance, usability and feasibility for application in a real-life environment to address the persisting citizen adoption problem. Overall, findings show that the three artefacts or models adequately identify and capture sufficiently and appropriately the different components of adoption and the corresponding relationships (section 8.2). Also, findings indicate an overall positive perception of the relevance of the framework, implying that the framework correctly addresses the ensuing adoption problem in Tanzania (section 8.3). In section 8.4, a positive perception is also noted regarding the usability of the framework, implying that the framework is useful in resolving the identified problem of citizens' adoption of m-government services, thus enhancing citizens' adoption of m-government services. Regarding how feasible the framework for application is, findings indicate high confidence in the application of the framework. Findings discussed in section 8.5 demonstrate that the framework can be implemented as is without change and with minimum resources.

However, suggestions were made to further improve the framework, which included training for both citizens and public officers, extending the list of stakeholders for provisioning to include funders and citizens, and improving the budget for m-government services to support the implementation of the framework. Given these recommendations, the user interactive service-provisioning framework is further improved to incorporate these suggestions. Figure 8.4 is a revised user interactive service-provisioning framework for m-government services that incorporates the recommendations from the framework evaluation as follows.

Explicit mention of the various stakeholders within their categories is made to facilitate ease of understanding and communication of the framework for easy implementation (Figure 8.4). For instance, explicit mention of stakeholders within the policymakers' category includes politicians and regulatory bodies such as the Tanzania Communication Regulatory Authority (TCRA). It was recommended that stakeholders like municipalities, faith-based organisations (FBOs), non-governmental organisations (NGOs), government electronic payment gateway, mobile money operators (MMOs), and politicians who were implicitly captured within the four stakeholders' categories be explicitly identified in the framework. Thus, Figure 8.4 explicitly incorporates the identified stakeholders.

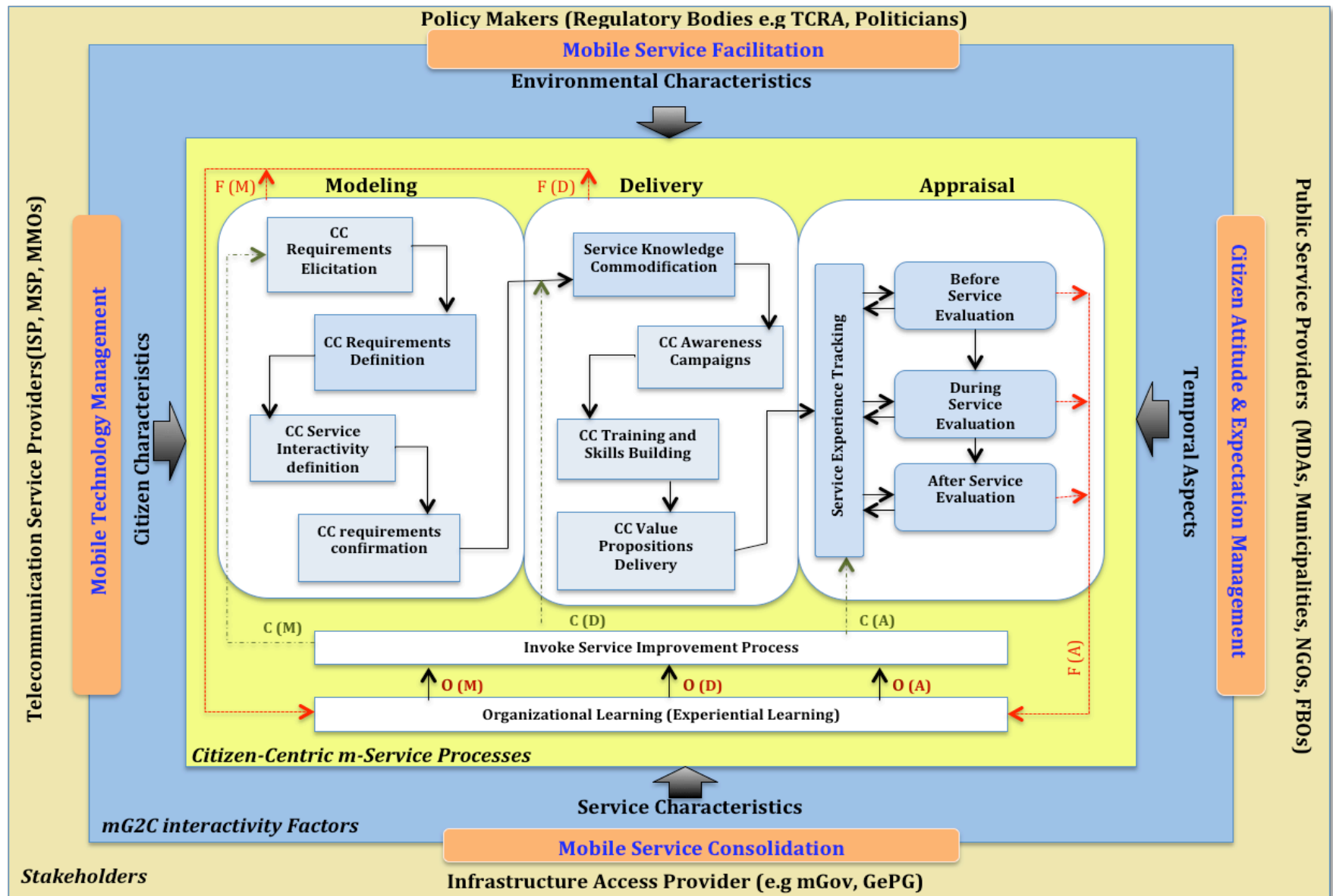
Furthermore, the revised framework explicitly incorporates a training module within the m-government service delivery phase (Figure 8.4). Training and skills development on m-government services for both citizens and provisioning stakeholders emerged as one of the

suggestions to improve provisioning. Section 7.4.3.2 indicates that the citizen-centric (CC) knowledge dissemination process within the m-government service delivery phase implicitly captures and addresses awareness and training related issues for m-government services. Moreover, in the revised framework, the citizen-centric (CC) knowledge dissemination process is broken down into two processes; the CC awareness campaigns and CC training and skills development process (Figure 8.4). Suggestions on improving the budget for m-government service provisioning is however noted as a practical recommendation. This study thus puts it forth as a study recommendation to m-government service provisioning organisations (Section 9.6.1), specifically to ICT managers, to lobby for improved budget lines.

## **8.6 Summary**

This chapter discussed the empirical results of the evaluation of the user interactive service-provisioning framework for m-government services in Tanzania. The findings quantitatively indicate that the acceptance level for the recommended m-government service-provisioning framework based on its adequacy, relevance, usability and feasibility for application, is high. The qualitative findings, while fully supporting the quantitative results, also highlight areas for further improvement of the provisioning framework. Extension of the stakeholders list, training and skills development for m-government services, and improvement of the budget for m-government service provisioning are among themes that emerged from the qualitative findings. It is however important to note that stakeholders indicated for inclusion and training and skills development were implicit in the previous provisioning framework (Figure 7.8), but to improve clarity, these components were made explicit to further improve clarity and appropriateness of the framework (Figure 8.4). Also, the study notes the cost implication associated with implementing the framework and thus acknowledges the need for an increased budget for m-government service provisioning as a practical recommendation for management and policymakers to consider.

The next chapter reflects the aim of the entire research study. It presents the summary of major findings, the contribution made to knowledge, limitations encountered and suggestions for future research.



**Figure 8. 4:** Revised User Interactive Service Provisioning Framework for m-Government Services

## **CHAPTER NINE**

### **SUMMARY OF FINDINGS AND RECOMMENDATIONS**

#### **9.1 Introduction**

This chapter reflects on the major research findings and recommendations. It presents a summary of findings, discusses the contributions made to knowledge, and acknowledges the study limitations, with useful recommendations for future research on citizens' adoption of m-government services.

Importantly, the crux of this research was to construct a service-provisioning framework that will enhance citizens' adoption of m-government services in Tanzania. To achieve the service-provisioning framework, factors influencing both adoption and the m-government services-provisioning practices in Tanzania were investigated, and several findings are summarized in section 9.2. Section 9.2.1 presents a summary of findings regarding the current status of the citizens' adoption of m-government services. While section 9.2.2 presents major findings regarding the provisioning practice, section 9.2.3 presents the factors influencing citizen adoption decisions for m-government service in Tanzania. Section 9.2.4 presents a summary of barriers to citizens' adoption of m-government services in Tanzania. Similarly, a summary of findings from the evaluation of the developed service-provisioning framework to determine its adequacy, relevance, usability and feasibility for application are summarized and presented in section 9.2.5.

The chapter discussion begins by providing an overview of the research in section 9.2, then reflects the major findings in section 9.3. In section 9.4, the study contributions to the body of knowledge are noted. Section 9.5 notes the study limitations followed by recommendations in section 9.6, while section 9.7 presents the summary that concludes this research.

#### **9.2 Reflection on Major Research Findings**

This study realised the need for a citizen-centred service-provisioning framework for m-government service as a salient solution to confront the low citizen adoption problem facing the government of Tanzania. The study recommends a user interactive service-provisioning

framework to guide m-government service provisioning, that is, modelling, delivery and appraisal processes for m-government services in Tanzania. To arrive at the recommended framework, the research adopts a holistic approach whereby both consumption and provision perspectives for m-government services were examined; examination of consumption yielded citizens' perceived factors on adoption, while examination of provision highlighted the provisioning practices for m-government services in Tanzania. The various steps towards accomplishing the research aim and responding to research questions were discussed in respective chapters.

Therefore, this section presents the major findings corresponding to the five objectives of the study (section 1.5). The reflection on major findings is organized to highlight the achievement of the set objectives and to verify that the study accomplished what was set out to be achieved.

### **9.2.1 Present Status of Citizens' Adoption of m-Government Services**

This section presents major findings in response to achieving objective RO1. Findings of this study revealed that citizens' adoption of m-government services in Tanzania is generally low. The status of m-government service adoption was assessed based on two indicators; awareness of the existence, and frequency of access of m-government services. In section 5.4.2, it is evident that a significant proportion (63% at  $p < 0.005$ ) of the respondents acknowledged that they were not aware that the government of Tanzania offers service via mobile phones. Additionally, to capture use behaviour patterns for m-government services, findings indicated majority had either never accessed (67.9%) m-government service or have accessed the services only once a year (19.7%); Table 5.4 shows a significant proportion ( $\chi^2 (5) = 801.046$ ,  $p < 0.0005$ ) have never accessed m-government services. This finding is consistent with findings from Abdelghaffar & Magdy (2012), Ahmad & Khalid (2017), Al-Hujran (2012), and Almarshdeh & Alsmadi (2017). The finding confirms that citizens' adoption of m-government service is still a challenge to most governments and further justifies the need for this research.

### **9.2.2 m-Government Services Service-provisioning Practices**

The qualitative aspect of this study that achieved objective RO2 uncovered several practices (section 6.2.2 and 6.3.2) that contribute to the low citizen adoption of m-government

services in Tanzania. Findings in sections 5.5.2.1 and the discussion in section 6.2.2 establish that there are limited efforts directed towards creating awareness on m-government services. Limited funding, low priority or competing priorities with other projects are among the reasons provided to explain the limited efforts for m-government services. Mtingwi (2015) argued that these practices are common among least developed countries, a result of low budget lines set aside for ICT related implementation. It was further revealed that where there are some attempts on awareness creation, the content was found to target organisational adoption as opposed to individual knowledge and skills building towards m-government service adoption. Also, it was noted that dissemination is only limited to traditional channels such as radio, television, newspapers and billboards. However, new channels, especially social media platforms (For example WhatsApp, Instagram, Facebook) that have been proven effective for awareness creation (Al-Hurjan, 2012; Burksiene, Dvorak & Duda, 2019), are rarely used.

Another striking practice that contributes to the limited citizen adoption is the designing and development practices for m-government services. Findings in section 5.5.1.1 and the discussion in section 6.2.2 and section 6.3.2 establishes that there is limited citizen participation in m-government service development and provision. m-Government services are thus developed based on assumed citizens' needs, resulting in a mismatch between service provided and citizens' expectations. This finding confirms Ibrahim & Mohammed (2008) and Mewala, Ocharab & Twinomurinzi's (2017) attestation that public services are developed based on assumptions about citizens' needs.

Practices related to provisioning the multi-stakeholder structure for providing m-government services also possess challenges regarding citizens' adoption. Findings in section 5.5.1.2 and section 5.5.2.2 establish there is limited collaboration as a result of limited strategic partnerships, coordination and synchronisation among provisioning stakeholders. A significant effect of this finding that is highlighted is the lack of a centralized service support system or structure for supporting citizens' use of m-government services. It is noted that each partner provides support separately, leading to redundant efforts and confusion for citizens on where to locate what assistance among the provisioning stakeholders, for some, their presence in the value chain is not so apparent to citizens.



Conclusively, findings established that m-government service provisioning in Tanzania is conducted along with the e-business service provision model. Section 5.5.1.3 establishes technical or functional factors are considered critical quality descriptors for m-government service provisioning. Accordingly, Stamenkov & Dika (2015) and Wanjau, Wangari & Ayodo (2012) elaborate that the e-business focus centres on ensuring the functionalities supporting the completion of an electronic transaction are achieved. However, Abro et al. (2015) attest that socio-technical factors are the ones more appealing for adoption over and above functionality of the services. The exclusion of factors that trigger cognition and positive emotions in citizens towards m-government services is thus identified and modelled in section 7.2 as the main obstacle to adoption.

### **9.2.3 Determinants of Citizens Adoption of m-Government Services**

Results corresponding to achieving research objective RO3 established that all eight independent factors are applicable in examining citizens' behaviour intention to adopt m-government services. Section 5.4.3.4 shows performance expectancy (PE), hedonic values (HV), self-efficacy (SE), attitude influences (AI), subjective norms (SN), technological influences (TI), financial influences (FI) and facilitating conditions (FC) loaded (at  $p < 0.001$ ) on the structural model of the Unified Model of Technology Adoption for Mobile Enable Services' (UMTAMES) (Figure 3.2).

However, findings divulge that non-technical factors are dominant in predicting citizens' behavioural intention to adopt m-government services in Tanzania. Upon examining the predictive power of identified independent factors, only four were significant. Three non-technical factors included Financial Influences (BI  $\leftarrow$  FI,  $\beta=0.416$ ,  $T=4.566$ ,  $P=0.001$ ), Subjective Norms (BI  $\leftarrow$  SN,  $\beta= 0.261$ ,  $T=3.815$ ,  $p< 0.001$ ) and Attitudes (BI  $\leftarrow$  AI,  $\beta= 0.109$ ,  $T=3.304$ ,  $p< 0.01$ ), and one technical factor, that is, the technology influences (BI  $\leftarrow$  TI,  $\beta= 0.226$ ,  $T=5.566$ ,  $p< 0.001$ ). Susanto & Goodwill (2011) attest that people tend to compare costs they incur against the benefits they expect when making an adoption decision. Almarashdeh & Alsmadi (2017), on the other hand, posit that individually formed opinions (attitude) and those of other people significantly define citizens' adoption behaviour; thus subjective norms are critical for consideration. Also, these findings confirm Al-Lozi & Al-Debei's (2014) argument regarding the significant influence of technology itself, measured in terms of time efficiency, location independency and mobility, on

adoption decisions. Therefore, taking into consideration these factors of adoption and the corresponding provisioning practices described in section 9.3.2, barriers hindering citizen's adoption of m-government services were identified.

#### **9.2.4 Barriers to Citizens' Adoption of m-Government Services**

Drawing on the implication of the study findings, which corresponds to achieving research objective RO4, three barriers are established to inhibit citizens' adoption of m-government services. First, citizens' unpreparedness is established as a barrier to m-government service adoption in Tanzania, as demonstrated through citizens' unawareness and lack of necessary skills to navigate through m-government service in section 6.2.1. Henningsson & van Veenstra (2010) and Yonazi, Sol & Boonstra (2010) also noted citizen unpreparedness as a major obstacle to governmental IT transformation and e-government adoption.

Second is the mismatch in service requirements as a result of citizens' exclusion from m-government service development practices. This finding implied that there is a mismatch between citizens' expectations and service quality specifications for the resulting m-government services. This barrier is a result of the common practice noted by Ibrahim & Mohammed (2008) that public services are developed based on assumed citizens' needs. Findings also established this as a practice in Tanzania (Section 6.2.2). Savoldelli, Codagnone & Misuraca (2014) argue that quality and public value specifications should not be identified self-referentially by public administrators but through consultation with citizens.

Third, the m-government service provider focus that is vested within the e-business focus is established as a barrier to citizens' adoption of m-government services in Tanzania. Findings corroborated that the current m-government service provisioning falls under an e-business service model whereby completing an online transaction via a mobile phone is more essential than the emotions and cognitive affect the transaction creates within a citizen. It merely focuses on achieving technical or functional factors. Findings have established that non-functional factors such as financial influences, subjective norms and attitudinal influence significantly predict Tanzanians' intention to adopt m-government services (Sections 6.3 and 6.4). Abro et al. (2015), Stamenkov & Dika (2015) and Wanjau, Wangari & Ayodo (2012) vehemently contest the e-business model for provisioning and recommend

consideration of emotional, aesthetic and cognitive attributes in public service-provisioning models.

Accordingly, the presence of these barriers has led to the modelling of the current m-government service provision-adoption scenario in section 7.2; the mismatch between service provision targets and consumer expectations. The modelled scenario indicates that while citizens are driven by a user experience focus (emotional and cognitive experience) to adopt and consume services, m-government service providers are driven by an e-business focus (online transactional accomplishment) for provision (Figure 7.1). Robert & Lesage (2010) agree that functionality concerns of usability and usefulness are no longer effective predictors of intention to use and usage patterns of interactive systems. Section 7.3 established the application of a combination of an e-service and citizen-centric focus to address the identified citizens' adoption problem. Stamenkov & Dika (2015) align the success of an e-service experience with the quality of interaction between the user, service and technology, in this case, the mobile technology. Also, Bertor, Estevez & Janowski (2016) attest that the involvement of citizens in provisioning will further improve service satisfaction. Therefore, a citizen-centric m-service focus and a user interactive service-provisioning framework are recommended for enhancing citizens' adoption of m-government services in Tanzania.

#### **9.2.5 Viability of the Strategy for Enhancing Citizen Adoption**

This section presents major findings that achieve research objective RO5. Evaluation findings revealed that the modelled citizens' adoption problem, solution and the user interactive service-provisioning framework adequately captures the m-government service adoption scenario in Tanzania. In section 8.3.1 and section 8.3.2, findings indicate the problem design and the corresponding solution design appropriately and sufficiently identify components and the relationships of the m-government service adoption scenario. Findings in section 8.4 indicate that the user interactive service-provisioning framework appropriately aligns with policies and procedures guiding m-government service provision in Tanzania. Additionally, based on assessing relevance, findings in section 8.4 and its subsequent subsections establishes that the user interactive service-provisioning framework addresses actual provisioning challenges, enhances efficiency in provisioning, and that it contributes to best practices in m-government service provisioning.

Similarly, the findings indicate an overall positive attitude towards adequacy, relevance, usability, and feasibility of the framework, thus implying that the framework is viable for implementation in Tanzania. The user interactive service-provisioning framework was established to be usable in guiding m-government service development and provision as it is discovered to be easy to use, understand and be communicated among provisioning stakeholders. Also, evaluation results revealed that the framework facilitates further improvement in provisioning. Evaluating the feasibility in applying the user interactive service-provisioning framework, findings revealed that the framework could be implemented within existing organisational resources, professional capacity, without any changes, immediately and within a short time frame.

In contrast, findings revealed that the framework is rather expensive to implement. This finding is in line with Bell & Nusir (2017), who argue that citizen-centricity and value co-creation is both financially and labour intensive, and time-consuming. Drawing on the implications of the evaluation findings and the suggestions made for improvement, the m-government service provisioning framework was revised to incorporate their recommendations explicitly (Figure 8.4).

### **9.3 Research Contributions**

This study makes several contributions to the body of knowledge on m-government service adoption. These contributions are classified into two categories, namely, the contribution to m-government service adoption and to the m-government service provisioning practices. The research makes a theoretical knowledge contribution to the understanding of m-government service adoption (Section 9.3.1) and a practical contribution towards enhancing m-government service-provisioning (Section 9.3.2).

#### **9.3.1 Contribution to m-Government Service Adoption Evaluation Approaches**

This study contributes to the existing literature on m-government service adoption with regard to the research context and application of the holistic approach in evaluating adoption; that is, combining the provision and consumption focus to understand factors influencing citizens' adoption of m-government services. It is noted that there is no study that has applied a comprehensive approach to understanding the causes of low citizen adoption of m-government services in Tanzania.

### **9.3.2 Contribution to m-Government Service Adoption Model**

The originality of the conceptualized framework for evaluating the adoption of mobile-enabled government services, that is, the Unified Model of Technology Adoption for Mobile Enables Services (UMTAMES) is another contribution that the study makes. This contribution relates to the application and extension of theories to address the uniqueness of the m-government service adoption scenario. The UMTAMES extends and modifies the Unified Theory of Acceptance and Use of Technology (UTAUT) model and incorporates the influences of technology itself to predict citizens' adoption intentions and behaviour. The "mobility", a characteristic peculiar to mobile technologies, is hypothesized and proven statistically to influence intention to adopt m-government services significantly. Moreover, UMTAMES applies the technology domestication and the technology use and gratification bodies of knowledge to define the indicators of the framework variables.

### **9.3.3 Contributions to m-Government Service Provisioning Practices**

In addressing the main aim of this study, the research made significant contributions to practice in transforming public service provision and enhancing adoption of m-government services.

First, the main contribution of this study is the construction of the user interactive service-provisioning framework to guide m-government service provisioning in Tanzania. Additionally, the provisioning framework provides a basis upon which governments in developing countries, with a similar culture and socio-economic conditions, can enhance their provisioning practices and thus improve the adoption of their m-government service initiatives.

Second, the research, through modelling of the m-government service adoption barriers and the recommended solution, enlightens the m-government service provisioning organisations on what hinders citizens' adoption. The model provides the platform for individual stakeholders to reflect on their provisioning practices and how these practices act as obstacles to citizens' adoption.

Last, the development of the models (problem and solution models) and the user interactive service-provisioning framework implies a contribution of an innovative artefact in the field of Information Systems. This knowledge from the models further extends understanding of

the persistent challenges of citizens' adoption of m-government services, and so provides an opportunity to recommend appropriate solutions. Also, the knowledge on the user interactive service-provisioning framework enhances effectiveness in development and delivery of m-government services. It provides a practical solution in resolving the citizens' m-government service adoption problem in Tanzania and to countries with similar cultural and socio-economic conditions.

#### **9.4 Study Limitations**

This research, while it has achieved its primary objective, just like other studies, acknowledges some limitations. Moreover, it is essential to note that since adoption is a socio-psychologically driven decision, the solutions to m-government service provisioning for enhancing citizens' adoption will keep on changing to reflect the changes in citizens' socio-psychology.

First, the findings and the resulting artefacts, that is, the modelled m-government service adoption problem, the candidate solution, and the user interactive service-provisioning framework for m-government service provision, exclusively applies to m-government service provisioning in Tanzania. The resulting artefacts' applicability is limited to the context of Tanzania due to these reasons: one, the factors influencing citizens' adoption decision were identified using perception data from Tanzanians. Two, the m-government service provisioning practices established reflect the practices of government organisations in Tanzania who are providing or intending to provide m-government services. Finally, the assessment for the viability of the resulting user interactive service-provisioning framework was conducted using officials from government organisations in Tanzania. Moreover, this research acknowledges the context specificity nature of adoption; thus, the resulting models and the framework provides a conceptualisation and an approach for other nations to assess and develop their context-specific provisioning frameworks for m-government services. Therefore, for the generalizability of knowledge, this study makes a recommendation for future research to consider extending the sample to include citizens and m-government service provisioning organisations from other countries. Also, while the resulting framework is universal, similar efforts need to be applied to determine its viability in the context in which the framework is to be applied.

Second, despite the user interactive service-provisioning framework addressing provisioning concerns for m-government service in Tanzania, the study acknowledges that the citizens' perspectives captured to inform the framework development is limited to residents of Dar es Salaam city. While Dar es Salaam as a study area and the ability for findings to be generalized to Tanzania is justified in section 4.8.1, the economic, social, urban-rural cultural dynamics may provide a richer context to inform provisioning practices for m-government services. Thus, this study makes a recommendation for the future study to consider a nation-wide survey on citizens' opinions towards m-government services provided.

Third, the context of the research is limited to the intricacies of citizens' consumption attitudes and provisioning practices of government organisations, and it does not include third party stakeholders' practices in m-government service provisioning. The study acknowledges the vital role of third-party partners in m-government service value creation; hence the resulting framework identifies and captures their roles for provisioning. However, the third-party partners' perspectives are not captured in the research results. Therefore, a recommendation for future research is made to extend the scope and incorporate practices of third-party partners like policymakers and telecommunication service providers.

Fourth, while overall the framework was established as viable for implementation and for resolving the ensuing m-government service adoption problem, some respondents indicated it is not cost-effectively implemented. Section 8.5 established quantitatively that a significant proportion (33%) disagreed with one respondent, noting explicitly that implementation will not be cost-effective. This observation is consistent with the observed practices in section 5.5.2.1, which note budget constraints for implementing m-government services. Also, Bell & Nusir (2017) acknowledge that implementing citizen-centricity and value co-creation approaches is expensive due to the skilled labour and time requirements.

Fifth, since only an ex-ante evaluation was conducted, that is, evaluation prior to framework implementation, the study acknowledges the need for a post ante evaluation. A post ante evaluation may yield relevant information to further improve the framework. Therefore, incorporating post ante experiences may imply additional changes to localize the framework during implementation.

Finally, the resulting user interactive service-provisioning framework was only evaluated for its applicability in the intended context for which it was designed and not against other similar frameworks for instance the evaluation framework for m-government service success in Malaysia (Azeez & Lakulu, 2018). This is therefore recommended as an area for future research. Such an evaluation may yield several changes and further improvement to the framework.

## **9.5 Recommendations Based on Research Outcomes**

This study makes a general recommendation to periodically review the provisioning framework in order to ensure it addresses emerging barriers to citizens' adoption. It acknowledges that adoption is purely reliant on citizens' perceptions, which, like any social phenomenon, are never constant. This finding is consistent with the observation that countries with high EGDI commonly had a practice of conducting periodic surveys on citizens' perceptions towards e-government initiatives (UN, 2018).

### **9.5.1 Recommendations for m-Government Service Providing Organisations**

Based on the findings, this study makes the following recommendations to the government organisations providing or intending to provide m-government services:

First, it is recommended to public service providers that citizens are included in the m-government service development phases, from modelling, to delivery, and service appraisal, as indicated in the framework (Section 7.4.3). This recommendation is in line with the research findings that most organisations work under assumed citizens' needs (Sections 5.5.1.1 and 5.5.2.3), which jeopardizes the expected quality of the resulting m-government services. Therefore, technical personnel must utilize different techniques, including user ghosting and prototyping, to involve citizens.

Second, it is recommended that public service providing organisations conduct citizens' perception surveys periodically to ensure that m-government services cater to realistic citizens' needs and requirements. This recommendation corresponds to the current practice in m-government services provisioning noted in section 5.5.1.1. Consistent with Mpinganjira's (2014) observation that failure to respond to customer needs promptly and accurately leads to disappointed citizens. It is suggested that technical personnel must gather requirements from citizens for every service modelled, even in the event of re-engineering



existing services. Moreover, the citizens' perception surveys on m-government services are recommended to be scheduled after every three years, a period long enough for any changes in perception, and also to facilitate funding.

Third, managers are advised to provide training and skills development to public officers, to facilitate internal capacity building and encourage in-house m-government development, for citizens' confidence and trust in m-government services. It is noted in section 5.5.1.1 that among the reasons for outsourcing is the limited ICT capacity in most government organisations.

Fourth, it is recommended that managers in public service providers consider private-public partnership models for m-government service pricing in order not to compromise sustainability in provisioning of public services. Therefore, public service providers must ensure that citizens are included in the service pricing to facilitate their comprehension and concession on the price to be charged. Similar to Yan (2015), the eGovernment Agency (eGA), as a coordinating organisation, must ensure acceptable risk sharing and benefit compensation among stakeholders while at the same time protecting citizens' affordability and access to m-government services as a public good.

Fifth, it is suggested to government organisations that the knowledge for m-government services needs to be commodified and reflective of citizens as the main audience. Knowledge commodification implies making the m-government service knowledge content appropriate, addressing benefits or application of m-government services in daily life to encourage use. Awareness of the presence, benefits and the functioning of most m-government services was found to be low among citizens (Section 5.4.2). This suggestion involves periodic reviews of m-government service knowledge, training and skills development strategies being used, to assess their effectiveness and impact on citizens' knowledge and skill set.

Sixth, managers in government organisations are urged to explore other opportunities on m-government service knowledge dissemination. While the television was claimed as the platform that the majority use to access information regarding government innovation (Section 5.4.2), this was not effective as overall awareness was low. It is recommended that they consider utilizing the various social media platforms (Facebook, WhatsApp, Twitter,

Instagram) to more effectively create awareness of m-government services (Al-Hurjran, 2012; Burksiene, Dvorak & Duda, 2019). Moreover, it is recommended that managers consider identifying champions for m-government services, both ordinary citizens and top politicians.

Seventh, it is recommended that public service providing organisations must ensure the presence of legally binding partnership contracts for m-government services with all partners involved in provisioning. This recommendation will facilitate efficiency and accountability among partners resulting in improvement in m-government services. It is noted in section 8.2.1 that not all partners have legal contracts with public service providing organisations.

Eighth, it is recommended that changes and any major upgrading are scheduled and synchronised among stakeholders. This corresponds to the finding in section 5.5.1.2 that indicates the absence of scheduled or planned service upgrading; as a result, most changes are adhoc changes. Managers need to ensure major changes and any upgrading are communicated, planned and synchronised across all partners to ensure service continuity and appropriate communication to citizens.

Last, it is suggested that managers in government organisations should lobby for improved budgets for m-government service provisioning. It is important to note that the implementation of all the other recommendations made is dependent on the available funds. Generally, the success of m-government service adoption is highly dependent on the investment made towards its provisioning.

### **9.5.2 Recommendations for m-Government Service Infrastructure Access Providers**

This study makes the following recommendations to infrastructure access providers for m-government services, based on the research findings:

First, it is recommended that eGA, as an infrastructure access provider for Tanzania, takes a leadership position in coordinating and synchronising provisioning activities among stakeholders. Although leadership is noted, it was established to be absent in coordinating other critical functions like citizen support (Section 5.5.1.3) and citizens' awareness and skills building (Section 5.5.2.1). Moreover, issues like conflicting roles and lack of strategy

and guidelines that are noted in section 5.5.2.2, need to be ironed out to facilitate coordinated efforts among stakeholders towards adoptable m-government services.

Second, as part of taking leadership in m-government service provisioning efforts, it is recommended that eGA oversee the establishment of a well coordinated and synchronised citizen support service. This recommendation corresponds to findings in section 5.5.1.3 that indicated the lack of a centralized and coordinated citizen support system for m-government services. It is time consuming and expensive for citizens to identify the relevant stakeholder to contact each time they face a challenge in using m-government services.

Third, it is recommended that managers at eGA stipulate a mechanism to involve and obtain citizens' opinions on implementation of the m-government service infrastructure. This corresponds to research findings in section 5.5.1.1 that citizens are not regarded as critical stakeholders in m-government service development practices. The crux of the recommended user interactive m-government service provisioning framework rests on the citizen being at the centre, thus advocating for a citizen-centric approach (Section 7.4.3). Similar to public service providing organisations, infrastructure access providers need to implement various techniques to incorporate citizens, in designing and development of the infrastructure, in service price setting, as well as in publicity and training on how to use the infrastructure.

Fourth, it is recommended that public service providing organisations conduct periodic infrastructure surveys to determine and ensure that the infrastructure supports the ICT capabilities of the citizens. This recommendation addresses the mismatched m-government service requirements challenge as identified in section 6.5.2. Therefore, the survey should aim to identify the hardware used by the majority, as well as the ICT skills of the citizens, in order to match these variables with the access infrastructure.

Fifth, managers must ensure regular ICT training and skills development for public officers to keep them abreast of the changes in mobile and wireless technology. Since eGA has the leading role in ICT implementation in Tanzania, it is recommended that the training of the trainer (ToT) approach be implemented. The trained trainers can then be used to train and support other government organisations, thus building internal ICT capacity within the government, which section 5.1.1.1 established as limited.

Sixth, it is recommended that eGA devise a mechanism that will ensure inclusion of citizens' opinions in the pricing of m-government services. As a key player that negotiates with telecommunications companies, the prices to be charged for m-government services needs to incorporate citizens' voices and ensure prices are reflective of the economy and the purchasing power of majority. This recommendation corresponds to the price sensitive nature of Tanzanians, as indicated in section 5.4.3.5.

Last, corresponding to the limited ICT budget noted in section 5.5.2.1, it is suggested that managers should lobby for an improved ICT budget to support infrastructure access provision for m-government services and the leadership role in ICT implementation in the public sector. Moreover, more effort should be made to lobby for increased budgets to be a priority in coordinating stakeholders' activities to facilitate quality m-government services delivered to citizens of Tanzania.

### **9.5.3 Recommendations for Policy Makers**

Based on the research findings, the following recommendations are proposed to policy makers, to ensure a safe, trusted and regulated environment for citizens to utilize m-government services when interacting with the government.

First, it is recommended that policy actors, including the Tanzania Communications Regulatory Authority (TCRA), formulate laws and principles that guide the use and safeguard the privacy and security of both citizens and government organisations when transacting using m-government services. The unpreparedness of a cyber legal and regulatory framework in Tanzania, noted in section 7.4.1.4 and section 7.4.2.3, affects citizens' trust in online transactions with the government (Isagah & Wimmer, 2018). Therefore, TCRA and other actors need to stipulate clear laws and principles related to the rights and responsibilities of both citizens and governments on acquisition and use of data and information.

Second, the policy makers need to implement a mechanism for ensuring compliance with the policies, laws and regulations that govern stakeholders' behaviour while transacting using a mobile device. This recommendation corresponds to the need for a regulated environment for providing m-government services as established in section 7.4.2.3. The presence of the legal instruments requires a mechanism for enforcing these instruments,

which may include using the police and the court systems to deliver justice. Therefore, these laws, policies, principles and regulations must be made part of the nation's cyber security laws enforceable within the justice system.

Last, it is recommended that the TCRA institute a policy and guidelines for minimum service standards for m-government service provisioning in Tanzania. The policy should regulate the prices charged for m-government services by ensuring citizens and other implementing stakeholders have a forum to negotiate. Moreover, the policy should stipulate the required quality of service, which may include network quality, the service package and the level of support made available to citizens. This recommendation responds to findings in section 5.4.3.5 that indicate the price sensitive nature of citizens such that the policy and subsequent guidelines should ensure value for money spent on m-government services. This policy will safeguard citizens and ensure quality m-government service provisioning in Tanzania.

#### **9.5.4 Recommendations for Telecommunication Service Providers**

Recommendations to telecommunication service providers (TSP), that is, mobile service providers (MSP) such as mobile phone companies and Internet service providers (ISP), based on the research findings, are below:

The study recommends that telecommunication services providers ensure a minimum agreed quality of service, which may include network availability, sufficient network speed and security for the wireless and mobile services. Findings in section 5.5.1.3 indicate that the quality of network, that is, network speed, network availability (accessibility) and security are important descriptors of service quality.

Also, it is recommended that telecommunications providers ensure formal and legally binding contracts or agreements with third party vendors they work with to deliver services to citizens. Third party vendors, also referred as Mobile Money Operators (MMOs), including kiosk owners and small retail shops, affect the overall m-government service experience. This is a recommendation also raised by experts who evaluated the user interactive m-government service provisioning framework (Section 8.3.1).

### **9.5.5 Recommendations for Citizens**

It is recommended that citizens, as part of the development and provision stakeholders, should be willing to participate in various activities including surveys, requirements elicitation, price discussions, and in testing and verification of the resulting m-government services. As a targeted consumer, citizens need to understand their role in improving provisioning and adoption of m-government services in Tanzania. This recommendation addresses the study findings noted in section 5.5.1.1 and section 5.5.2.3, that citizen exclusion is common in m-government provisioning practices. Moreover, it corresponds to two contributions made by this research in improving m-government provisioning, that is, the user interactivity concepts (Section 7.4.2) and citizen centricity (Section 7.4.3).

### **9.6 Recommendations for future research**

Based on the acknowledged limitations, the following recommendations are made for future research work:

It is suggested that future research should consider extending its sample to include third party stakeholders in order to examine the provisioning practices and their impact on citizens' adoption of the resulting m-governments service. Third-party stakeholders may include but not limited to, policymakers and telecommunication service providers (that is Internet service providers and mobile service providers). Also, the scope of the research should be extended to include second layer stakeholders such as mobile money operators, to understand their practices and the impact of these practices on citizens' adoption.

Furthermore, to facilitate generalizability, it is recommended that future research draw on a more comprehensive and extensive sample of citizens and provisioning organisations that extend beyond Tanzania. These study results are confirmed to the context of Tanzania; therefore, m-government service provisioning organisations and citizens from other nations are not addressed by these results.

Additionally, given the diversity in human socio-psychological factors, the study recommends that future research consider other cities in Tanzania. The broad national survey will facilitate a comprehensive description of the citizens' adoption perspective for m-government services by ensuring that the factors of adoption identified are representative

of the entire population. Moreover, a nation-wide survey will facilitate capturing of the citizens' social, economic and rural-urban cultural diversity.

Likewise, to derive a generic framework for guiding m-government service provisioning, the study recommends future research to consider widening the research scope and including other nations in the research. For instance, for a generic m-government service framework applicable in Africa, a sample of African nations needs to be considered. It is recommended because the social, cultural, economic and political factors affect both practice and citizens' attitudes. Moreover, different nations may have different structures and stakeholders involved in the provisioning of m-government services; thus, impacting on the provisioning practices.

Furthermore, the study only considered an ex-ante evaluation of the derived m-government service-provisioning framework. Also, the resulting framework has not been evaluated against other similar frameworks. It is thus recommended that future research consider conducting a post ante assessment and also a comparative evaluation with other similar frameworks. This is acknowledged as a limitation to the study in section 9.4.

## **9.7 Summary**

This research responded to the main research question that asks, *"How can citizens' adoption of m-government services be enhanced in Tanzania?"* as follows:

In addressing the main research question and the subsequent specific research questions (section 1.4), the study applied a unique research approach that investigated the m-government service adoption problem from a holistic perspective. The holistic approach combined both a service provision perspective and service consumption perspective in examining adoption.

The study embarked on a two-phase research process; namely, the adoption challenges identification phase and the framework evaluation phase. Phase 1, applying a holistic approach, uncovered the citizens' perceived factors of adoption (Sections 6.3.1) and the provisioning practices that hinder the achievement of these factors (Sections 6.3.2), thus establishing and explaining the present citizen adoption status for m-government services in Tanzania. The discussion of the implications of these findings facilitated the identification

of citizens' challenges in adopting m-government services (Section 6.5).

Moreover, the study provided an m-government service provisioning solution informed by the holistic identification of the citizens' adoption problem. This concluded phase one, whereby three artefacts were developed, namely, the m-government service provision-consumption problem design (Figure 7.1), the m-government provision-consumption solution design (Figure 7.2) and the consolidated user interactive service-provisioning framework (Figure 7.8). Thus, findings of phase one of the research facilitated the understanding of dynamics involved in citizen adoption decisions towards of m-government services. The study identified a specific adoption problem, the mismatch between service provision and service consumption expectations (Section 7.2), which a citizen-centric service provisioning (Section 7.3) can solve. These findings facilitated the development of a service provisioning framework (Section 7.4) to aid the provisioning practice for m-government services, thus, enhancing citizens' adoption.

In Phase 2, the evaluation of the developed artefacts, findings revealed that the artefacts were relevant, adequate, usable and feasible for application in enhancing citizens' adoption of m-government services. While developing the service-provisioning framework is core in addressing the main research aim, evaluation of the developed artefacts forms a crucial stage within the adopted design research approach (Yonazi, 2010). Thus, executing phase two revealed that the developed artefacts are viable for application in enhancing citizens' adoption of m-government services in Tanzania (Section 8.5). Conclusively, this demonstrates that the research approach and the findings realized addressed the research aim.



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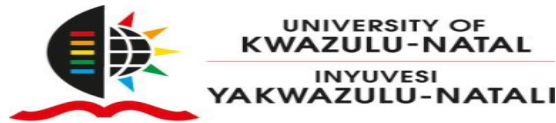
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## APPENDICES

### Appendix A1: The Adoption Factors Identification Questionnaire – English Version



## UKZN HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE (HSSREC)

### APPLICATION FOR ETHICS APPROVAL

For research with human participants

#### Information Sheet and Consent to Participate in Research

Date: 20/12/2017

Greetings,

My name is Maria lauda Joel Goyayi from University of Kwa-Zulu Natal, Westville campus, Contact details: +255 754 271 685 and Email address: [215082145@stu.ukzn.ac.za](mailto:215082145@stu.ukzn.ac.za).

You are being invited to consider participating in a study that involves research on factors that influences citizens' decision to adopt mobile services provided by the government of Tanzania. The aim and purpose of this research is to understand the factors that influences citizen's adoption decisions and then develop an implementation framework to enhance adoption of government m-services in Tanzania. The study is expected to include a total 412 residents of Dar Es Salaam, Tanzania. Participation in this research involves filling out a questionnaire that will take no more than 5 minutes.

The study involves no risks and/or discomforts the following risks and/or discomforts of any nature and also you are free at any time to withdraw your participation. We hope that the study will create the following benefits to government institutions providing m-services by modeling and incorporating citizen's factors for m-service adoption in the implementation process to enhance adoption. If any additional information is required regarding this study please contact me to verify before filling the questionnaire.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee (approval number **HSS/2085/017D**).

In the event of any problems or concerns/questions you may contact the researcher at MARIA LAUDA JOEL GOYAYI on +255 754 271 685 and [215082145@stu.ukzn.ac.za](mailto:215082145@stu.ukzn.ac.za) or the UKZN Humanities & Social Sciences Research Ethics Committee, contact details as follows:



**HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION**

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Tel: 27 31 2604557- Fax: 27 31 2604609

Email: [HSSREC@ukzn.ac.za](mailto:HSSREC@ukzn.ac.za)

Your participation in the study is voluntary and by participating, you are granting the researcher permission to use your responses. You may refuse to participate or withdraw from the study at any time with no negative consequence. There will be no monetary gain from participating in the study. Your anonymity will be maintained by the researcher and the School of Management, I.T. & Governance and your responses will not be used for any purposes outside of this study.

All data, both electronic and hard copy, will be securely stored during the study and archived for 5 years. After this time, all data will be destroyed.

If you have any questions or concerns about participating in the study, please contact me or my research supervisor at the numbers listed above.

Sincerely

MARIA LAUDA JOEL GOYAYI

## CONSENT TO PARTICIPATE

I ..... has been informed about the study entitled “Adoption Framework for Mobile Services Provided by Government for Citizens of Dar Es Salaam Tanzania ” by Marialauda Joel Goyayi.

I understand the purpose and procedures of the study. Participating in this research involves filling out a questionnaire that will take no more than 5 minutes.

I have been given an opportunity to ask questions about the study and have had answers to my satisfaction.

I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any of the benefits that I usually am entitled to.

I have been informed about any available compensation or medical treatment if injury occurs to me as a result of study-related procedures.

If I have any further questions/concerns or queries related to the study I understand that I may contact the researcher at [215082145@stu.ukzn.ac.za](mailto:215082145@stu.ukzn.ac.za) or +255 754 271 685.

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact:

### HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus  
Govan Mbeki Building  
Private Bag X 54001  
Durban  
4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604557 - Fax: 27 31 2604609

Email: [HSSREC@ukzn.ac.za](mailto:HSSREC@ukzn.ac.za)

---

Signature of Participant

---

Date

## QUESTIONNAIRE –ENGLISH VERSION

### Profiling Questions

Q1. Age Group

Up to 29	30 -55	56 and Above

Q2. Gender

Male	Female

Q3. Highest level of education

No Formal Education	Some/all Primary	Some/all Secondary	Intermediate Level (Certificate, Diploma)	Advanced Level (Degree, Masters, PhD)

Q4. Work status

Government Employee	Private Sector Employee	Self-Employed	Unemployed

Q5. Indicate whether you have used the following mobile services: (Tick **ALL** that apply)

5.1 Mobile Money/Payment (M-Pesa, TiGO Pesa, Airtel Money)	5.2 Mobile Banking Services (CRDB Simbanking, NMB Mobile)	5.3 Mobile Gaming (Biko, Tatu Mzuka, Sport Pesa)

Q6. Have you heard of government services being offered through mobile phones?

Yes	No

Q7. Indicate through which **ONE** of the following media you **MOSTLY** hear about government innovations on service provision (Select **ONE** option only)

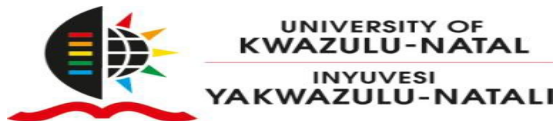
Radio	Television	Magazine/ Newspapers	Street Promotion	Other - Please specify:

	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<b>Subjective Norms</b>						
SN1	My friends and family think I should use mobile phones to access government services.					
SN2	My superiors support the idea of using mobile phones to access government services.					
SN3	Using mobile phones to access government services is acceptable in my society/culture.					
SN4	People from my society/culture prefer to access government services via mobile phones as opposed to face to face					
SN5	Accessing government services or information through mobile phone gives a person a sense of importance					
SN6	People who access government services or information through mobile phones are more accepted by their peers					
<b>Facilitating Conditions</b>						
<b>Behavioural Control</b>						
BC1	I can get help from government employees when I have difficulties in using mobile government services.					
BC2	I know someone who has successfully accessed government services using mobile and I can get help from him/her if necessary					
BC3	The mobile government service provided is compatible with the mobile phone that I use.					
BC4	Existing guidelines for m-service provision adequately address service users' interests					

BC5	There are sufficient laws to prosecute cyber crimes in the event of m-service abuse					
<b>Trust and Security</b>						
TS1	I believe government information and services provided through mobile phones are accurate					
TS2	I believe government information and services provided through mobile phones are authentic					
TS3	I feel safe to share my personal information with the government through the mobile phone technology					
TS4	I feel my privacy is assured when using mobiles phones to access government services.					
<b>Attitudinal Influences</b>						
AI1	Using a mobile phone to access information or a service is addictive					
AI2	I routinely use my mobile phone to access information off the internet					
AI3	Using a mobile phone gives one the ability to repeatedly get information or use services.					

	<b>Statement</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
<b>Technological Influences</b>						
TI1	I am able to have instant connectivity and access to information with my mobile phone					
TI2	I am able to access information efficiently using my mobile phone.					
TI3	I am able to access information 'on the go' using my mobile phone					
TI4	I am able to access information wherever I am situated with my mobile phone					
TI5	I am able to save time when accessing					

	information with my mobile phone compared to other methods of accessing information					
TI6	I am able to access information at any time of the day or night with my mobile phone					
<b>Financial Resources Influence</b>						
FI1	The cost of messages for mobile government services is reasonably priced.					
FI2	Government services provided via mobile phones is affordable					
FI3	The current messaging price to access government services via mobile phone is acceptable					
FI4	The approach used to determine price of government provided m-services is acceptable					
FI5	The incentives (discounts) attached to the government provided m-services are appreciated					
<b>Behavioural Intention</b>						
BI1	I intend using mobile phones to access government services in the future.					
BI2	I will use mobile phone to access government services in the future when possible.					
BI3	I am willing to adopt/use a mobile phone to access government services if it is available to me					



**UKZN HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS  
COMMITTEE (HSSREC)**

**APPLICATION FOR ETHICS APPROVAL**

**For research with human participants**

**Information Sheet and Consent to Participate in Research**

Tarehe: 20/12/2017

Habari,

Ninaitwa MARIA LAUDA JOEL GOYAYI kutoka chuo kikuu Kwa-Zulu Natal, Kampasi ya Westville, Mwenye mawasiliano ya simu +255 754 271685 na barua pepe [215082145@stu.ukzn.ac.za](mailto:215082145@stu.ukzn.ac.za).

Ninakualika wewe kushiriki katika utafiti unaohusu kuelewa mambo muhimu yanayochangia uchaguzi wa kutumia huduma za serikali kwa njia ya simu ya kiganjani kwa watu wa Tanzania. Utafiti huu unalenga kuelewa mambo haya na hivyo kutengeneza mpango mkakati utakaosaidia kuongeza chachu ya matumizi ya huduma za serikali kwa njia ya simu ya kiganjani. Utafiti huu unategemea kushirikisha waTanzania takribani 412 wanaoishi Dar Es Salaam,Tanzania. Ushiriki wako ni kwa njia ya kijibu maswali yaliyopo katika dodoso ambayo hayatakuchukua muda zaidi ya dakika 5 tu.

Utafiti huu hauna athari zozote kwa washiriki wake na pia mshiriki anao uhuru wakuamua kujitoa ushiriki wake muda wowote. Tunatunamaini kuwa utafiti huu utaleta manufaa kwa Taifa la Tanzania kwa kuleta uelewa zaidi juu ya matumizi ya huduma za serikali kwa njia ya simu ya kiganjani na hivyo kuongeza ufanisi katika utoaji huduma kwa wananchi. Iwapo taarifa ya ziada itahitajika tafadhali usisite kuwasiliana nami kwa ufafanuzi zaidi kabla ya kujaza dodoso.

Utafiti huu umehakikiwa kitaalam na kitengo cha kuratibu maswala ya utafiti cha chuo kikuu Kwa-Zulu Natal, idara ya Humanities and Social Sciences Research Ethics Committee (namba ya kibali HSS/2085/017D).

Kwa tatizo lolote au maoni au maswali yeyote tafadhali wasiliana na mtafiti MARIALAUDA JOEL GOYAYI kwa namba +255 754 271 685, barua pepe: [215082145@stu.ukzn.ac.za](mailto:215082145@stu.ukzn.ac.za) au kitengo cha utafiti chuo kikuu Kwa-Zulu Natal Humanities & Social Sciences Research Ethics Committee, kwa anwani ifuatayo:

**HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS**

**ADMINISTRATION**

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Email: [HSSREC@ukzn.ac.za](mailto:HSSREC@ukzn.ac.za)

Ushiriki wako kwenye utafiti ni wa hiari na kwa kuamua kushiriki kwako, unampa mtafiti ridhaa ya kutumia majibu yako. Unaweza kukataa kushiriki au kujitoa ushiriki wako katika hatua yeyote ile na muda wowote wa utafiti bila kupata madhara yeyote. Hakutakuwa na zawadi yeyote ya kifedha itakayotokana na ushiriki wako. Usiri wa ushiriki wako utatunzwa na mtafiti pamoja na skuli ya 'Management, I.T. & Governance' na taarifa zozote ulizotoa hazitatumika kwa nia yeyote nje ya utafiti huu.

Taarifa zote, aidha za kielektronik na za ripoti zitatunzwa kwa usalama katika kipindi chote cha utafiti na nakala zote zitatunzwa kwa muda wa miaka mitano (5) kuafata na taratibu za chuo. Baada ya muda huo taarifa na nakala zote zitaharibiwa kwa kufuata utaratibu wa chuo.

Kama kuna maswali au maoni yeyote kuhusu ushiriki katika utafiti huu, tafachali wasiliana nami au na msimamizi wangu kupitia mawasiliano hayo juu.

Wako

**MARIA LAUDA JOEL GOYAYI**



## **RIDHAA YA KUSHIRIKI UTAFITI**

Mimi ..... nimepata taarifa zote kuhusu utafiti huu wenye kichwa cha habari “Adoption Framework for Mobile Services Provided by Government for Citizens of Dar Es Salaam Tanzania ” wa Marialauda Joel Goyayi.

Ninaelewa dhumuni na utaratibu wa utafiti huu. Ushiriki wangu katika utafiti huu ni kwa njia ya dodoso ambalo litachukua takribani dakika 5 tu.

Nimepewa nafasi ya kuuliza maswali kuhusu utafiti huu na nimepatiwa majibu ya kuridhisha.

Ninakiri kuwa ushiriki wangu katika utafiti huu ni wa hiari na kuwa ninayo haki ya kusitisha ushiriki wangu muda wowote bila kiathiri mafao na stahilli zangu zozote.

Nimetaarifiwa kuhusu stahili na huduma za kitibabu zilizopo iwapo nitaathirika kwa namna yeyote ile na utaratibu wa utafiti huu.

Iwapo kuna maswali ya ziada au maoni ninafahamu kuwa ninaweza kuwasiliana na mtafiti kupitia barua pepe [215082145@stu.ukzn.ac.za](mailto:215082145@stu.ukzn.ac.za) au simu namba +255 754 271 685.

Iwapo nina maswali au maoni zaidi juu ya haki zangu kama mshiriki au kitu chochote kuhusiana na utafiti au mtafiti ninaweza kutuma maswali au maoni hayo kwa:

### **HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION**

**Research Office, Westville Campus**

**Govan Mbeki Building**

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**Durban**

**4000**

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**Tel: 27 31 2604557 - Fax: 27 31 2604609**

**Email: [HSSREC@ukzn.ac.za](mailto:HSSREC@ukzn.ac.za)**

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**Sahihi ya Mshiriki**

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**Tarehe**

## DODOSO LA TAFITI

### Maswali kuhusu wasihi wa mtoa taarifa (Profiling Questions)

Q1. Ainisha kundi la umri wako

Mpaka 29	30 -55	56 na Zaidi

Q2. Jinsia

Mme	Ke

Q3. Kiwango cha Elimu uliyonayo

Sijasoma	Elimu ya Msingi	Elimu ya Sekondari	Elimu ya Kati (Cheti, Diploma)	Elimu ya Juu (Shahada ya Kwanza na kuendelea)

Q4. Hali yako ya ajira

Mtumishi wa Umma	Mtumishi wa Sekta Binafsi	Nimejiajiri	Sina Ajira

Q5. Ainisha kama umewahi kutumia huduma za simu zifuatazo: (Weka alama ya vema kwa huduma **ZOTE** husika)

5.1 Huduma za kifedha/ malipo kwa njia ya simu ya kijangani (M-Pesa, Tigo Pesa, Airtel, Money)	5.2 Huduma za Benki kwa njia ya simu za mkononi ya kijanjani (CRDB Simbanking, NMB Mobile)	5.3 Michezo ya Bahati Nasibu kwa njia ya simu za mkononi ya kijanjani (Biko, Tatu Mzuka, Sport Pesa)

Q6. Je, umewahi kusikia kuhusu huduma za Serikali kwa njia ya simu za kiganjani?

Ndio	Hapana

Q7. Ainisha ni njia ipi **HASWA** uwa unapata taarifa kuhusu ubunifu na uboreshwaji wa huduma za Serikali (Chagua njia **MOJA** tu)

Redio	Luninga (TV)	Magazeti	Promosheni za mtaa kwa mtaa	Nyingine – Tafadhali ainisha:

	<b>Kauli (Statement)</b>	<b>Sikubaliani Kabisa</b>	<b>Sikubaliani</b>	<b>Sina Uhakika</b>	<b>Nakubali</b>	<b>Nakubali ana Kabisa</b>
<b>Viashiria vya Kikanuni za Kibinafsi (Subjective Norms)</b>						
SN1	Ndugu na Jamaa zangu wanafiki ninahitaji kutumia simu ya kijangani kupata huduma/taarifa za serikali					
SN2	Wakubwa wangu wanaunga mkono matumizi ya simu za kijangani kupata huduma/taarifa za serikali					
SN3	Utumiaji wa simu za kiganjani kupata huduma/taarifa za serikali unakubalika katika jamii/utamaduni wetu					
SN4	Watu katika jamii/utamaduni wetu wanapendelea kupata huduma/taarifa za serikali kwa njia ya simu za kiganjani kuliko mfumo wa uso kwa uso					
SN5	Upatikanaji wa huduma/taarifa za serikali kwa njia ya simu za kiganjani unampa mtu hisia za umuhimu					
SN6	Watu wanaopata huduma/taarifa za serikali kwa njia ya simu za kiganjani wanakubalika zaidi kwa rika lao					
<b>Viashiria vya Udhhibiti wa Kitabia (Behavioural control)</b>						
<b>Facilitating Conditions</b>						
FC1	Ninaweza kupata msaada kutoka kwa watumishi wa serikali pindi nipatapo tatizo katika kutumia huduma/taarifa za serikali kwa njia ya simu za kiganjani					
FC2	Ninamfahamu mtu ambaye ametumia kwa					

	mafanikio simu ya kiganjani kupata huduma/taarifa za serikali na anaweza kunipatia msaada inapobidi					
FC3	Huduma za serikali kwa njia ya simu za kiganjani zinaendana na aina ya simu ninayotumia					
FC4	Utaratibu uliopo wa utoaji huduma kwa njia ya simu za kiganjani unakidhi kwa ufasaha mahitaji ya watumiaji wa huduma					
FC5	Sheria zilizopo zinajitosheleza kushitaki makosa yeyote ya kimtandao endapo kutatokea uvunjwaji wa sheria katika kupata huduma za serikali kwa njia ya simu ya kiganjani					

#### Trust and Security

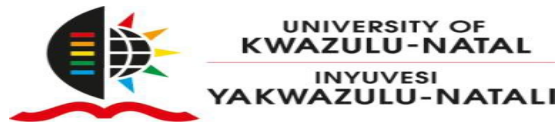
TS1	Ninaimani kuwa huduma/taarifa zozote za serikali zinazotolewa kwa njia ya simu za kiganjani zipo sahihi					
TS2	Ninaimani kuwa huduma/taarifa zozote za serikali zinazolewa kwa njia ya simu za kiganjani ni za halali/halisi					
TS3	Ninajihisi salama kutoa taarifa zangu binafsi kwa serikali kupitia teknolojia ya simu za kiganjani					
TS4	Ninajihisi faragha/usiri wangu unazingatiwa pale ninapotumia simu ya kiganjani kupata huduma/taarifa za serikali					

	Kauli (Statement)	Sikubaliani Kabisa	Sikubaliani	Sina Uhakika	Nakubali	Nakubali ana Kabisa
<b>Viashiria vya Kimtazamo (Attitudinal Influences)</b>						
AI1	Utumiaji wa simu za kiganjani kupata					

	huduma/taarifa za serikali unaweza kujengeka kuwa tabia/mazoea					
AI2	Ni utaratibu wangu kutumia simu yangu ya kiganjani kupata taarifa kutoka kwenye mtandao					
AI3	Utumiaji wa simu ya kiganjani unapa mtu uwezo wa kurudiarudia kupata taarifa au kutumia huduma					
<b>Viashiria vya Kiteknolojia (Technological Influences)</b>						
TI1	Kutumia simu ya kiganjani kunanipa uwezo wa kupata huduma/taarifa kwa haraka.					
TI2	Kutumia simu ya kiganjani kunanipa uwezo wa kupata huduma/taarifa kwa urahisi.					
TI3	Kutumia simu ya kiganjani kunanipa uwezo wa kupata huduma/taarifa hata nikiwa katika mizunguko (ninatembea)					
TI4	Kutumia simu ya kiganjani kunanipa uwezo wa kupata huduma/taarifa mahali popote pale.					
TI5	Kutumia simu ya kiganjani kupata huduma/taarifa kunanipa uwezo wa kuokoa muda ukilinganisha na njia zingine za kupata huduma/taarifa					
TI6	Kutumia simu ya kiganjani kunanipa uwezo wa kupata huduma/taarifa muda wowote ule usiku au mchana					
<b>Viashiria vya Kifedha (Financial Resources Influence)</b>						
FI1	Gharama ya meseji kwa huduma za serikali kwa njia ya simu za kijangani ni rafiki kwa watumiajia					
FI2	Bei ya huduma/taarifa za serikali kwa njia ya simu za kiganjani wengi tunaweza kuimudu					
FI3	Bei ya huduma/taarifa za serikali kwa njia ya simu za kiganjani inakubalika					

FI4	Utaratibu unaotumika kupanga bei/gharama za huduma/taarifa za serikali kwa njia ya simu za kiganjani unakubalika					
FI5	Zawadi/vichochezi (mfano punguzo la bei) vya kuongeza matumizi ya huduma/taarifa za serikali kwa njia ya simu za kiganjani inaridhisha					
<b>Viashiria vya Kitabia (Behavioural Intention)</b>						
BI1	Ninapanga kutumia simu ya kiganjani kupata huduma/taarifa za serikali kwa siku za usoni					
BI2	Nitatumia simu ya kiganjani kupata huduma/taarifa za serikali siku za mbele					
BI3	Nipo tayari kutumia simu ya kiganjani kupata huduma/taarifa za serikali iwapo huduma hiyo itapatikana kwangu.					

## Appendix B: The Interview Schedule



### **UKZN HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE (HSSREC)**

#### **APPLICATION FOR ETHICS APPROVAL For research with human participants**

#### **Information Sheet and Consent to Participate in Research**

Date: 20/12/2017

Greetings,

My name is Maria Lauda Joel Goyayi from University of Kwa-Zulu Natal, Westville campus, Contact details: +255 754 271 685 and Email address: [215082145@stu.ukzn.ac.za](mailto:215082145@stu.ukzn.ac.za).

You are being invited to consider participating in a study that involves research on factors that influences citizens' decision to adopt mobile services provided by the government of Tanzania. The aim and purpose of this research is to understand the factors that influences citizen's adoption decisions and then develop an implementation framework to enhance adoption of government m-services in Tanzania. The study is expected to include a total 412 residents of Dar es Salaam and a total of 16 representatives from the eGovernment Agency and Tanzania Electric Supply Company Limited (TANESCO) will be interviewed. Participation in this research involves being interviewed with the researcher that will not take more than 20 minutes.

The study involves no risks and/or discomforts the following risks and/or discomforts of any nature and also you are free at any time to withdraw your participation. We hope that the study will create the following benefits to government institutions providing m-services by modeling and incorporating citizen's factors for m-service adoption in the implementation process to enhance adoption. If any additional information is required regarding this study please do not hesitate to take it up with the researcher at any point before, during or after the interview for verification.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee (approval number **HSS/2085/017D**).

In the event of any problems or concerns/questions you may contact the researcher at MARIA LAUDA JOEL GOYAYI on +255 754 271 685 and [215082145@stu.ukzn.ac.za](mailto:215082145@stu.ukzn.ac.za) or the UKZN Humanities & Social Sciences Research Ethics Committee, contact details as follows:

**HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS  
ADMINISTRATION  
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Govan Mbeki Building  
Private Bag X 54001  
Durban 4000  
KwaZulu-Natal, SOUTH AFRICA  
Tel: 27 31 2604557- Fax: 27 31 2604609  
Email: HSSREC@ukzn.ac.za**

Your participation in the study is voluntary and by participating, you are granting the researcher permission to use your responses. You may refuse to participate or withdraw from the study at any time with no negative consequence. There will be no monetary gain from participating in the study. Your anonymity will be maintained by the researcher and the School of Management, I.T. & Governance and your responses will not be used for any purposes outside of this study.

All data, both electronic and hard copy, will be securely stored during the study and archived for 5 years. After this time, all data will be destroyed.

If you have any questions or concerns about participating in the study, please contact me or my research supervisor at the numbers listed above.

Sincerely

MARIA LAUDA JOEL GOYAYI



## CONSENT TO PARTICIPATE

I ..... has been informed about the study entitled “Adoption Framework for Mobile Services Provided by Government for Citizens of Dar Es Salaam Tanzania ” by Marialauda Joel Goyayi.

I understand the purpose and procedures of the study. Participating in this research involves being interviewed with the researcher that will take not more than 30 minutes.

I understand that by agreeing to take part in the interview I consent to my responses being noted down and/or audio recorded to allow future analysis.

I hereby consent/do not consent to have this interview recorded

I have been given an opportunity to ask questions about the study and have had answers to my satisfaction.

I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without affecting any of the benefits that I usually am entitled to.

I have been informed about any available compensation or medical treatment if injury occurs to me as a result of study-related procedures.

If I have any further questions/concerns or queries related to the study I understand that I may contact the researcher at [215082145@stu.ukzn.ac.za](mailto:215082145@stu.ukzn.ac.za) or +255 754 271 685.

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact:

**HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS  
ADMINISTRATION**

**Research Office, Westville Campus**

**Govan Mbeki Building**

**Private Bag X 54001**

**Durban**

**4000**

**KwaZulu-Natal, SOUTH AFRICA**

**Tel: 27 31 2604557 - Fax: 27 31 2604609**

**Email: HSSREC@ukzn.ac.za**

\_\_\_\_\_  
**Signature of Participant**

\_\_\_\_\_  
**Date**

## INTERVIEW GUIDE

### Section A: Questions pertaining to Operational Issues related to m-service provision

#### Application Development Issues

1. What is the role of institution in m-service provision?
  - 1.1. What m-service products are available?
2. How is the government mobile platform application developed?
  - 2.1. Who developed it?
  - 2.2. How do you determine the need for m-services?
  - 2.3. How do you verify the application against user needs?

#### Content Development and Sharing Issues

3. How is the service content for the government mobile platform developed?
  - 3.1. Who develops the content?
  - 3.2. What specific standards if any, the service content needs to conform to?
4. If the service content is developed independently from the government mobile platform, how is the service content shared?
  - 4.1. What Service content format is shared?
  - 4.2. How often is the service content shared?

#### Partnerships Issues

5. Who are the key operational partners in ensuring a complete service provision through the government mobile platform?
  - 5.1. What are their specific roles in providing m-services?

#### Updating Issues

6. How is the government mobile platform application updated?
  - 6.1. Who does runs the updates?
  - 6.2. How is the process communicated among operational partners?
  - 6.3. How often is the application updated? (Note if there is any specific schedule for Application updating)
7. How is the service content updated?
  - 7.1. Who has the responsibility of updating the service content?
  - 7.2. How is the process communicated among operational partners?
  - 7.3. How often is the service content updated? (Note if there is any specific schedule for service content updating)

#### Service Provision

8. How does the government mobile platform work to allow people to access government information and services?
  - 8.1. What physical evidences or descriptors indicating that a service has been provided?
  - 8.2. How are employees involved in the process of providing service?
  - 8.3. What other processes are necessary to ensure a service provision is complete?

#### Challenges

9. What challenges do you face in providing government information and public service through the government mobile platform in relation to
  - 1.1. Platform application development and updating
  - 1.2. Service content development and updating
  - 1.3. Service content sharing
  - 1.4. Working with other operational partners
  - 1.5. Any other challenges

### **Section B: Question pertaining to Managerial Issues related to m-service provision**

#### Awareness Issues

1. How are citizens made aware of the services available on the government mobile platform?
  - 1.1. What initiatives have you used to motivate citizens to use services available on the government mobile platform?
  - 1.2. What is the reflection on these initiatives (have they had any impact in boosting usage?)

#### Service Provision

2. How do you work with relevant partners (if any) in providing public service through the government mobile platform?
  - 2.1. Who are these partners/clients?
  - 2.2. What kind of agreements exists with your partners? (Note: Signed MOU or word of mouth)

#### Partnership Management

3. If mobile services are provided in partnership, how do you manage ownership of the service or the platform? (note if there any specific ownership Agreements)
  - 3.1. What are the major components of the government mobile platform service? (note : application, content, infrastructure)
  - 3.2. Which partner/stakeholders owns which component of the government mobile platform service?

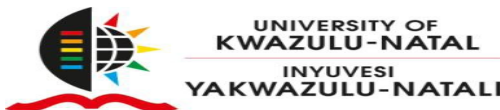
#### Service Pricing Issues

4. How is the price for services provided through the government mobile platform determined?
  - 4.1. Who is involved in the service price determination?
  - 4.2. How often is the price reviewed?

#### Challenges

5. What challenges do you face in providing m-services through the government mobile platform
  - 5.1. In creating awareness and ensuring service use
  - 5.2. In managing your partners in the provision on service
  - 5.3. In adhering to existing laws and regulations that guide the provision of mobile data services in public sector?
  - 5.4. Any other challenges?

## Appendix C: The Evaluation Questionnaire



### UKZN HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE (HSSREC) APPLICATION FOR ETHICS APPROVAL

**Researcher:** Maria Lauda Joel Goyayi, +27 728431968 or +255 754271685

**Supervisor:** Dr. Prabhakar Rontala Subramaniam, +27 33 260 5643

**Research Office:** Mariette Synman, +27 312608350

Greetings,

My name is Maria Lauda Joel Goyayi, a Doctoral student in Information System & Technology at the University of KwaZulu-Natal, Durban, South Africa (marygoyayi@yahoo.com). I would like to invite you to take part in a research study that investigates the factors that influences citizen's adoption for mobile enable government (m-government) services, specifically to understand these factors and propose a strategy to enhance adoption of such services by the citizen of Tanzania.

The data you have already contributed to this study through an interview process has been used to develop a proposed adoption framework for m-government services in Tanzania. In order to assess the suitability in terms applicability and relevance of the proposed framework in your institution, we have devised an evaluation tool in form of a questionnaire that accomplishes this objective. As a valuable contributor to this study we would like to get your opinion on this endeavor to facilitate its improvement. The evaluation questionnaire will take no more than 15 minutes of your time to complete it.

It is my hope that the final study output with your reflections incorporated will provide a good guidance for improving the adoptability of current and future mobile enable government services. Moreover it is our hope that the final framework will offer a blueprint to guide policy discourses in the development and provision of mobile enabled government services.

In the event of any problems, concerns or questions you may have, please feel free to contact the researcher at marygoyayi@yahoo.com or the UKZN Humanities & Social Sciences Research Ethics Committee, contact details as follows:

#### **HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION**

Research Office, Westville Campus

Govan Mbeki Building

Private Bag X 54001

Durban 4000 KwaZulu-Natal, SOUTH AFRICA

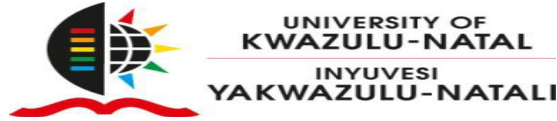
Tel: 27 31 2604557- Fax: 27 31 2604609

Email: [HSSREC@ukzn.ac.za](mailto:HSSREC@ukzn.ac.za)

Your participation in the study is voluntary and by participating, you are granting the researcher permission to use your responses. You may refuse to participate or withdraw from the study at any time without any negative consequences. There will be no monetary incentive to participate in the study. **Your anonymity** will be assured by the researcher and the School of Management, I.T. & Governance and your responses will not be used for purposes other than for that of this study. All data, both electronic and hard copy will be securely stored during the period of study and archived for 5 years. After this time, all data will be destroyed

Sincerely

Ms. Maria Lauda Joel Goyayi



**University of KwaZulu-Natal, Durban, South Africa**

**School of Management, IT and Governance**

**Researcher:** Maria Lauda Joel Goyayi, +27728431968

**Supervisor:** Dr. Prabhakar Rontala Subramaniam, +2733 260 5643

**Research Office:** Mariette Synman, +27312608350

### **CONSENT TO PARTICIPATE**

I have read the informed consent letter and hereby confirm that I understand the content of this document and the nature of the research project, and I consent to participate in this project.

I declare that my participation in this study is voluntary and that I may withdraw at any time.

If I have any further questions/concerns or queries related to the study I understand that I may contact the researcher at [marygoyayi@yahoo.com](mailto:marygoyayi@yahoo.com)

I hereby indicate my willingness to participate in answering the questionnaire: YES / NO

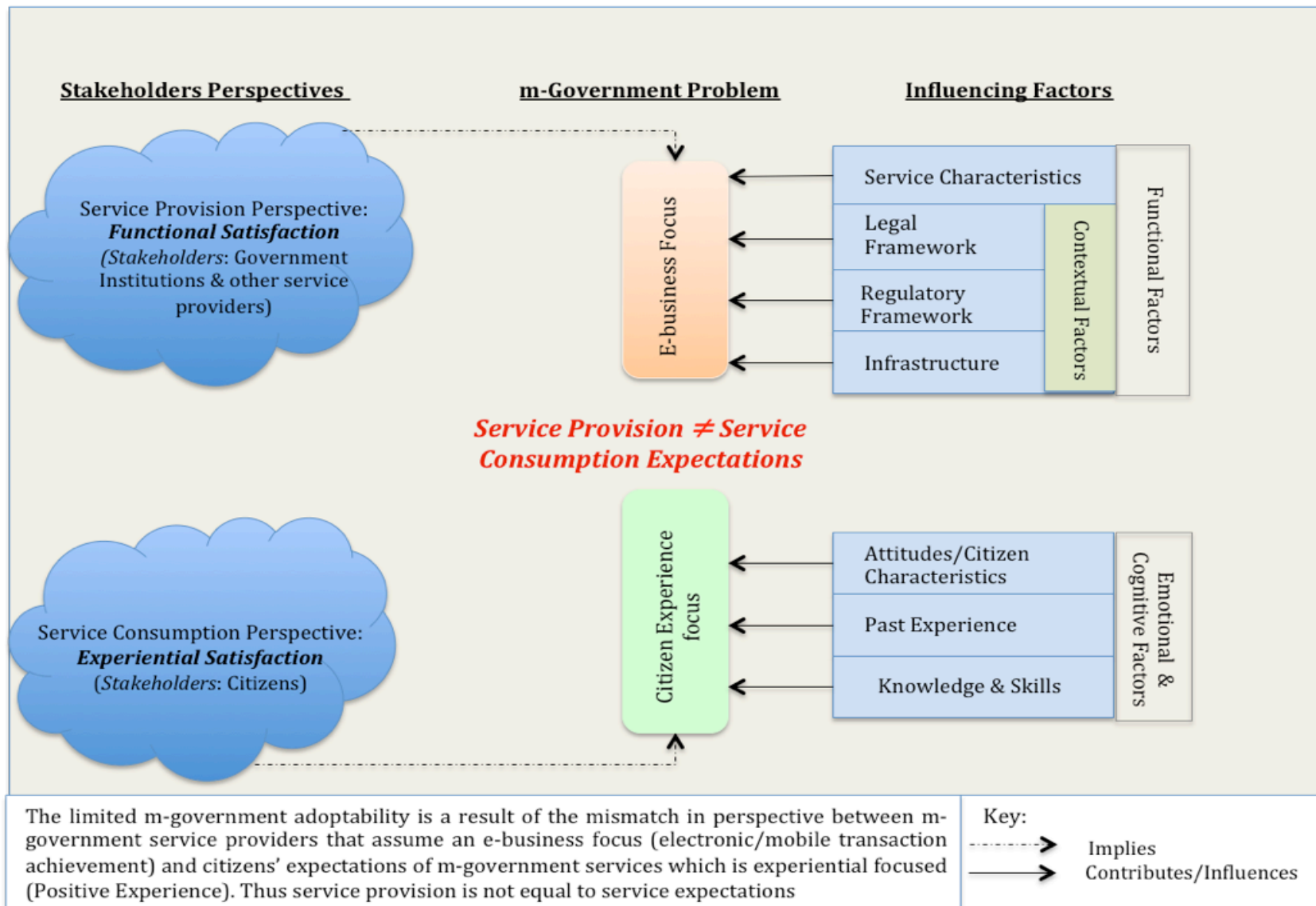
\_\_\_\_\_  
**Signature of Participant**

\_\_\_\_\_  
**Date**

#### **Instruction to respondents**

- Please sign this letter of informed consent, giving me permission to use your responses.
- Please be honest in your responses.

Please tick the appropriate option



**Figure 8:** Limited m-Government Adoption – Problem Modelling

## Evaluation of the framework for enhancing citizen's adoption m-Government Services

**Part A:** Evaluation on adequacy of the modeled m-government adoptability problem (Refer Figure 8)

	Statement	Yes	No
A1.	Identification of Functional Satisfaction as a service provision perspective is appropriate		
A2.	Stakeholders for service provision are sufficiently captured in the modeled problem		
A3.	Mapping of Functional satisfaction to an e-business focus is appropriate		
A4.	Functional Factor that influences e-business focus are sufficiently capture		
A5.	Identification of Experiential Satisfaction as a service consumption perspective is appropriate		
A6.	Capturing citizen as the service consumption stakeholder is appropriate		
A7.	Mapping of Experiential satisfaction to a User Experience focus is appropriate		
A8.	Emotional and cognitive factors that influences user experience focus are sufficiently captured		
A9.	Overall problem model for m-government adoption is acceptable		

A10. Kindly provide your reflection on the adequacy of the modeled problem in relation to

A10.1 Comprehensiveness in identifying m-government stakeholders

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A10.2 Mapping of the provision focus and its influencing actors

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A10.3 Mapping of the consumption focus and its influencing factors

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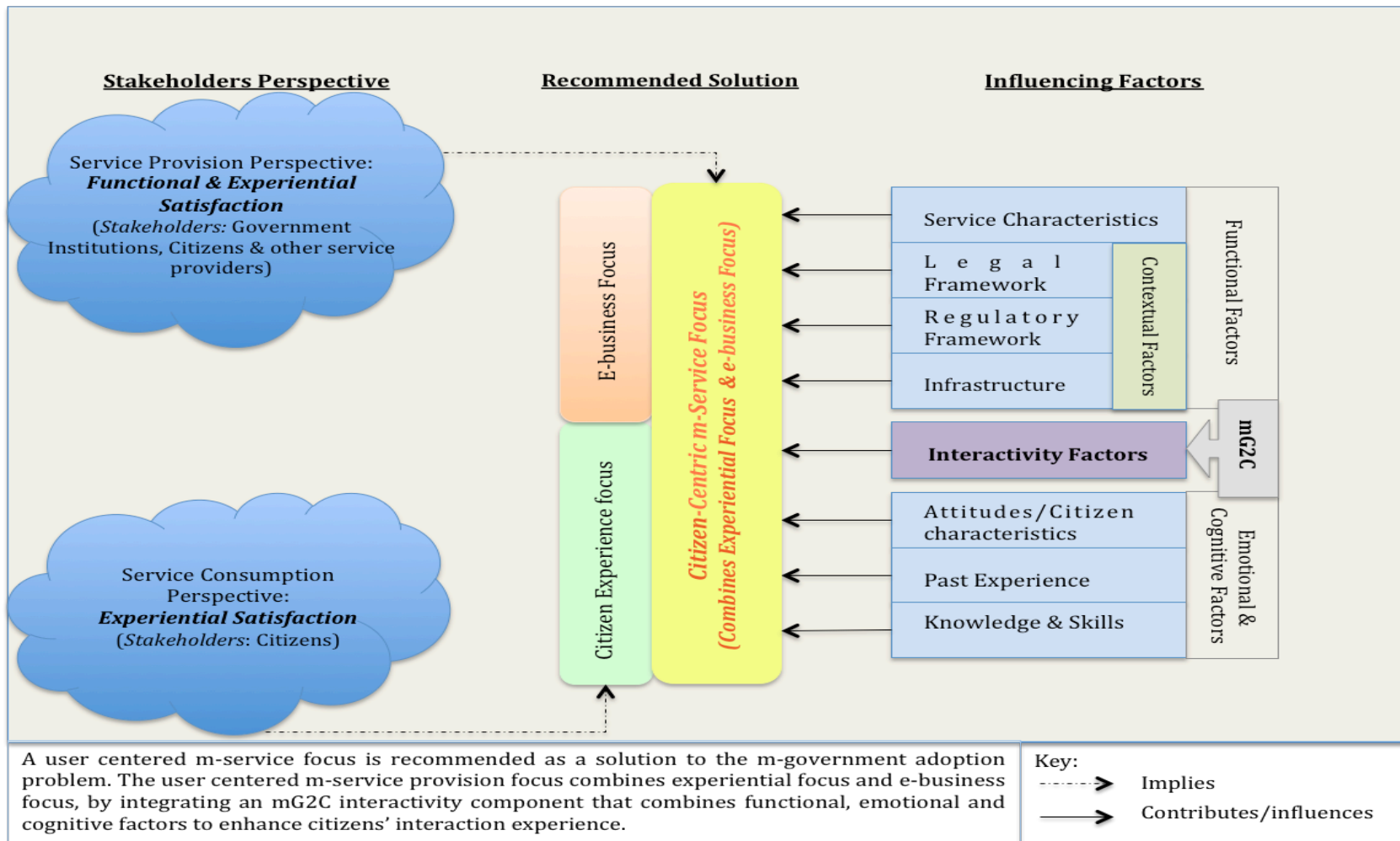
A11. Kindly provide any additional information that may further improve the modeling of the m-government adoption problem with reasons

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**Figure 9:** Enhanced m-Government Adoption – Solution Modelling



**Part B:** Evaluation on adequacy of the modeled m-government adoptability Solution (Refer Figure 9).

	Statement	Yes	No
B1.	Recommending the combination of Functional and Experiential Satisfaction as a service provision perspective is appropriate		
B2.	Adding Citizen an implementing stakeholder for the recommended service provision perspective is appropriate		
B3.	Mapping of Functional and Experiential satisfaction to user centered m-service focus is appropriate		
B4.	Mapping of Functional, Emotional, Cognitive and Government to Citizen (mG2C) Interactivity as factors influencing user centered m-service focus is appropriate		
B5.	Overall solution model for enhancing m-government adoptability is acceptable		

B6. Kindly provide your reflection on the adequacy of the modeled solution in relation to

B6.1 Mapping of the m-service focus and its influencing factors as a providers focus

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B6.2 Identification of citizens as additional stakeholder in m-government implementation

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B8. Kindly provide any additional information that may further improve the modeling of the m-government adoption solution with reasons

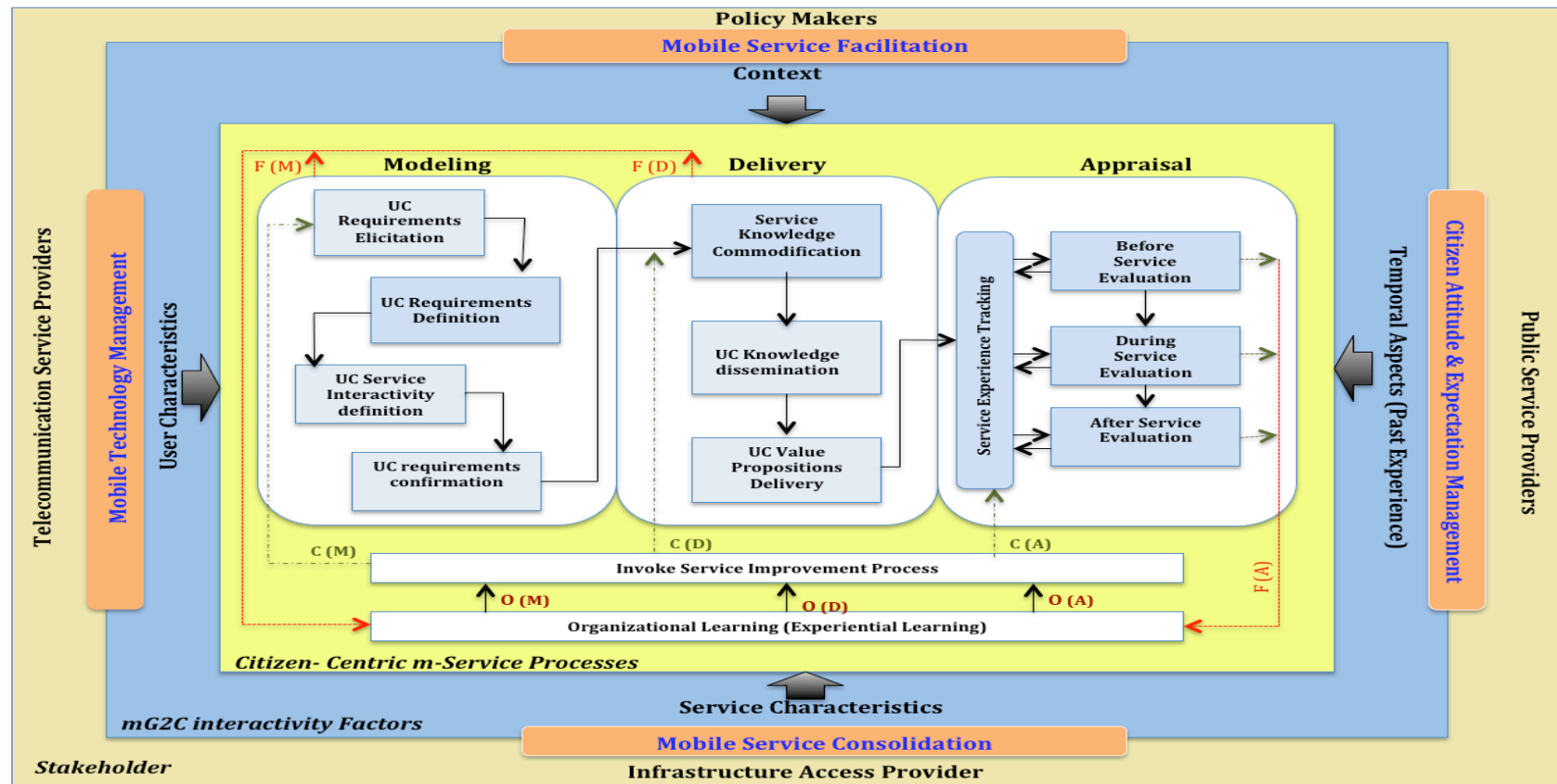
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#### Key:

	Feedback Loop
	Sequence/Transition of Event
	Correction Flow
	Output
UC	User Centered
mG2C	m-Government-to-Citizen

**Figure 10:** User-Centered m-Service Provisioning Framework for enhanced user experience

The user centered m-service framework recommended for the m-government adoptability problem is a three-layer framework that integrates stakeholders and user centered m-service processes. m-Government stakeholders include Public service Providers responsible for public service development and provision; Infrastructure Access Providers responsible for mobile service infrastructure development and administration; Telecommunication Service Providers for Mobile and Wireless Internet Service provision; and Policy Makers responsible for define the rules of engagement in mobile service provision and consumption. The mG2C interactivity layer includes user characteristics, service characteristics, temporal aspects and context factors critical for enhancing citizen's experience with m-government. To ensure achievement of interactivity each stakeholder has a specific role, which includes Mobile Technology Management, Mobile Service Facilitation, Mobile Service Consolidation and Citizen Attitudes Management. The mG2C interactivity factors provide inputs in the inner layer, the User Centered (UC) m-Service. The UC m-service layer constitutes four groups of processes, that is design, delivery, appraisal and the organisational learning processes that captures its feedback loops from the three process groups, analysed and the outcome acts as input in the improvement process which invokes a specific correctional flow on either design (C(M), C(D) or C(A)).

**Part C:** Evaluation on adequacy of the User Centered m-Service Framework (Refer Figure 11 )

	Statements	Yes	No
C1.	Implementing stakeholders for m-government services are captured sufficiently		
C2.	Factors facilitating m-government-to-citizen (mG2C) interactivity are captured sufficiently		
C3.	Mapping the intersection between implementing stakeholders and mG2C interactivity Factors in terms of tasks/roles is appropriate		
C4.	User centered m-service modeling processes are captured sufficiently		
C5.	User centered m-service Modeling processes, flow is appropriately represented		
C6.	User centered m-service Delivery processes are captured sufficiently		
C7.	User centered m-service Delivery processes, flow is appropriately represented		
C8.	User centered m-service Appraisal processes are captured sufficiently		
C9.	User centered m-service Appraisal processes, flow is appropriately represented		
C10.	User centered m-service Feedback loop is captured appropriately		
C11.	User centered m-service Organisational Learning Process is captured appropriately		
C12.	User centered m-service improvement process is captured appropriately		
C13.	User centered m-service correction flow is captured appropriately		
C14.	Overall User centered m-service framework for enhancing m-government adoptability is acceptable		

C15. If you answer to Qn. 1 is **NO**, provide additional stakeholders with reasons

.....

.....

C16. If you answer to Qn. 2 is **NO**, provide additional factors with reasons

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C17. If you answer to Qn. 3 is **NO**, provide additional tasks/roles with reasons

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C18. If you answer to Qn. 4 is **NO**, provide additional Modeling processes with reasons

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C19. If you answer to Qn. 6 is **NO**, provide additional Delivery processes with reasons

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.....


C20. If you answer to Qn. 8 is **NO**, provide additional Appraisal processes with reasons

.....

Appendix D: Gatekeepers Letter – Ilala District

The United Republic of Tanzania  
Prime Ministers' Office  
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

ILALA DISTRICT  
Phone Address:  
Phone No: 2203185/2203182  
In reply quote: Ref. No: AB.60/87/01/




DISTRICT COMMISSIONER'S OFFICE  
ILALA DISTRICT  
P. O. Box 15486,  
DAR ES SALAAM  
Date: 18/07/2016

Municipal Director,  
P. O. Box 20950,  
**ILALA – D'SALAAM.**

RE: RESEARCH PERMIT

Prof./Dr./Mr./Mrs./MS./Miss: MARIA LAUDA J. GOYAYI  
from The UNIVERSITY OF KWAZULU NATAL, she/he has been  
permitted to undertake a field work research on "ADOPTION FRAMEWORK  
FOR THE E-GOVERNMENT PLATFORM FOR SELECTED  
DISTRICTS OF DAR-ES-SALAAM" The  
case study at Ilala District from 15/08/2016 to 30/11/2016

Therefore, you are asked to give the said researchers necessary assistance and Cooperation.

  
District Administrative Secretary  
ILALA

Copy: MARIA LAUDA J. GOYAYI By: KATIBU TAWALA  
(W) ILALA

Principal/Vice Chancellor,  
UNIVERSITY OF KWAZULU NATAL  
DURBAN SOUTH AFRICA

## Appendix E: Gatekeeper's Letter – Kinondoni District

### KINONDONI MUNICIPAL COUNCIL

ALL CORRESPONDENCES TO BE ADDRESSED TO THE MUNICIPAL DIRECTOR

Tel: 2170173

Fax: 2172606

In reply please quote:

Ref. KMC/CC/ADM/PRT/21



KINONDONI MUNICIPAL COUNCIL  
P. O. BOX 31902  
DAR ES SALAAM

Date: 20<sup>th</sup> July, 2016

University of KwaZulu-Natal,  
School of Management, IT and Governance,  
Westville Campus,  
Durban, South Africa.

#### RE: RESEARCH PERMIT FOR MS. MARIALAUDA J. GOYAYI REGISTRATION NUMBER 215082145

This letter is to permit one Ms. Marialauda Goyayi a student/researcher from the University of KwaZulu Natal, Durban South Africa to undertake research fieldwork in Kinondoni District on a research titled "Adoption Framework for the m-Government Platform in Selected Districts of Dar Es Salaam, Tanzania". You have been granted access to conduct interviews and administer questionnaires to people in the following wards of Kinondoni District; **Kawe, MebziJuu and Kunduchi** wards. We look forward to the output of this research, which we hope will add to improving public service provision in our District.



.....  
: R.Shayo  
For District Executive Director  
KINONDONI

## Appendix F: The Research Ethical Clearance



07 December 2017

Ms Marialauda Joel Goyayi (215082145)  
School of Management, IT & Governance  
Westville Campus

Dear Mr Goyayi,

Protocol reference number: HSS/2085/017D

Project title: Adoption framework for Mobile Services provided by Government for citizens of Dar Es Salaam Tanzania

### Approval Notification – Expedited Application

In response to your application received on 26 October 2017, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

**PLEASE NOTE:** Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Dr Prabhakar Rontala Subramaniam  
Cc Academic Leader Research: Professor Isabel Martins  
Cc School Administrator: Ms Angela Pearce

---

Humanities & Social Sciences Research Ethics Committee  
Dr Shenuka Singh (Chair)

## Appendix G: The Amended Research Ethical Clearance



29 May 2019

Ms Marialauda Joel Goyayi (215082145)  
School of Management, IT & Governance  
Westville Campus

Dear Mr Goyayi,

**Protocol reference number:** HSS/2085/017D

**Project title:** Adoption framework for Mobile Services provided by Government for citizens of Dar Es Salaam Tanzania

### Approval Notification – Amendment Application

This letter serves to notify you that your application and request for an amendment received on 02 May 2019 has now been approved as follows:

- Inclusion of Additional Research Instrument (Questionnaire)

Any alterations to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form; Title of the Project, Location of the Study must be reviewed and approved through an amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

**PLEASE NOTE:** Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for period of 3 years from the date of original issue. Thereafter Recertification must be applied for on an annual basis.

Best wishes for the successful completion of your research protocol.

Yours faithfully

Dr Shamila Naidoo (Deputy Chair)

/ms

Cc Supervisor: Dr Prabhakar Rontala Subramaniam  
Cc Academic Leader Research: Professor Isabel Martins  
Cc School Administrator: Ms Angela Pearce

### Humanities & Social Sciences Research Ethics Committee

Dr Rosemary Sibanda (Chair)

Westville Campus, Govan Mbeki Building

Postal Address: Private Bag X54001, Durban 4000

Telephone: +27 (0) 31 260 3587/8350/4557 Facsimile: +27 (0) 31 260 4609 Email: [ximbap@ukzn.ac.za](mailto:ximbap@ukzn.ac.za) / [snymam@ukzn.ac.za](mailto:snymam@ukzn.ac.za) / [mohunp@ukzn.ac.za](mailto:mohunp@ukzn.ac.za)

Website: [www.ukzn.ac.za](http://www.ukzn.ac.za)



100 YEARS OF ACADEMIC EXCELLENCE

Founding Campuses: Edgewood Howard College Medical School Pietermaritzburg Westville

## Appendix H: Reliability Results of the Scales Used in Measuring the Constructs

	Construct Measured	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach Alpha if Item Deleted
PE1 Usefulness	Performance Expectancy (PE)	8.37	1.447	0.702	0.509	0.802
PE2 Saves time		8.3	1.385	0.762	0.582	0.745
PE3 Achieves goals		8.29	1.408	0.687	0.482	0.818
HV1 Fun	Hedonic Value (HV)	6.39	3.069	0.824	0.69	0.896
HV2 Enjoyable		6.49	2.787	0.87	0.758	0.856
HV3 Stimulating		6.55	2.916	0.82	0.68	0.899
SE1 Easy to learn	Self-Efficacy (SE)	6.56	2.94	0.791	0.688	0.835
SE2 Easy to use		6.62	2.6	0.847	0.741	0.779
SE3 Possess skills		6.4	2.727	0.714	0.523	0.903
SN1 Family and friends	Subjective Norms (SN)	19.73	11.539	0.696	0.541	0.902
SN2 Superiors		19.74	11.106	0.767	0.672	0.892
SN3 Society acceptance		19.73	10.735	0.796	0.693	0.888
SN4 Preference over face to face		19.73	10.84	0.767	0.622	0.892
SN5 Sense of importance		19.71	10.815	0.769	0.649	0.892
SN6 Acceptance by their peers		19.72	11.069	0.71	0.58	0.900
BC1 Assistance from Government Employees	Facilitating Conditions (FC)	15.02	9.781	0.637	0.533	0.860
BC2 Assistance from someone I know		15.04	9.304	0.713	0.654	0.843
BC3 Service compatible with my phone		14.98	8.809	0.754	0.638	0.832
BC4 Guidelines adequacy		15.28	8.196	0.745	0.69	0.833
BC5 Cyber Law Sufficiency		15.31	7.977	0.687	0.636	0.853
TS1 Service Accuracy		11.03	6.21	0.406	0.216	0.918
TS2 Service authenticity		11.11	6.106	0.794	0.675	0.718
TS3 Information sharing safety		11.18	5.995	0.738	0.746	0.734
TS4 Privacy assurance		11.18	6.013	0.761	0.727	0.726
AI1 Service addictiveness	Attitudinal Influence (AI)	7.13	2.693	0.706	0.563	0.832
AI2 Internet usage becoming a routine		7.16	2.183	0.827	0.688	0.712
AI3 Service re-use		6.97	2.47	0.683	0.508	0.853
TI1 Technology Connectivity	Technology Influence (TI)	21.39	11.216	0.777	0.688	0.920
TI2 Technology Efficiency		21.33	11.182	0.832	0.757	0.913
TI3 Technology Mobility		21.29	11.071	0.818	0.738	0.915
TI4 Location-free		21.29	10.991	0.816	0.736	0.915
TI5 Technology Time Saving		21.27	11.08	0.806	0.705	0.916
TI6 24/7 Service Access		21.27	11.338	0.731	0.585	0.926
FI1 Price Reasonability	Financial Influence (FI)	14.51	12.098	0.706	0.714	0.864
FI2 Service Affordability		14.51	11.294	0.781	0.797	0.847
FI3 Price Acceptability		14.63	11.017	0.784	0.701	0.844
FI4 Pricing Strategy acceptability		15.01	10.178	0.768	0.68	0.848
FI5 Service Rewarding Systems		14.93	10.873	0.616	0.559	0.889
BI1 Intention to Use in Future	Behavior Intention (BI)	8.74	2.217	0.809	0.66	0.916
BI2 Planning to use if available		8.65	2.105	0.845	0.733	0.887
BI3 Willingness to use		8.66	2.089	0.875	0.771	0.862



# Appendix I: Regression Weights of Factors for Predicting Citizens' Behavioural Intention

Items	Factors		Estimate (Unstandardized)	Estimate (Standardized)	S.E.	C.R.	P	Label
SE3	<---	F1	1	0.749				
SE2	<---	F1	1.185	0.937	0.063	18.79	***	par_1
SE1	<---	F1	1.026	0.883	0.056	18.175	***	par_2
HV3	<---	F2	1	0.874				
HV2	<---	F2	1.068	0.928	0.041	25.753	***	par_3
HV1	<---	F2	0.941	0.87	0.04	23.348	***	par_4
PE3	<---	F3	1	0.82				
PE2	<---	F3	0.93	0.846	0.055	16.785	***	par_5
PE1	<---	F3	0.877	0.727	0.059	14.752	***	par_6
AI3	<---	F4	1	0.731				
AI2	<---	F4	1.269	0.936	0.078	16.171	***	par_7
AI1	<---	F4	0.962	0.798	0.062	15.51	***	par_8
SN6	<---	F5	1	0.761				
SN5	<---	F5	1.024	0.784	0.053	19.426	***	par_9
SN4	<---	F5	1.003	0.77	0.067	14.953	***	par_10
SN3	<---	F5	1.046	0.806	0.069	15.153	***	par_11
SN2	<---	F5	1.026	0.836	0.069	14.842	***	par_12
SN1	<---	F5	0.88	0.74	0.061	14.332	***	par_13
TI6	<---	F6	1	0.724				
TI5	<---	F6	1.113	0.79	0.059	18.842	***	par_14
TI4	<---	F6	1.243	0.87	0.086	14.427	***	par_15
TI3	<---	F6	1.178	0.841	0.074	15.981	***	par_16
TI2	<---	F6	1.238	0.92	0.077	16.137	***	par_17
TI1	<---	F6	1.132	0.836	0.076	14.869	***	par_18
TS4	<---	F7	1	0.834				
TS3	<---	F7	1.041	0.846	0.038	27.095	***	par_19
TS2	<---	F7	0.988	0.869	0.049	20.307	***	par_20
TS1	<---	F7	0.764	0.759	0.045	16.807	***	par_21
BC5	<---	F7	1.003	0.701	0.065	15.387	***	par_22
BC4	<---	F7	0.907	0.707	0.059	15.425	***	par_23
BC3	<---	F7	0.768	0.684	0.055	13.878	***	par_24
BC2	<---	F7	0.752	0.734	0.053	14.11	***	par_25
BC1	<---	F7	0.642	0.654	0.052	12.436	***	par_26
FI5	<---	F8	1	0.653				
FI4	<---	F8	1.157	0.738	0.065	17.929	***	par_27
FI3	<---	F8	1.14	0.872	0.084	13.621	***	par_28
FI2	<---	F8	1.167	0.92	0.088	13.252	***	par_29
FI1	<---	F8	0.968	0.832	0.08	12.149	***	par_30
BI1	<---	F9	1	0.857				
BI2	<---	F9	1.064	0.89	0.045	23.764	***	par_31
BI3	<---	F9	1.102	0.935	0.043	25.666	***	par_32

Significant at \*\*\* p < 0.001

## Appendix J: Regression Weights of Factors for Predicting Citizens' Use Behavior

Item	Factor		Estimate (Unstandardized)	Estimate (Standardized)	S.E.	C.R.	P	Label
SE3	<---	F1	1	0.749				
SE2	<---	F1	1.185	0.937	0.063	18.784	***	par_1
SE1	<---	F1	1.027	0.883	0.056	18.171	***	par_2
HV3	<---	F2	1	0.874				
HV2	<---	F2	1.068	0.928	0.041	25.764	***	par_3
HV1	<---	F2	0.941	0.87	0.04	23.357	***	par_4
PE3	<---	F3	1	0.82				
PE2	<---	F3	0.931	0.847	0.055	16.786	***	par_5
PE1	<---	F3	0.878	0.727	0.059	14.752	***	par_6
AI3	<---	F4	1	0.731				
AI2	<---	F4	1.269	0.936	0.078	16.172	***	par_7
AI1	<---	F4	0.962	0.798	0.062	15.51	***	par_8
SN6	<---	F5	1	0.762				
SN5	<---	F5	1.024	0.784	0.053	19.433	***	par_9
SN4	<---	F5	1.003	0.77	0.067	14.965	***	par_10
SN3	<---	F5	1.046	0.806	0.069	15.162	***	par_11
SN2	<---	F5	1.024	0.835	0.069	14.843	***	par_12
SN1	<---	F5	0.88	0.74	0.061	14.335	***	par_13
TI6	<---	F6	1	0.724				
TI5	<---	F6	1.113	0.79	0.059	18.844	***	par_14
TI4	<---	F6	1.243	0.87	0.086	14.43	***	par_15
TI3	<---	F6	1.178	0.841	0.074	15.982	***	par_16
TI2	<---	F6	1.238	0.919	0.077	16.141	***	par_17
TI1	<---	F6	1.131	0.836	0.076	14.871	***	par_18
TS4	<---	F7	1	0.835				
TS3	<---	F7	1.041	0.846	0.038	27.11	***	par_19
TS2	<---	F7	0.988	0.869	0.049	20.328	***	par_20
TS1	<---	F7	0.763	0.758	0.045	16.785	***	par_21
BC5	<---	F7	1.003	0.701	0.065	15.398	***	par_22
BC4	<---	F7	0.906	0.707	0.059	15.426	***	par_23
BC3	<---	F7	0.767	0.684	0.055	13.872	***	par_24
BC2	<---	F7	0.751	0.733	0.053	14.102	***	par_25
BC1	<---	F7	0.642	0.655	0.052	12.45	***	par_26
FI5	<---	F8	1	0.654				
FI4	<---	F8	1.144	0.731	0.064	17.916	***	par_27
FI3	<---	F8	1.135	0.87	0.083	13.633	***	par_28
FI2	<---	F8	1.166	0.922	0.088	13.266	***	par_29
FI1	<---	F8	0.967	0.833	0.08	12.159	***	par_30
BI1	<---	F9	1	0.857				
BI2	<---	F9	1.063	0.889	0.045	23.735	***	par_31
BI3	<---	F9	1.103	0.936	0.043	25.703	***	par_32
USE	<---	F9	-0.14	-0.106	0.096	-1.456	0.146	par_98
USE	<---	F7	-0.162	-0.143	0.093	-1.74	0.082	par_99
USE	<---	F8	0.197	0.164	0.112	1.755	0.079	par_100

Significant at \*\*\*p < 0.001

### Appendix K: Results on Moderation Effect of Age, Gender and Experience

			Unstandardized Coefficients		Standardized Coefficient	t	Sig.
Moderated Relationship	Moderating Variable	Indicator	B	Std. Error	Beta		
BI <--- AI	Age	Up to 29	0.046	0.520	0.520	8.309	0.021
		30-55	0.179	0.424	0.208	5.807	0.002
		Over 55	0.596	0.733	0.664	12.246	0.203
	Experience	Voluntary	0.061	0.242	0.542	10.024	0.031
		Mandatory	0.657	0.179	0.438	7.813	0.010
BI <--- TI	Age	Up to 29	0.242	0.723	0.547	16.309	0.002
		30-55	0.550	0.046	0.475	8.983	0.004
		Over 55	0.208	0.189	0.576	10.324	0.105
	Gender	Male	0.542	0.062	0.521	8.687	0.023
		Female	0.764	0.061	0.686	12.496	0.016
BI <--- FI	Age	Up to 29	0.424	0.203	0.657	15.039	0.013
		30-55	0.520	0.026	0.457	7.903	0.214
		Over 55	0.038	0.179	0.596	11.302	0.009
	Gender	Male	0.457	0.052	0.402	7.087	0.084
		Female	0.733	0.091	0.676	12.590	0.011

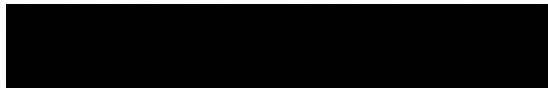
## Appendix L: Declaration of Language Editing Services

26 June 2020

Re: Language editing of the doctoral thesis

This letter confirms that the doctoral thesis **User Interactive Service Provisioning Framework for Enhancing Citizens' Adoption of Mobile Enabled Government Services in Tanzania** by Maria Goyayi was copy edited for language use.

Cordially



Dr Karen Buckenham (PhD)

kbuckenham@mweb.co.za

## Appendix M: Turnitin Report

User interactive service provisioning framework for enhancing citizens' adoption of mobile enabled government services in Tanzania

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