

A Framework for Enhancing Government Service Delivery using Mobile Technologies: An African Countries Context

A

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By

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Supervisor: Professor Jean-Paul Van Belle

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CERTIFICATION

As the Candidate's supervisor, I have approved this dissertation for submission

Professor Jean-Paul Van Belle

Signature:

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Date: ...05th June 2017.

DECLARATION

I declare that this work is my own work. Where collaboration with other people has taken place, or material by other researchers are included, the parties and/or materials are indicated in the acknowledgements or are explicitly stated with references as appropriate.

This work is being submitted for the Doctor of Philosophy in Information Systems at the University of Cape Town. It has not been submitted to any other university for any other degree or examination.

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05th June, 2017

Date

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DEDICATION

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ABSTRACT

Electronic government (e-government) is how the providers of public services interact with the citizen and business via electronic means. The internet is the most commonly used electronic channel. E-government can provide major benefits to citizens and businesses by making the delivery of public services more efficient and effective. However, recent advances in mobile technology have offered the potential to support government services at various levels. This has made it possible to deliver services to the citizens who have no convenient physical access to government services, for example, people living in rural areas and those who are continually on the move, such as business professionals. This study explores the possibilities of effectiveness, resistance, opportunities and issues related to supporting government services delivery through using mobile cellular technologies.

This research study focused on the South African and Nigerian contexts. The focus was to explore various ways that the government can use mobile technologies to improve the provision of government services. A major output of this research work is a conceptual framework to guide mobile government implementation as a vehicle for delivery of government services.

Literature from both academic and professional domains were consulted throughout the study. Furthermore, a case study research was conducted in two organisations, which are different in terms of cultural and transformative settings (one in South Africa and another in Nigeria). The study followed an interpretive research approach, and collected data through semi-structured interviews in the two organizations. The data gathered were relevant to the implementation of m-government systems. The study relied on two underpinning theoretical frameworks, namely Structuration Theory and Actor Network Theory to understand the socio-technical factors affecting the implementation of m-government systems in government organisations. The perspective of duality of structure and moments of translation from both Structuration Theory and Actor Network Theory were adopted to analyse the data collected in the case study organisations.

The result of the analysis aided the design and development of a framework that captures how the challenges of scalability and sustainability of m-government system implementation in developing countries can be addressed. The framework proposes an initial design that would assist decision makers to suitably integrate how sustainability and scalability of m-government system implementation could be achieved.

The contribution of this study can be categorized into three namely: methodological, practical and theoretical.

The methodological contribution of the study is found in the combined application of Structuration Theory and Actor-Network Theory in the analysis of the two case studies by applying the concepts of the duality of structure and moments of translation, respectively.

The practical contribution of the research is found in the detailed work that supports the theoretical frameworks presented. This means showing how the researcher arrived at the frameworks.

Theoretically, the contribution of this research study is found in the examination of how the two theoretical underpinnings were used to analysis the two case studies.

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LIST OF ABBREVIATIONS

ANT: Actor-Network Theory

BIR: Board of Internal Revenue

C2G: Citizens to Government

G2B: Government to Businesses

G2C: Government to Citizens

G2E: Government to Employees

G2G: Government to Government

ICT: Information and Communication Technology

IS: Information Systems

KZN: Kwazulu Natal

M4D: Mobile for Development

ICT: Mobile Information and Communication Technology

M-Government: Mobile Government

SARS: South African Revenue Service

SMS: Short Messaging Service

ST: Structuration Theory

CHAPTER ONE

INTRODUCTION

Governments in the majority of developing countries have poor reputations with respect to service delivery which, in many cases, involves repetitive and manual operations at government offices (Bassara et al., 2005). Low throughput coupled with traditional communication channels are expensive and require intensive human processing. Also, the lack of a single point of contact with the government has been identified as one of the key challenges facing service provision of traditional governments processes (Mansoor and Rohan, 2010).

In order to overcome the limitations of traditional government, and to improve the quality of service delivery, many of these governments, including the South African government, have started moving towards new ways of implementing government services by employing innovative service processes, service flows, approaches to service delivery and service delivery philosophies (Valentina, 2004). For example, the South African government proposes a transition to e-government in order to enhance access to, and delivery of, government services to the citizens, businesses, employees and other government departments twenty-four hours a day and seven days a week through a single government portal using modern Information and Communication Technologies (ICT) (Blessing et al., 2007).

E-government can be defined as the application of ICT to government services in order to improve the activities of public sector organizations and to enhance the effectiveness and efficiency of information to the citizens, as well as to improve the quality of service delivery among organizations, business and citizens (Saysoth and Robert, 2009).

Challenges faced by government in developing countries, such as lack of access to fixed line internet by many citizens, in implementing e-government to ensure delivery of services have led some governments to shift their attention to mobile government (m-government) as the ultimate target of e-government (Sharma and Gupta, 2004). This is due to the development in mobile technology and the mobility of people with respect to the use of mobile devices and technologies that surround it (Sharma and Gupta, 2004). In addition to this, Song (2005) advocates going beyond e-government and

recognizes the potential of m-government for the transformation of government services.

Mobile government is defined as “*the strategy and its implementation involving the utilization of all kinds of wireless and mobile technology, services, applications and devices for improving benefits to the parties involved in e-government including citizens, businesses and all government units*” (Kushchu and Kuscu, 2003). M-government is an accepted extension of e-government for the delivery of government services and information to citizens (Kushchu and Kuscu, 2003).

The purpose of this research is to study and explore ways through which government can incorporate the use of mobile phone technologies to improve the provision and reach of government services to its citizens. As an effort to improve the mobile government experience, this work will provide a proof of concept that serves to address mobile government implementation at various tiers of government. A major output of this research work is a conceptual framework to guide mobile government implementation as a vehicle for the delivery of government services.

This introductory chapter contains twelve sections. The first section provides the research topic and study. The second section presents the background to the research study, while the third section provides a brief overview of the theories underpinning the research study. Section four provides justification and motivation behind the main aims of this research study. In the fifth section, the description of the research problem is discussed from two points of view, namely, IT strategy development and implementation, and organisational politics and power. This discussion leads to the formulation of the research objectives and research question, which are covered in sections six and seven. Section eight provides a brief overview of sustainability and scalability of m-government projects for service deliveries, which is discussed further in Chapter Two. Section nine discusses the significance of the research and its key contributions to the academic body of knowledge and IT professionals, while section ten discusses the research design that was followed in this research study. Section eleven provides a road map of the thesis and, finally, section twelve recaps with the summary of the chapter.

1.1. Background to Research Study

Information and Communication Technologies have comprehensively impacted the course of human development. The rapid change in business processes has made it difficult or impossible for any organisation to conduct business without the help of ICT (Ward and Peppard, 2002). Therefore, it is not an overstatement to say that ICT has contributed to the success or failure of many organizations in the way they conduct their businesses and with recent developments in ICT; nearly the entire world is now a reachable horizon upon which organisations can act and by which they are acted upon (Lee and Whitley, 2002).

The influence of ICT on every aspect of any organisation that utilizes it cannot be overestimated (Lee and Whitley, 2002). This is because ICT is bringing people in various parts of the world closer, and therefore making the global village a smaller place. Undoubtedly, ICT has been the greatest agent of change in the last century and promises to play this role even more dramatically in the coming decades (Kling, 2000). ICT has changed from what it used to be a decade ago and will continue to change every aspect of humanity, especially in areas such as trade, manufacturing, services, entertainment, education, research, security and mobile technologies and communications. However, for the purpose of this research study, our focus is on mobile technologies and communications, particularly mobile phone technologies.

The penetration of mobile phone technologies in Africa and other developing countries is such that the line between the mobile phone and desktop has blurred. This is because mobile devices have become the computers in the pocket of every citizen, both in Africa and other developing countries to the point that it is no longer a case of digital divide but that of digital difference (Botha and Herselman, 2011). Therefore, providing government Information and Communications Technologies (ICT) services through mobile phone technologies can lead to sustained economic growth and human development. This is because mobile technologies are increasingly used as a transformational tool to foster economic growth, accelerate knowledge transfer, develop local capacities, raise productivity, and alleviate poverty in a variety of sectors (Mariana, 2011). In that respect, in the last decade, mobile phone technology development has become a key strategic area for policy engagement in emerging

economies, because this will help in delivering effective service delivery to the citizens (Mariana, 2011).

The high relevance of mobile phone and mobile technology in Africa and other developing countries today requires a framework for its proper utilization and deployment within a government organization. Without a proper framework, all possible ways of deploying mobile government implementation may lead to a future for any government such that there will not be cohesiveness within its mobile government implementation activities. With an effective framework in place, a roadmap to the future is designed with a government that has effective and efficient government service delivery through mobile technology in place. A framework is often broken into components such as the organization strategy and the IT environment permit.

A framework for enhancing government service delivery cannot be static, because the needs and demands of the various government organizations constantly change (Wolff and Sydor, 1999). Papp and Fox (2002), argue that traditional ways of implementing business strategies to deliver services to the citizens by the government have failed to take full advantage of ICT. Therefore, there is a need for a new approach. However, in investigating the framework for enhancing government service delivery, it is imperative to better understand the relationships between the social factors, the technology and the organization that deploys it. Due to this, this research study used two theories to conduct the study about the relationship between social factors and technology as well as the organization that deploys the technology. These are Actor-Network Theory and Structuration Theory. Actor-Network Theory (ANT) enables the construction of detailed accounts on how human and non-human actors gradually form stable actor networks. Structuration Theory (ST), on the other hand, attempts to bridge the gap between two schools of sociology. These schools are those that are predominantly concerned with structure and those that are predominantly concerned with agency (Giddens, 1984). The structuralists and the functionalists argue that social structures have a direct influence on human behaviours; however, the hermeneutics and phenomenologists believe that the social structure is the product of action by the human agents. As such, ANT and ST approaches were applied in this study. These approaches are further discussed in the next section and in detail in Chapter Three.

1.2. Theoretical Underpinning

Over the last decade, the exploits, methods, power and presence of Information and Communication Technology (ICT) have increased significantly. ICT, particularly mobile technologies, have and will remain a key aspect of organizational development for many years.

How human and service delivery management are seen, understood, practiced, interpreted and used differ. (Human and service delivery management in this research study refers to managing human beings in terms of service delivery). The practice and/or existence of human management has positive and negative influences and impacts on the individuals, teams or groups, and the entire government organization that administer the service.

Issues with managing service delivery to the citizenry arise when people for whom the service is meant think differently and want to act differently in order to get the required service. It is this diversity that creates tension that must be resolved through service delivery. It is, therefore, not surprising that managing human and service delivery has a significant level of impact on the formulation and implementation of a mobile government project framework (DHS, 2011). However, the impact of this influence could be negative or positive depending on how the management is understood, practiced or exercised within the various government organizations that are implementing mobile government projects. This impact forms the principal area of this research study.

To explore the impact of human and service management on framework design and implementation in this research study, we have selected Structuration Theory (ST) and Actor-Network Theory (ANT) perspectives. These two theories have been used extensively in the field of Information Systems research.

The perspective of structuration theory holds that an attempt needs to be made to bridge the gap between the two schools of sociology; these schools are those that are predominantly concerned with structure and those that are predominantly concerned with agency (Giddens, 1984). The structuralists and the functionalists argue that the social structures have direct influence on human behaviours; however, the

hermeneutics and phenomenologists believe that the social structure is the product of action by the human agents. On the other hand, according to Giddens (1984), structure and agency are not independent and/or conflicting entities, but are a mutually interacting duality. Therefore, social structure constrains and enables the actions of human agents, and the human agents draw on the existing structures to produce and reproduce social structure.

In structuration theory, it is believed that structure is only injected in the structural properties of social systems, which consists of the rules and resources that human agents use in their everyday interaction. These rules and resources are not independent of human action; in addition, they are material entities. Giddens (1984) describes them as “traces in the mind” and Jones (1997) argues that they occur only through the action of human beings. Orlikowski (1992) further explains that they mediate human action, and at the same time they are reiterated through being used by human agents.

The other theoretical perspective that is used in this study is Actor-Network Theory. ANT offers a new perspective on the significance of relationships between actors that are both human and non-human. In ANT, actors collaborate to create, manage and study the creation of organizational networks of affiliated interests.

The perspective of ANT stipulates that actors are connected through various interests which highlight its heterogeneous nature which consists of both technical and non-technical elements (Callon, 1991). A firm belief in ANT is that no actor is different in kind from another. However, how size, power and organization are generated should be studied (Law, 1992).

The two theories, Structuration Theory and Actor-Network Theory, are discussed in more detail in Chapter Three. Having presented some background and the theoretical underpinning to the research, it is necessary to discuss the motivation for this research study.

1.3. Motivation for the Research Study

The key focus of this research study is the development of a framework to enhance the quality of government service delivery through the use of mobile technology, in particular mobile phones.

The purpose is to enable us to set out key directions in the management of Information and Communication Technology, particularly the deployment of mobile technology (i.e. mobile phones) for service delivery in government organization. This is to enable the government to gain mutual understanding of the goals and objectives of the particular government's organization or agency, which will help set priorities in terms of service delivery.

Frameworks are designed for particular purposes by particular users, groups of users or organizations. Therefore, it should be expected that differences in the goals and objectives of the various groups or organizations will exist. Such differences, however, will constitute the key to understanding many situations that are not expected.

There are two key motivations from the perspective of this research study. Firstly, many government organizations and/or agencies devise and develop their goals, objectives, and vision towards service delivery to business and citizens; on many occasions, the effort towards achieving this is based on ICT strategy and usage. This research will identify key components and seek to make contributions to the attainment of service delivery goals and objectives through the use of ICT strategy, particularly mobile technology. Secondly, it has become a common practice that many organizations develop ICT strategies in the course of delivering service to their customers, in this case the citizens and the business, but little is known about the influence and impact of non-technical factors, such as human beings. This motivated the study to make a contribution in this regard. However, to achieve this, Structuration Theory and Actor-Network Theory were employed to investigate the implementation of a framework for enhancing service delivery through the use of mobile technologies.

1.4. Statement of the Research Problem

The challenge remains how best to enhance the quality of government service delivery in developing countries for citizens with their personal mobile devices, taking into consideration the mobile phone is now the computer in the pocket of the majority of citizens in developing countries (Laurie et al., 2009). Most governments and their agencies provide resources to citizens through the traditional internet, which assumes access to computers. For example, in South Africa, urban citizens have access to

government services mostly through computers. However, of those who live in the remote areas and in other developing countries i.e. Nigeria, Sudan, Uganda, Rwanda etc. many do not have access to computers but do have access to mobile devices that are connected to the internet; hence, enhancing government service delivery through mobile devices which are already prevalent among citizens becomes a viable option to explore.

An increase in the use of mobile devices in the last decade has led to an increased number of opportunities for exploring the possibilities of the use of these devices in enhancing government service delivery (Mansoor and Rohan, 2010).

In South Africa, mobile devices are the only major computer information technology most citizens have. The affordability of mobile devices as government service delivery tools unleashes tremendous opportunities for innovative uses in government service delivery. The argument pointing to the fact that most citizens own mobile devices creates an opportunity to embrace m-government to assist citizens to improve their interaction with the government and vice-versa (Liu et al., 2010). The proliferation of the mobile phone as well as its affordance has made it a feasible tool in solving some of the governance problems inherent in majority of the government service delivery agencies and departments who deliver core services to the citizens, as adjudicated by its adoption by many citizens in developing countries (Laurie et al., 2009)

1.5. Description of the Research Problem: A Framework Perspective

Framework design, development and implementation could be viewed as a position, pattern, plan or perspective which provides direction on what needs to be done and, at the same time, is directed by the actions that have already taken place. Framework development has been used to bridge the gap between organization strategy and the technological know-how. However, there still exists a clear problem with the implementation of mobile government projects and hence framework design, development and implementation that will guide the implementation of mobile government projects to enhance the quality of service delivery to the citizens by the government.

Framework development in this study is guided by three key issues. The first issue deals with how the framework is designed, developed and implemented, which includes the structure and people in the IT department. The second issue deals with the factors such as structure, agency, humans that can influence the design, development and implementation of the framework for enhancing the quality of service delivery. The third issue deals with the impact that these influencing factors have either on the design or on the development and implementation of the framework within the computing space of the government agencies and/or organization. These issues are further discussed below.

1.5.1 Framework Design, Development and Implementation

ICT related framework design, development and implementation is an endeavour that refers to the ideas, insights, experiences, expertise, perception and expectation that provides general guidelines for specific actions in pursuit of goals within an ICT environment.

Government organizations have many diverse stakeholders which makes management in terms of service delivery unavoidable. In the past years, much attention has been given to how ICT strategy is communicated and formulated but little attention was given to how this should be used in government service delivery in developing countries, particularly when it comes to mobile technologies. Furthermore, technical issues are less of a problem compared to relationship issues among the stakeholders and the people for which the government services are intended.

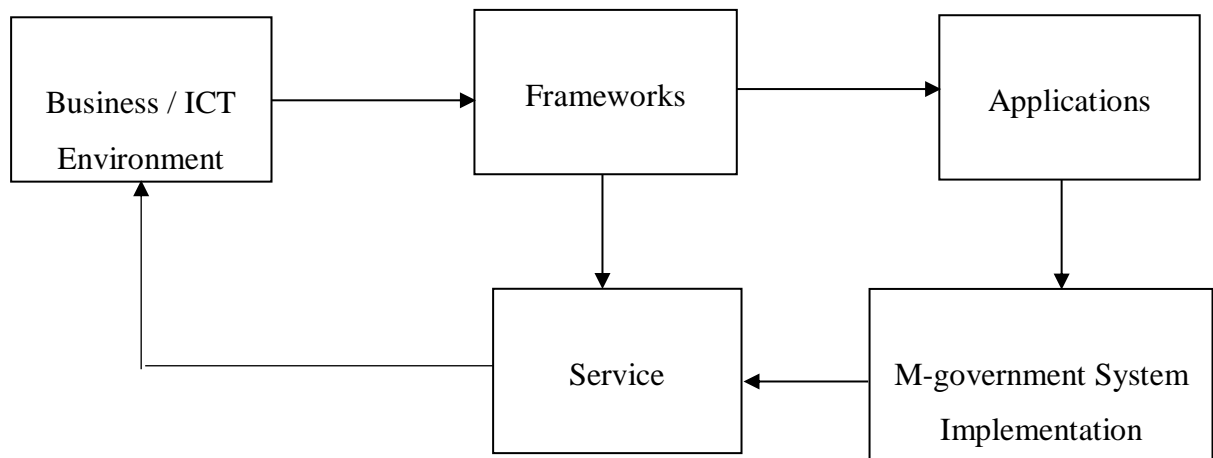


Figure 1.1: Framework Development Planning. Source: (Wallace et al., 2002)

As shown in Figure 1.1 above, framework design, development and implementation should be formulated based on government business and ICT environment, requirement and factors. While this is seen as a practical reality, what is more important is the relationship between ICT strategy and the business strategy of government organizations and/or agencies. The process of doing this must be clearly understood (Wallace et al., 2002).

Framework development helps to set directions and focus for the future in the event of change in the government organizations or agencies that ICT supports. It helps in making adjustment modification accordingly and when necessary. The framework should clearly set out the objectives and have access to both the external and internal situations that the organization faces (Dirk et al., 1997).

An ICT framework to enhance service delivery through using mobile technologies should be structured into components that influence ICT strategy to create the intended service delivery that leads to effective and enhanced governance (Dirk et al., 1997).

However, framework development cannot be formulated in isolation. Its success depends on the acceptance of the various stakeholders which include the structure, agencies and people (i.e. the citizens). As stated before, one of the motivations of this study is that, in the course of mapping out ICT strategy that can aid the government in delivering service to the citizen, there is little knowledge about the non-technical

element (i.e. people) which is one of the deciding elements for the success of framework development. Further research is germane in this area, particularly in developing countries, with South Africa and Nigeria as the context.

1.5.2 The Influencing Factors

It is a serious oversight to pretend that government organizations do not need the contributions of the citizens in the discharge of service to the public. Therefore, framework implementation needs to include elements with strong influences such as the people in order to achieve the goals and objectives. This research intends to address this by examining the factors that influence the design, development and implementation of framework to enhance service delivery through mobile technologies. This research examined this through the gathering of data concerning citizens' desires in relation to service delivery via mobile devices.

1.5.3 The Impact of the Influencing Factors

An accepted ICT strategy is not guaranteed to be the most successful or better than the rest. The more important a product is, the more the criticized it becomes. Peiyong (2010) argues that a product that does not face criticism by the people that it is intended for is a sure sign that it is not doing anything significant. The individual cultural background, the mindsets, interests, and the relationships among these individuals and the implementing government organizations are often the baseline for criticism. Therefore, criticism that later leads to acceptance of the implementation of the framework is as important as the technical competencies. This means that the impact of people on ICT project implementation is an important factor in the success or failure of the implementation of the framework that enhances the quality of the service deliver to the people through the use of ICT (in this case, mobile technology).

The following sections cover the research objectives and a set of research questions of this study. They acted as the guidance for this research study. Also, they were used in data gathering for the research study.

1.6. Research Objectives

The key high-level objective of this research was to study and explore how government can incorporate the use of mobile phone technologies to improve the provision and

reach of government services. This will help to present a framework for the delivery of m-government services to the citizenry.

To meet this objective, the following will be covered as part of this research project:

1. To explore particular ways in which governments can effectively deliver services through the use of mobile cellular technologies.
2. To explore various factors and challenges that are faced by government in developing countries that make implementing mobile government systems difficult to succeed.
3. To provide a broad understanding of the issues around scalability and sustainability of m-government projects in general and mobile phones-based projects for service delivery in particular.
4. To explore and recommend technical architectures that can be put in place to support the delivery of integrated m-government services.

1.7. Research Question

The provision of mobile services for citizens and customers is no longer about a technological revolution (Kushchu, 2007), but more about provision of better social infrastructure through mobile applications and services to citizens and customers. While e-government is an important step, the provision of services through mobile technologies is also unavoidable (Kushchu, 2007). As with every technology adopted from the developed world, understanding the social, economic, and cultural conditions in which it will be deployed in developing countries increases its adoption and effectiveness. Unless m-government adds real value to the existing information and service architecture, its relevance must be questioned. A critical question to ask while considering the deployment of m-government services and applications concerns the various ways the government can utilize and deploy the technology (Farshid and Kushchu, 2004).

More than 95% of the total population of both Nigeria South Africa has access to mobile phones (Fripp, 2014). The social and economic development of these countries, however, depends on the government's ability to respond to the challenges and urgent needs facing the citizens which include unemployment, HIV and AIDS, drug abuse, crime, poverty, safety and security, and housing, to mention just a few. These problems

are most prevalent in areas where government is unable to reach most the population due to poor or non-existent fixed internet infrastructure. The *digital divide* (separating those who have access to computers and the internet from those who do not) poses a particular problem in the context of e-government. For m-government, however, a more relevant notion is the *digital difference* where the separation is not defined in terms of access to computers and the Internet, but rather in terms of how access is gained to the network/grid/internet (Botha and Herselman, 2011). The majority of people have access to mobile telephones that can be used to access the internet. For instance, according to Teller (2014), 63 percent of Nigerians, South Africans and Kenyans stated that mobile internet has “greatly improved” their lives which is in stark contrast to only 40% of those in the UK (a developed country), who have the same sentiment. Figure 1.2 and figure 1.3 below show the statistics of both improvement of lives through mobile and penetration through internet and mobile accessibility.

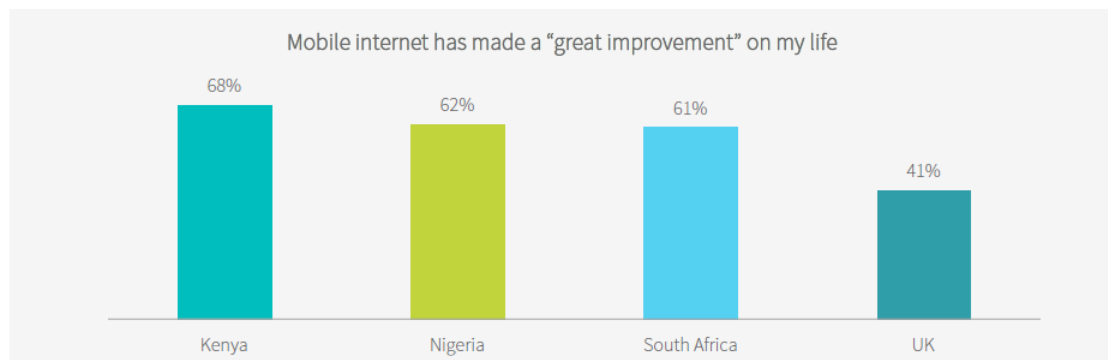


Figure 1.2: Improvement based on mobile internet. Source: (Teller, 2014)

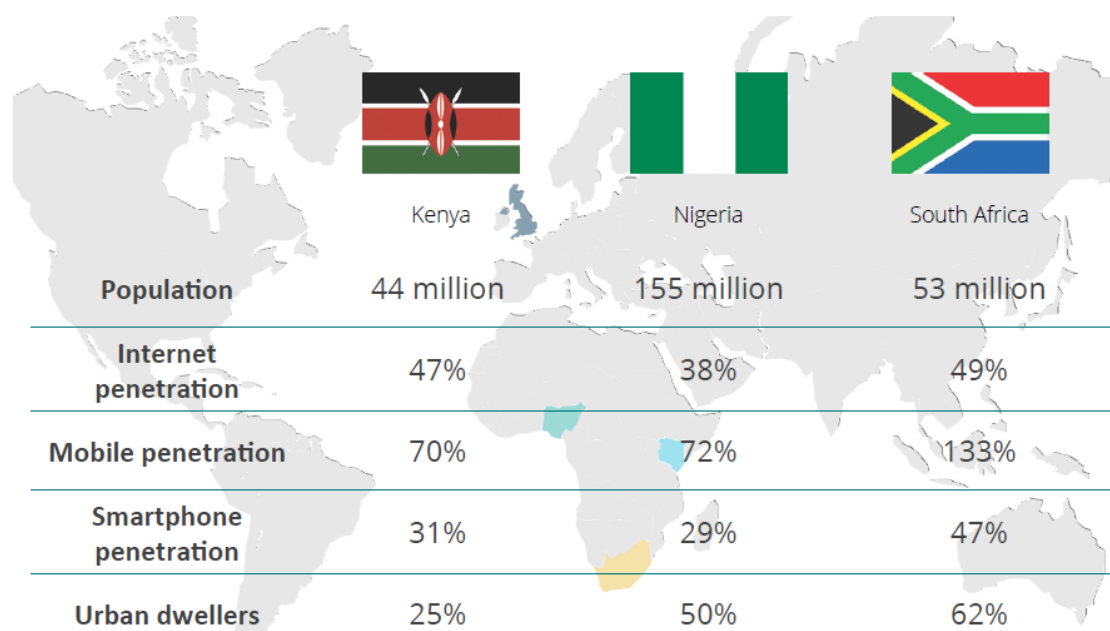


Figure 1.3: Mobile and Internet penetration in Nigeria and South Africa. Source: (Teller, 2014)

This leads to the main research question of this project:

How can the government incorporate the use of mobile cellular technologies to improve the provision and reach of government services?

To answer the main research question, the following sub research questions must be studied:

1. How can governments deliver services effectively using mobile technologies such that people will use the technology they already have (i.e. mobile phones) to access government services in a way that adds value to the lives of the citizens?
2. What are the factors that are preventing the implementation of mobile government in Africa?
3. What are the factors that affect or influence the sustainability and scalability of m-government implementation?
4. What technical architectures can be put in place to support integrated m-government services?

1.8.Sustainability and Scalability of M-government Projects for Service Delivery

If service delivery goals must be achieved through the use of mobile technologies, it is important that m-government initiatives and the outputs of these initiatives be made available to the various citizens living in various developing countries. Also, these initiatives must run effectively for long time periods. As indicated in the previous section, mobile technologies can be useful tools in service delivery and this will eventually lead to development, but in order to achieve effective development through the use of mobile technologies, the sustainability and scalability of these projects must be achieved. According to Walsham and Sahay (2006), non-scalable and non-sustainable Mobile-for-Development (M4D) projects have implications for the raising and non-fulfilment of expectations of various people involved in the projects (i.e. the actors), the alleged usefulness or not of M4D initiatives, and the utilised and/or wasted assets and the unused technology. Subsequently, this can lead to any or all of the following: lack of reliance on technology, scattered unused mobile solutions, lack of commitment of key stakeholders in future M4D initiatives and unachieved mobile for development objectives, as was the case with failed Health Information System in South Africa (Littlejohns et al., 2003). In order to circumvent the negative implications of mobile government initiatives that are not scalable and/or sustainable, it is imperative not only to show the relevance of how M4D will improve the lives of citizens through the innovative use of appropriate mobile technologies, but also to show how to channel and use scarce resources efficiently and effectively towards addressing pressing and relevant development challenges.

1.9.Significance and Contribution of this Research Study

The mobile phone has become ubiquitous. This is due to the innovative capabilities of mobile devices complemented with a decrease in cost. According to ITU (2014), there are now almost 7 billion mobile subscriptions globally, which corresponds to 96% of the world's population. In developing countries, mobile penetration has reached 90% by the end of 2014 (ITU, 2014).

This study is significant in the sense that it explores the prospective of allowing citizens to use their personal mobile devices to enhance their interactions with the government in search of service delivery; this can serve to eliminate the cost implications inherent in traditional service delivery systems. This study is also different in that it assists in

supporting government in the integration of virtual government service application on mobile devices. The study is expected to inform researchers and stakeholders within governments on how mobile devices as service delivery tools can enhance government service delivery.

Another contribution of this research study can be seen from the explanation of theoretical concepts applied in the exploration of the case study. This contributes to an improved understanding of many government organizations' trajectories that are connected with the development and implementation of ICT frameworks for enhancing service delivery.

Another contribution from this study comes from the effect on the decision makers within government organizations and/or agencies that are responsible for formulating standards for the development and implementation of ICT frameworks for service delivery. Furthermore, the purposes, dynamics and reasons for what, why and how IT strategy or any of its elements succeed or fail at the micro-level in delivering services to the public at various levels of government and how solutions can be provided need to be understood by the decision makers. This provides a focus on sustainability and scalability as well as the novel aspect of the m-government design implementation as the key intellectual contribution to this research study.

The aim of this study, therefore, is to be of significance to the decision makers, including managers and employees of government organizations where ICT usage is leveraged for service delivery. In addition, this study aims to be of significance to Information System researchers through the choice of methodology used in the development of the framework. Therefore, the expectation of this study is that the major contributions will come from the development and application of the framework, presented in Chapter Six, to the practical analysis of the relationship between ICT utilization and management of service delivery to the public by government organizations in the developing countries. This will help to provide an adequate understanding of the contribution of socio-technical elements to ICT utilization.

1.10. Research Design

This research study adopts an interpretive research paradigm (Walsham, 1995b) and case study methodology to explore how the government can incorporate the use of mobile cellular technologies to improve the provision and reach of government services to the citizens in developing countries, using South Africa and Nigeria as contexts of the study. The study adopted case study research approach so as to gain an insightful, qualitative interpretation in the development and implementation of a framework that guides mobile government project implementation as well as measures the scalability and sustainability of the project.

The study also adopted a qualitative methodology to study the impact of organizational structure as well as human influences on ICT project frameworks with a focus on mobile technologies. A qualitative methodology was adopted due to the fact that it is more appropriate for this type of study as it allows explanations of questions when respondents are asked to explain their answers. Furthermore, qualitative research is an important and useful method that can be used to study and explore complex situations and theories (Stake, 2005).

Furthermore, case study research methodology was adopted due to the fact that a case study allows a researcher to conduct an investigation in order to retain holistic and meaningful characteristics of real-life events (Yin, 1994). The data sources for this research included interviews and documentation as well as a pilot study. The key factor in this area was a set of balanced respondent demographics which helped this research to achieve a true reflection of the situations around service delivery and mobile ICT.

The interviews that were conducted included a mix of structured and semi-structured interviews that were designed to gather data on ICT strategy, organizational structure, organizational culture towards the use of ICT, and the relationship between all the actors in the network.

The procedures followed in the interview were based on the previous work and literature, for example (Orlikowski, 1991) and (Ward and Peppard, 2002). The data that were gathered from the interviews were recorded and transcribed. Data collection was performed as follows:

1. Documentation about mobile ICT strategy, governance and policy was gathered.
2. Based on the activities in 1, research questions were formulated and these questions were used to formulate the interview questions.
3. Structured interviews were conducted with identified key members of each organization used in the case studies.
4. The interviews were recorded with the consent of the interviewees and all the interviewees gave their permission to the recordings. The recorded interviews were transcribed and interviewees were asked to confirm the transcriptions.

The findings that were obtained were used as information that contributed towards the whole research study.

In this research, Structuration Theory (ST) and Actor-Network Theory (ANT) were adopted for analysis and interpretation of the case studies at different levels. These were achieved through the “duality of structure” concept of ST and “translation” concept of ANT. These will be discussed further in Chapter Three. The next section presents an overview of this thesis.

1.11. Structure of the Thesis

This thesis is structured into nine chapters. The remaining chapters are briefly described as follows:

Chapter Two provides a thorough description of background and literature review in this study.

Chapter Three describes the theoretical framework underpinning this research study.

Chapter Four provides the description of research approach and research methodology adopted in this study.

In Chapter Five, a description and presentation of the case studies are presented. This chapter also explains the justification for the selection of the case study.

Chapter Six provides an explanation of the design and development of the artefact.

In Chapter Seven, a description of the evaluation conducted is provided.

Chapter Eight provides an explanation on the interpretation of the results obtained.

In Chapter Nine, conclusion and recommendations are presented.

Finally, Bibliography and Appendices are presented.

1.12. Chapter Summary

The aim of this thesis was to investigate how governments in developing countries can incorporate the use of mobile cellular technologies to improve the provision and reach of government services. The emphasis, however, was on both technical and non-technical actors in the development and implementation of a framework that can aid governments in mobile government project implementation. The relationship between these actors and structures was interrogated.

Due to these factors, Structuration Theory and Actor-Network theory were identified as appropriate theories to underpin this research study.

The next chapter provides background and an overview of the literature on mobile government project implementation.

CHAPTER TWO

BACKGROUND AND LITERATURE REVIEW

2.1 Introduction

This chapter will discuss the literature that is relevant to m-government project implementation. The literature review will be presented in 8 sections that include the following topics:

- The Social Problem of Governance
- E-government, M-government, Government to Citizens (G2C) and M-democracy
- Background and Context of M-government
- Benefits and Barriers of M-government
- Mobile ICT (ICT) for Government
- Mobile ICT (ICT) Strategy for Government Service Delivery
- Implementing Mobile ICT (ICT) Strategy for Government Service Delivery
- Elements of Mobile ICT (ICT) Strategy for Government Service Delivery
- Maturity Models
- M-Government Implementation
- M-Government Project Scalability and Sustainability in Developing Countries

2.2 The Challenge Facing Public Governance

The purpose of this section is to provide a background to the practical context in which m-government is taking shape. This is grounded within the sphere of public governance in developing countries. The societal problem that m-government implementation seeks to address in developing countries is that of enhancing government service delivery (as contained in the research questions asked in this study). Goldsmith (2007), argues that the principal justification for the pursuit of good public governance reforms has been based on the conviction that reforms can assist in boosting economic growth. The assumption is that if good governance (in the form of accountable, transparent as well as inclusive governance) measures are established, then the significance of this is an increase in the performance of the country concerned.

In order to justify the credibility of the link between good governance and national development, the United Nations (UN, 2015) in its Millennium Development Goals takes into consideration good governance as an instrument that can be used to bring about development and eradicate poverty. This can also form the basis on which economic growth can be sustained and employment can be created (UN, 2006). Literature studies revealed that lack of accountability, lack of transparency, and governance restriction are not favourable to the welfare and development of a nation, while the opposite predisposition is beneficial (Acemoglu et al., 2001). The findings from the literature study also strengthen the idea that genuine improvements in governance could improve the economy significantly and also have positive effects over short periods of time (Kaufmann et al., 2006).

The perception of public governance in developing countries shows that this discussion is in line with the philosophy that good governance results in development. Mekolo and Resta (2005) further argue that although governance is linked to the contexts of a particular country, it has developed as a concept in developing countries within the framework which moves towards the understanding of Millennium Development Goals, the Heavily Indebted Poor Countries Initiative, the Brussel's Programme of Action, Poverty Action Strategies, the New Partnership for Africa's Development (NEPAD), as well as many initiatives currently underway in Africa. Within the framework of NEPAD, the authors argue that good public governance has a central role to play in reaching certain socio-economic objectives with key functional areas being the use of ICT such as e-government, m-government and knowledge management; developing human capital within the public sector; public participation (citizen/government relations); and service delivery innovation/re-engineering.

As stated earlier, in order to overcome public governance challenges, developing countries at large have evolved a joint concept of governance that is attached to agreed evaluative measures such as citizen's involvement in governance, the perceptions of citizens towards governance which should be positive, security of citizens and businesses, poverty alleviation, etc. Due to this, the collected notion of governance is therefore understood as an outcome of evaluation processes as well as a pro-active leadership adopting values of efficiency, fairness and adherence to certain generally accepted values. The realisation of this collected concept of good governance is now

peddled as critically dependent on e-government and, recently, m-government as a reform instrument. This is due to the fact that mobile devices and mobile technologies have become the tools in the pockets of every citizens (Rain et al., 2010).

2.3 E-Government

Governments are playing a critical role in ensuring that information and communication technologies (UN, 2015) are used for political transformation as well as the creation of a socially all-encompassing information society. The World Summit on Information Societies (WSIS, 2003) plan of action proposed the formation of a citizen-centered, inclusive and development-oriented information society where every citizen of a particular country can utilize, access and share information among one another as well as with the government. Many developed countries and, to a lesser extent, developing countries have taken an important step towards meeting the proposed plan of action of the WSIS by making some government services available through the use of the internet. This is known as e-government implementation.

“E-government is the use of ICT and Internet to promote more efficient and effective government, facilitate more accessible government services, allow greater public access to information and make government more accountable to the citizens” (Farelo and Morris, 2006:1). According to Evans and Yen (2006), the implementation of e-government has been widely approbated such that it offers new momentum to deliver government services quickly and efficiently and provide benefits to both government and citizens.

The development and implementation of e-government in a particular country epitomizes the level of functional sophistication of its e-government service provision portal (UN, 2001). Although this involves significant investment of resources for governments, it is not only anticipated to deliver benefits such as revenue growth, increased reaction to citizens' needs, and cost reductions (Tan and Pan, 2003), but also to possess the ability to make a reasonable and effective relationship between government and citizens (G2C), government and businesses (G2B), government and employees (G2E), and between other governments agencies and/or organizations (G2G) (Siau and Long, 2009). However, many research studies have ignored the fact that the citizens and government (C2G) part of this relationship is, practically, the most important factor. Due to this, there have been different research studies conducted in

the areas of e-government, for example (Chan et al., 2008; Chen et al., 2009; Chan et al., 2011). However, these studies show that the intended benefits of e-government continue to be an “obscure vision” for many governments worldwide and developing countries in particular, despite the enormous amount of resources required in the development process. To confirm this argument, Heeks (2008), through the research study conducted in the context of developing countries, explained that 35% of e-government development initiatives were “*total failures*” which means that the initiative was either not implemented or it was an initiative that was abandoned immediately after the commencement of the implementation. The study also claimed that 50% of e-government initiatives were “*partial failures*”. This means that there were undesirable outcomes after the implementation of the initiative. According to Heeks (2008), only 15% of the e-government initiatives were “*successes*”, a statistical figure that is too low for the huge resources committed to the implementation of the initiatives. Therefore, these statistics, put together, show that despite the array of inspirations, motivations, enthusiasm and service targets that are essential to public institutions, successful development of e-government is a challenging task in most countries.

Heeks (2008) argues that there is no theoretical reason to support e-government failures in developing countries; however, there are more practical reasons such as lack of infrastructure to support e-government implementation in developing countries, such as the lack of access to traditional internet. Also, lack of public support due to limited or no access to internet constitutes another reason why e-government implementation fails (Richard, 2009). Therefore, a move not totally replacing e-government but rather complementing it is imminent.

2.3.1 From E-Government to M-Government in Africa

Although some governments in developing countries have made significant progress towards the implementation of e-government, the state of e-government in developing countries at the national level is still at the rudimentary stages (Mutula and Mostert, 2010). There are various reasons for such claim, the major reason being the lack of adoption of e-government services by the majority of the citizens, and of the expectation of the citizens who are the primary users of the system (Kaisara and Pather, 2009).

As mentioned earlier, challenges such as limited or no access to fixed line internet by many citizens, faced by governments in implementing e-government to ensure delivery of services, have led some governments to shift their attention to m-government as the ultimate target of e-government (Sharma and Gupta, 2004). The ability to provide access to mobile telephone communications in of the 21st century civilization brings about economic, social and political benefits to society (Kholadi et al., 2007). The ubiquitous nature of mobile phone technologies forms part of the lives of individuals, families, businesses, governments and the broader civil society (Kholadi et al., 2007). The remarkable advancement of mobile technologies as well as the proliferation of mobile phone technologies has revolutionized the field of mobile telephony and provided an alternative solution to re-engineer the delivery of public service mechanism.

Mobile phones have now become the world's most common means of technology-mediated interpersonal communication and this new frontier is beginning to transform governance, thereby creating a paradigm shift in governance in developed countries (Kushchu, 2007). Therefore, in the context of developed and industrialized countries, m-government has emerged as an appropriate form of government initiatives using mobile devices within the purview of government administration to deliver public services to citizens and organizations in a transparent, accountable, efficient and effective manner on mobile devices.

More than 95% of people living in Africa have access to mobile phones while 90% of these are actual owners of mobile phones (Rawlinson, 2011). This high penetration of mobile technologies presents an opportunity to reach an exceptionally broad base of citizens in the developing countries (for example, South Africa, Nigeria, and Kenya). This has raised the motivation for mobile government service implementation.

The effects of this cannot be understood simply by taking a broad view and generalizing from the past research on ICTs. Therefore, governments and all stakeholders need to build specific knowledge about the new capabilities (Heeks, 2008). Mobile phones have penetrated the informal sector (i.e. the rural areas) in developing countries so much that they are helping to reinforce existing structures and inequalities, and this has become the case of digital divide as opposed to digital difference (Botha and Herselman, 2011).

One thing that is very obvious is that mobile applications in developing countries will not be consumed and used in the same manner as in developed and industrialized countries (Botha et al., 2010). This digital divide will increase the disparities in society unless new initiatives and innovations, including increasing the affordability of mobile phones, reach those who are currently disconnected (Botha et al., 2010).

Furthermore, governments have the responsibility to deliver quality service and information to their citizens at all levels of life. These services and information, which are sometimes critical, are needed by citizens in making decisions and forming opinions. This helps them to feel a part of the government (Farshid and Kushchu, 2004). This also allows timely service delivery to the public and therefore helps to promote public participation in democracy and creates accountability and transparency (Farshid and Kushchu, 2004). To this end, mobile service delivery has proven to be a critical channel through which government delivers services and information to citizens. This is called government to citizen (G2C) service delivery (Farshid and Kushchu, 2004) and citizen communication with the government (C2G and m-democracy) (Brücher and Baumberger, 2003). This also applies to government delivery of service to business (G2B) and business interacting with the government (B2G).

2.3.2 Background and Context (Developed to Developing)

Information and the ability to communicate are essential components of human existence. The advent of electronic communication technologies has made it easier, faster and cheaper to communicate, thereby bringing personal and competitive advantage to those who have access to such technologies. The desire to enjoy these advantages is evident in the national communication policies of government in developing countries as well as in the programmes of international development agencies (Sey, 2008).

Research on mobile phones and mobile cellular technologies has been conducted in a number of developing countries. Most of this research focused on the aesthetics and user experience of mobile device usage, mobile learning, mobile communication and mobile health. Less research on the implementation of mobile technologies for government services in developing countries (especially as it relates to the scalability and sustainability of such implementation) can be found in the literature. However,

research on mobile government implementations has been reported in developed countries of Europe, Asia, and some parts of America. Examples are the Go-Mobile project of the City of Seattle in United States (Raya et al., 2007), Fully Mobile City Government Project of the City of Seattle in United States (Hans et al., 2008), the Tartu mCity by the Tartu City government in Estonia (TartuCity, 2009), and the mobile law enforcement in Turkey (City of Istanbul, 2008).

Research has demonstrated that mobile information and communications technologies have the potential to radically transform government service delivery by providing access to government services in areas where infrastructure required for internet or wired phone service is not an option (ITU, 2011). Therefore, while it is generally perceived that mobile government will be good for developed countries (Farshid and Kushchu, 2004), it can potentially be even more beneficial to developing countries. Furthermore, more people in the developing countries have access to high end mobile phones (Laurie et al., 2009).

The potential for m-government implementation in developing countries remains largely unrealized. There have being numerous efforts by private organisations in developing countries to spread out mobile network infrastructures; however, the government in the developing countries have not utilized this opportunities to deliver quality services and present more access and information to citizens (Desta et al., 2009). The qualities of m-government services vary significantly; for example, in rural areas, there are limited financial, technical and human resources to deploy and implement electronic services that are of the same quality as those offered by large organizations (e.g. banks).

Within this context, this study conducted research and examined how government service delivery can be enhanced using mobile technologies (m-government). The research presents rationale for the adoption of mobile technologies for the delivery of government services to citizens.

2.4 Benefits and Barriers of M-Government

Mobile access anytime anywhere is becoming a natural part of daily lives and it is the responsibility of government to find ways of transforming its activities according to the demands of convenience and efficiency of interaction for both citizens and governments. According to Kushchu and Kuscü (2003), one of the benefits of m-government comes from the functionality of m-government implementation supporting mobility of citizens and internal operations of the governments. For example, the ability to locate a government hospital for a particular medical service through one's mobile phones could be a distinguishing benefit of m-government over conventional e-government implementation.

One of the major benefits of m-government is that it truly helps to create an integrated digital nervous system for the government (Rain et al., 2010). In addition, the propinquity and ease of use reduce the previous obstacles to public service, which gives confidence to citizens to make use of the technology. Furthermore, m-government implementation will be helpful in expanding the capacity of government to deliver citizen- as well as business-centric services (OECD/ITU, 2011) and this will bring about a notable progress in developing countries that have been historically limited by poor and/or non-existent communication infrastructures that constrain economic developments and social improvements. However, m-government implementation also provides countries with existing e-government implementation the opportunity to tackle digital divide-related issues, which remain a critical factor in lower-than-expected levels of m-government services take-up.

M-government implementation also encourages interactive services to be implemented which will allow interaction between government and citizens. Through this, citizens can engage in dialogues with governments and send inquiries, problems, comments, or service requests to specific agencies. This will also allow citizens to have access to some applications and general information from within their mobile devices which will allow a personalized interaction with the government, and the communication will become one to one with the focus on citizens' convenience. This will help to increase citizen participation in the government (OECD/ITU, 2011).

On the other hand, m-government implementations also face a number of barriers discussed below:

- **Privacy and Security:** This is seen as the most important concern that citizens have about m-government (Lanvin, 2002). A common concern about this is that you often have to trace IDs and phone numbers where identification is crucial, when one makes one form of communication or the other with the government. The mistrust should be overcome, and an assurance needs to be given to mobile users that people's privacy is protected.
- **Legal issues:** It is a barrier that is facing m-government implementation and adoption. The reason for this is largely because many countries are yet to adopt the Law of Fair Information Practices, which states the rights of data subjects (i.e. citizens) and the responsibilities of the data holders (i.e. government). In many cases, the law does not recognize mobile documents and dealings. This means that there is no clear legal status for government mobile transaction (Farshid and Kushchu, 2004).
- **Accessibility:** The success of any government to citizen (G2C) mobile government implementation will depend critically on the number of its users i.e. the citizens. However, socio-economic issues such as level of income, education level, gender, age, disability, language variation, literacy, efficacy, cost, and regional ethnic discrepancies will affect the citizens' attitudes towards mobile government implementation and adoption (Farshid and Kushchu, 2004). In order to improve citizens' contributions to government and democracy and provide citizen-oriented services, governments need to find a way to offer easy access to m-government services and be able to cater for and accommodate every user.
- **Infrastructure development:** For m-government to succeed, the information technology infrastructure must be at hand. This infrastructure is both 'hard' and 'soft'. Hard infrastructure refers to the technology, equipment, and network required in implementing mobile government. No less important are soft infrastructures such as institutional arrangements and software that make m-government dealings achievable (Farshid and Kushchu, 2004; Kushchu and Kuscu, 2003).

2.5 Mobile ICT for Government Service Delivery

Mobile Information and Communication Technology is the use of mobile devices and mobile technologies in the field of socioeconomic development and human rights advancement. Besides its reliance on mobile technology, ICT for government service delivery requires an understanding of community development and engagement which will make it suitable for bridging the digital divide and aiding government service delivery as well as creating equitable access to government services by all citizens (Victoria, 2013).

However, ICT implementation in the developing countries is seen to directly benefit the bottom of the population pyramid. This, therefore, assists government and government agencies in improving the way services are delivered to citizens.

2.5.1 ICT Strategy for Government Service Delivery

Strategy involves high level plans that emerge over time as goals and objectives collide with and adapt to a changing reality (Mintzberg, 2000), with a perspective and conclusion that a particular position is to be attained by a carefully crafted and sketched plan. The outcomes of this exercise are reflected in a pattern that is evident in decision and action taken over time. This means that strategy offers direction, concentration of effort, uniformity of purpose, and flexibility in operation.

However, ICT strategy often focuses on the non-human elements, as well as building and sustaining commitment to the strategy that has been formulated, which are often the decisive variables in strategy success (Reinier, 2011; Outsystems, 2013).

From the literature review, this study takes note of the following observation:

- That there is a general notion that strategy is key to any ICT implementation including mobile ICT implementation.
- Little or no importance is given to the definition of ICT strategy in the field of information systems and to mobile implementation in government organizations. The mobile aspect may have been due to the recent proliferation of mobile devices and mobile technologies. We also observe that this proliferation has been in place for more than a decade and this cannot be used as an excuse.

Therefore, this research defines ICT strategy as follows:

ICT strategy is an action plan which operates with the intention to achieve a particular goal over a period of time set in the context of a rapidly changing technology environment by the management, using a prescribed and recognized process (Ward and Peppard, 2002).

This research study adopts this definition in order to examine the development and implementation of mobile ICT strategy that is useful for government service delivery for the following reasons:

- The inseparable relationship between the social construction of the ICT environment and mobile technology is identified.
- The role of human involvement as a major actor in the relationship that exists between the social formation of the ICT environment and mobile technology adoption for service delivery is acknowledged.

Therefore, this study formulates the definitions of mobile ICT strategy as follows: mobile ICT strategy is envisioned to set out key directions and objectives on how mobile technologies are applied and managed within the organisation that deploys it (in this case, government organisation). As such, mobile ICT strategy serves as the gauge to guide the organisation on mobile technology issues over a period of time. This means that mobile ICT strategy allows all parts of the organisation to gain a shared understanding of the importance of mobile technology as a tool to drive successful service delivery as well as goals for the time period as defined in the strategy. Mobile ICT strategy should, however, form part of the overall ICT strategy.

Figure 2.1 below, adapted from Ward and Peppard (2002), illustrates mobile ICT strategic planning which clearly defines objectives and assesses both government internal and external environments, and integrates the alignment process. The required concepts, controls and new techniques are introduced while the relationships between them are established. The tasks which can be interpreted as responsibility are the identified. Finally, the planning of the resource requirements is defined.

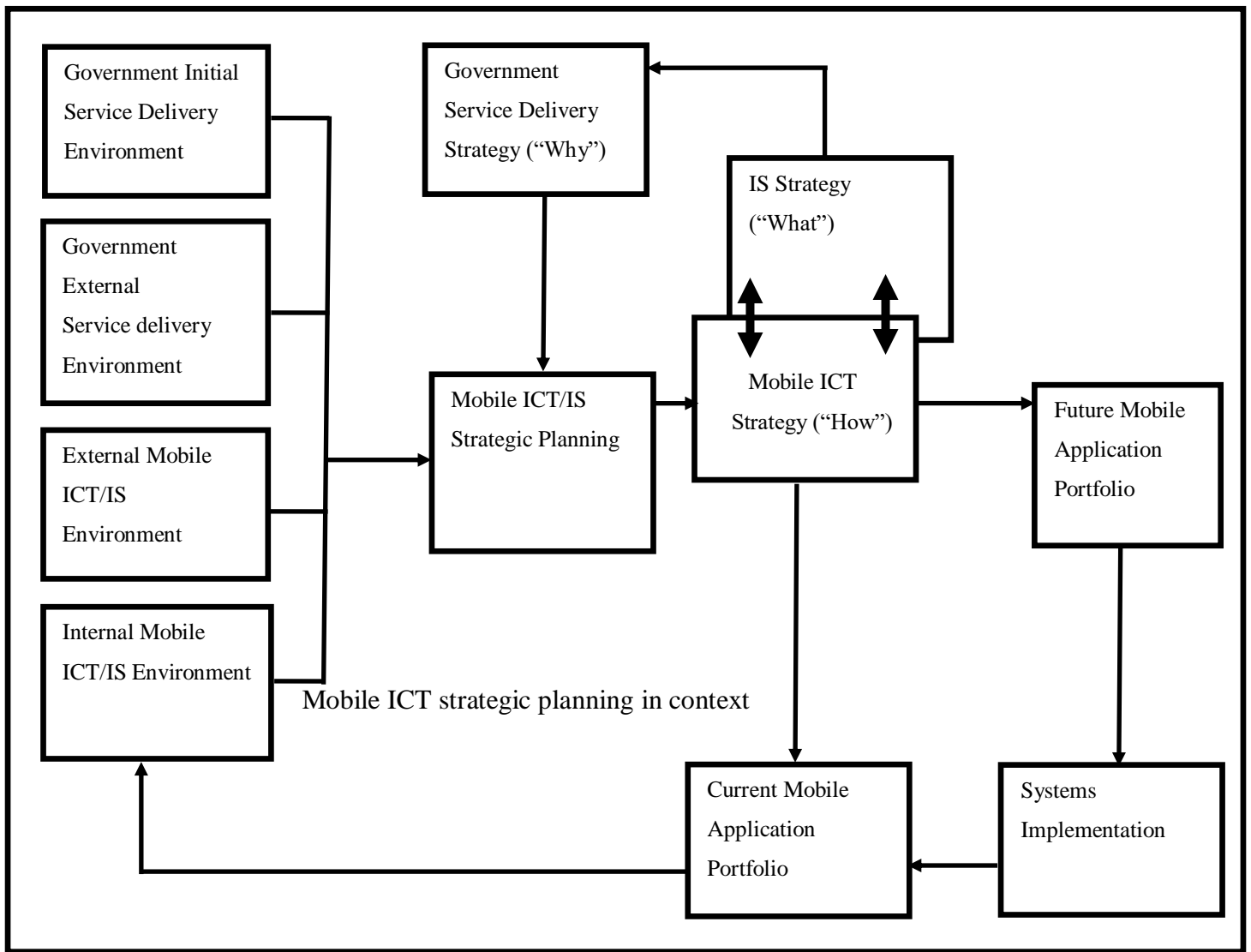


Figure 2.1: Mobile ICT Strategic Planning. Adapted from Ward and Peppard (2002)

ICT and Information Systems (IS) have become essential operational and managerial elements of public administrative reforms (Mtingwi and Van Belle, 2013). This means that ICT strategy is motivated by the organisational vision and strategy. This is because it cannot operate on its own. Therefore, it is important to align the ICT strategy with the operational strategy of government organisations. Strategic alignment is an intense hands-on business redesign process of applying ICT in an appropriate and timely way, which is conducted in harmony with business strategies and the organization’s culture, harnessed with key business purpose and core values (AdvanceBusinessConsulting, 2009).

This means how the stakeholders and actors that use and implement it adopt it is what counts. And this will help to structure the development process. This is discussed in the next section.

2.5.2 Developing ICT Strategy for Government Service Delivery

The development of ICT strategy will help to control and establish the technological direction within the mobile computing unit of the government organisation that deploys it.

As shown in Figure 2.1, mobile ICT strategy is developed based on both business and ICT internal and external environments that surround government organisations. This is because every organization needs ICT strategy to enable it to perform better in an ever changing ICT environment (Benamati and Lederer, 1999). What is more noteworthy is that the relationship between ICT strategy and business strategy of government organizations must be understood before an m-government system should be deployed.

The vision of any government organization should focus on the ability to deliver quality services to the citizens of their respective country that require the services of the government. This is the starting point that serves as the framework upon which ICT strategic commitment is developed (Daniels, 1994). This means that all key decision-making stakeholders are important and should be involved, at least at the beginning of the ICT strategy development.

The development of ICT strategy is done by gathering data from both current (as is) and predicted internal and external environments. ICT strategy planning should clearly outline the objectives and assess both the internal and external situation of both the government and the societies that contain the citizens. ICT strategy development planning, therefore, includes the process of introducing the required disciplines, controls and new techniques, establishing good relationships between the adopters (i.e. the citizens) and the implementer (i.e. the government and government organisations), and also identifying tasks and responsibilities that should be performed to achieve a successful implementation (Ward and Peppard, 2002).

Boar (1993) argues that developing any strategy is an action that is process oriented. Based on the guidelines of Boar (1993), strategy development should include the following: Scope, Objectives, Strategic moves, Change management and a Commitment plan. These are further explained below.

Scope – This gives the explanation and outlines the notion and strategic position of both current and future state as well as advancement.

Objectives – This outlines and specifies some important measurable results to be accomplished during the planning process.

Strategic moves – This outlines the purpose of the actions that will be taken in order to achieve the objective.

Change management – This is the stage that specifies the development of specific actions that will be taken to address the problem of change, which may be due to expected resistance occurring within the organisation and the society.

Commitment plan – This outlines the development of commitment and resources to an action plan that will be taken to ascertain credibility of the overall plan.

Developing ICT strategy is only a means to an end. In order to achieve the goals and objectives of such development, there is a need for an implementation process to take place (Ward and Peppard, 2002). This implementation process is the subject of the next section.

2.5.3 Implementing ICT Strategy for Government Service Delivery

Implementation of ICT strategy is the accomplishment of mobile technological change within the organisation that deploys it, in this case, government organisation. Note that there are likely possibilities that different actors within the organisation will have different views on the ICT strategy.

The mobile technology, the people and process components of the development phase are significant components of the implementation stage of ICT strategy. Therefore, understanding people and their understanding of ICT is critical to implementation (Orlikowski and Gash, 1994). According to the explanation of Daniels (1994), implementing ICT strategy requires understanding the people's roles.

The process leading to the implementation of ICT strategy determines whether it will be successful, and/or have a direct influence on the culture of the government organisations or not. Gottschalk (1999) explains that implementation is crucial to the success or failure of any ICT strategy and there is every possibility that those who

develop the ICT strategy are different people from those who conduct the implementation. Therefore, if the ICT strategy is construed differently, the implementation will confront problems that may be difficult to understand.

Gottschalk (1999) argues further that implementation could convey different meanings to different people and recommends that the management must first define the term implementation and the implementers must understand the definition before any action could be taken on implementing ICT strategy.

According to Gottschalk (1999), ICT implementation is essential for four reasons:

- i. The extent to which the ICT strategy achieves its goals and objectives is determined by its implementation as well its adoption.
- ii. Lack of implementation leaves the organisation (in this case, government organisation) dissatisfied with and reluctant to continue strategy development in order to deliver services to the citizenry.
- iii. Lack of implementation will allow the organisation to encounter problems of funding and maintaining priorities of ICT strategy development in the future.
- iv. Opportunities to serve the citizens can be lost and efforts could be duplicated, resulting in technology incompatibilities with the needs and wants of the citizens which results in a waste of resources.

ICT strategies often pay more attention to the nonhuman factors. What organisations do not consider, but is frequently the determining factor in strategy implementation success, is the human aspect. This, in particular, is the issue of building and sustaining organisational commitment to the formulated technology strategy (Ward and Peppard, 2002).

There are basic elements which are common to both the development and implementation of ICT strategy as adapted from Mack (2002). These elements include mobile technology, the process and the people. Mack (2002) explains that these elements are crucial to the development and implementation of any ICT strategy implementation. Mobile ICT strategy implementation forms part of these and it could contribute to the success or failure of the implementation. The elements are described in the next section.

2.5.4 Elements of Mobile ICT Strategy

The elements of ICT strategy, as adopted in this research, based on Mack (2002), are significant to both the development and implementation stages. Figure 2.2 below shows the relationships between these elements within the mobile ICT strategy environments.

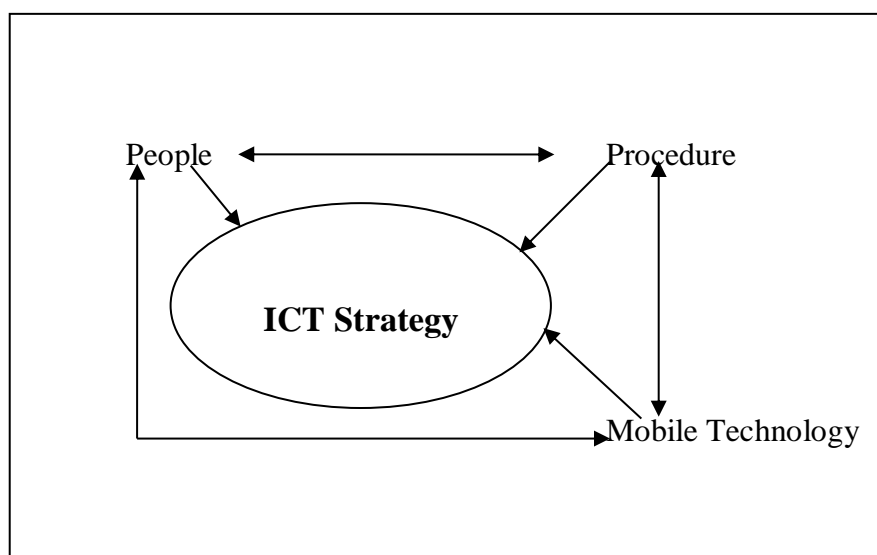


Figure 2.2: Elements of Mobile ICT Strategy

2.5.4.1 People Element

The process of developing and implementing mobile ICT strategy is achieved by people. Therefore, the people involved in this process determine if the strategy will be successful or not. Due to this, it is important to understand how people interpret technology in order to gain an understanding of how they relate with it (Orlikowski and Gash, 1994). To relate to technology, people have to understand it; in the process of understanding technology, particular beliefs, opportunities, and familiarity of the technology are created, which is then presented to foster subsequent actions towards its implementation. The reactions of people towards technology usage are based on their understandings of the technology and this controls the effects the technology has or will have on the process of using the technology. Therefore, willingness to accept or reject the ICT strategy will be highly influential in service delivery by the government and, as such, it should be taken into consideration.

The people attribute is therefore a significant element in the development and implementation of an effective ICT strategy. This means that developing and

implementing an ICT strategy within a particular government organisation is a function of having key people within the organisation (Daniels, 1994). However, Mack (2002) explains that an operational strategy must be the take off point for developing an ICT strategy, irrespective of whether one already exists or must be created.

Furthermore, simply involving the people, is, of course, not sufficient. People involved must be endowed to take the full responsibilities given to them. This may require particular training and the elimination of obstacles and hindrances that might prevent them from contributing to their full potential.

Therefore, ICT strategy is not only about information and communication technology that relates to mobile utilization, strategic direction and choices. It also needs the participation of people. People have different views and understanding, which is likely to have an impact on the development and implementation of ICT strategy in government organisations.

2.5.4.2 The Procedure Element

Procedure is the element of ICT strategy that explores the possibilities for the development and implementation of ICT strategy. Procedure creates a direction for ICT strategy development and implementation. A procedure is a specific organisation of work activities across time and place, with a starting point, an end point, and clearly recognised inputs and expected outputs (Mooney et al., 1996).

According to Mooney et al. (1996), there have been many studies that have been conducted with respect to procedure and these studies identify the role of ICT in organization and society development, but none explicitly considers the business value of ICT in ICT strategy development. Therefore, a strong procedure perspective should be embraced before any ICT strategy implementation is embarked on.

However, it is important to understand that without the participation of people, procedure is neither formulated nor executed (Mack, 2002). Therefore, the people element of the ICT strategy is imperative.

2.5.4.3 Mobile Technology Element

The mobile technology element of the ICT strategy is the combination of the technology artefacts (i.e. the software and hardware elements). This controls the technological solutions based on the government and its organisation's goals and objectives regarding how service should be delivered to the citizenry. This is done through information systems strategy. Also, the mobile technology component provides technology choices that are needed to sustain and enable the organisation's objectives.

2.6 Maturity Models

Maturity models are designed purposefully to evaluate maturity, based on one or more set of conditions, including competency, capability, and level of sophistication. Maturity models are established to assist an organization as a basis for assessing as well as comparative measures for the organization's improvement (De Bruin et al., 2005).

Tapia (2009) argues that maturity models define the development of clear systems that allows an organization to have its processes and methods assessed according to best practices prescribed by the management. Through this, an organization can recognize which activity in each area has the desire to accomplish possible outcomes. Maturity models are descriptive and normative, but not prescriptive in nature. For example, the capability maturity model (CMM) defines each maturity level without recommending how to get there (Tapia, 2009).

Furthermore, according to several researchers (Kim, 2010; Andersen and Henriksen, 2006; Siau and Long, 2005), there are various benefits to using a maturity model in government service delivery: (1) Maturity models play significant roles as roadmaps in guiding governments in long-term planning, (2) Maturity models describe the theoretical strategies about important requirements in each maturity stage that allow the citizens, businesses and employees to understand the government activities relating to service deliveries, and (3) Maturity models can be used as communication tools to validate government potential capabilities.

Citizens, businesses and employees will recognize in which maturity levels the government currently is, and government, on the other hand, will increase their competences to improve its services to the citizenry.

A description of various maturity models in the area of e-government and how the reviews of this are directly linked to m-government will be presented in the next section. This is because m-government and e-government are not two separate entities, rather m-government is a compliment to e-government. The difference is the use of mobile devices and mobile technologies so that the citizens can access government services anytime, anywhere via electronic means. We have also tried to search the literature about m-government maturity models, but until now, there is no specific scientific research of m-government maturity models available in the field, related to this research work.

2.6.1 E-Government Maturity Model

In this section, a summary of different e-government maturity models will be presented through **Error! Reference source not found.2.3** below. A more detailed explanation of each of the existing models can be found in Appendix A.

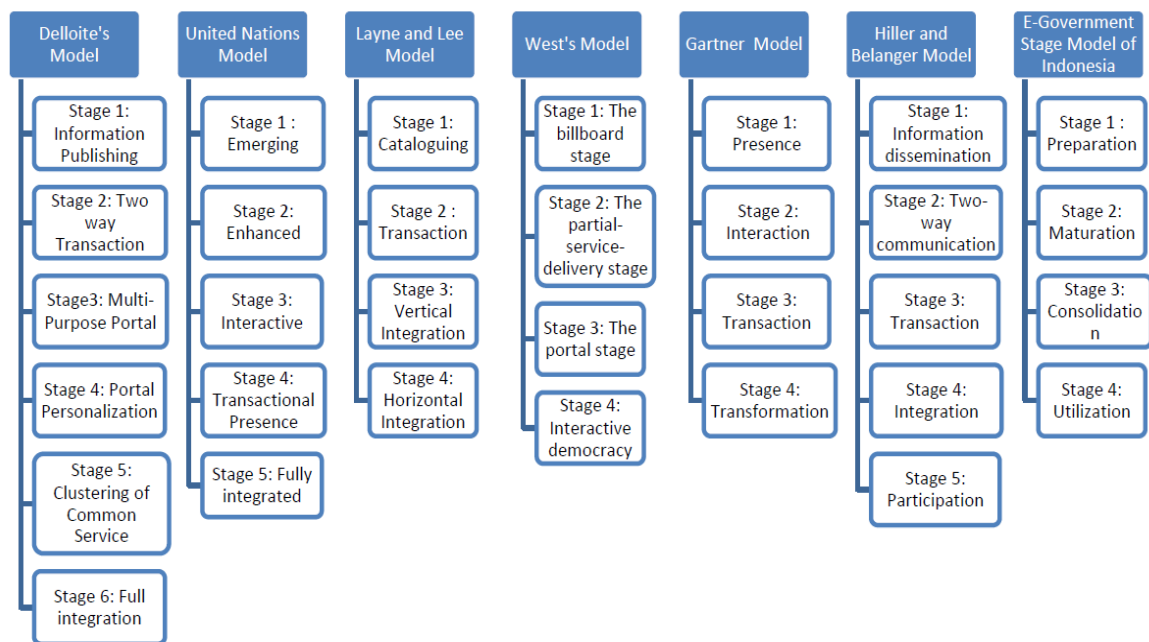


Figure 2.3: E-Government Maturity Models

2.6.2 Discussion of the E-Government Maturity Model

The widely used e-government concept as described in Appendix A is based on different points of view of different researchers (Layne and Lee, 2001; Hiller and Belanger, 2006; West, 2004) as well as consultant companies such as Deloitte (2000)

and Gartner (2000) as well as the e-government maturity model that was developed by the UN (2001), which was based on research in various countries, especially developing countries.

Layne and Lee (2001), Hiller and Belanger (2006) and West (2004) present a similar model. These models, however, combine the stages of different models with major types of electronic relationships between government and different level of constituents. In the first relationship, they showed that government directly delivers services to the citizens, a political or democratic process which is known as the government to citizen (G2C) relationship. The second relationship is the government to business (G2B) relationship in which a major portion of online transaction involves the business stakeholders, such as payment of tax online, booking of licence online, etc. The third relationship is another government agencies or government employees. Through this, collaboration will be formed to provide services to one another, as explained in the stage model as vertical and horizontal integration. This is called G2G relationship.

However, Sandy and McMillan (2005) and Georgiadis and Stiakakis (2010) explain that some researchers are now extending the concepts and theories of e-government to include mobile services with the aim of providing effective and efficient services to the citizens, the businesses and the government agencies and employees, as well as convenient access to those government services through mobile and wireless technologies. This is an argument we are already witnessing. However, there are limitations in the amount of research in the m-government maturity model. Some of the models available are described and analysed.

2.6.3 M-government Maturity Model

As mentioned previously, there is limited literature on the m-government maturity model. Most of the available research (Fasanghari and Samimi, 2009; Mengistu et al., 2009; Alijerban and Saghafi, 2010) develops the models based on the review on e-government. However, m-government and e-government are not two separate entities and the former builds upon the latter. This research could only find a little literature on m-government maturity model. This model, presented in figure 2.4 below was developed from the previous e-government model earlier explained with the utilization

of mobile devices and technology as the focus of the models. Please refer to Appendix B for a detailed discussion of m-government models.

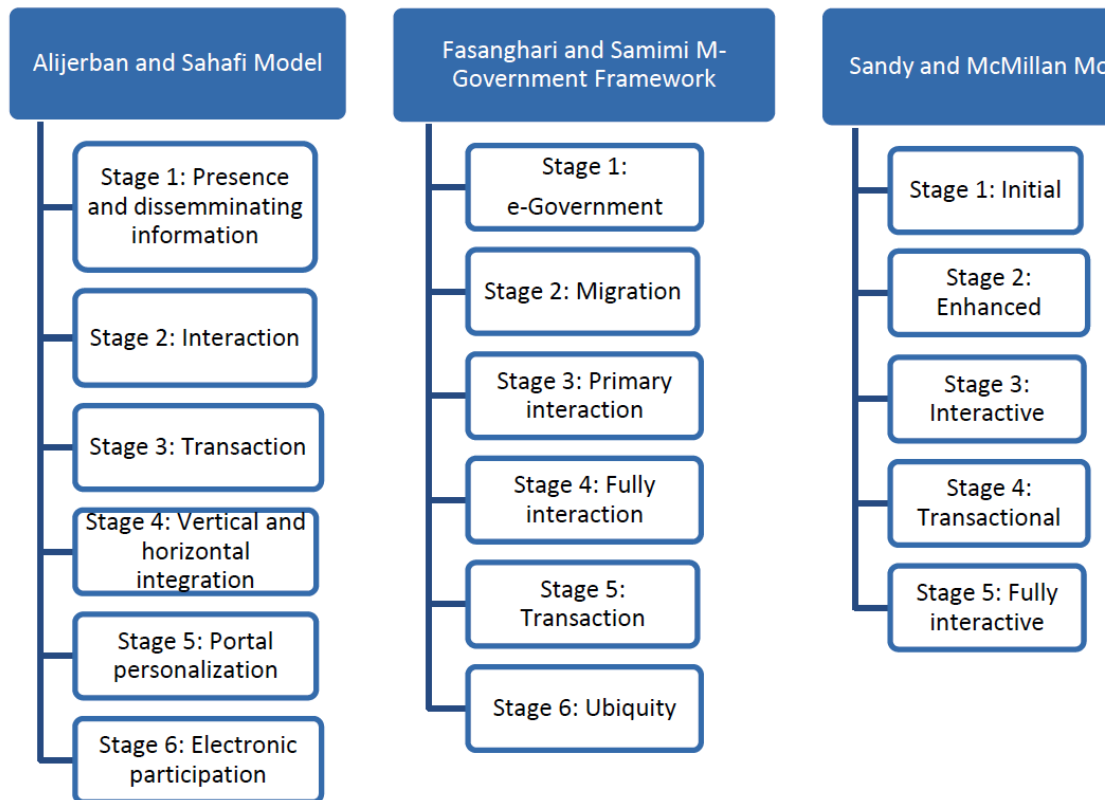


Figure 2.4: M-Government Maturity Models

2.7 M-Government Implementations

This section discusses m-government implementation under the following headings:

- Africa and the Developing Countries
- South Africa
- Nigeria

2.7.1 African Countries

As stated earlier, communities (that is the citizens) are now embracing mobile technologies (i.e. mobile phones and mobile devices as well as applications running on them) for their ease of use and ability to proliferate among communities. This has prompted various governments (in the developing countries) to start moving towards improving their services by using mobile technologies (i.e. m-government) as a new delivery channel through the utilization of available wireless infrastructure provided by private mobile operators. In the light of this, a great deal of research has been conducted to address these issues; for example, Burundi and Burkina Faso Digital Solidarity for Fund Project (Silver Rights, 2005), the Enabling Development through Governance and Mobile Technology (Ojo et al., 2012), the Kenya Violence Prevention tool (WTSC, 2012), the Kenya mobile-kilimo which serves as a mobile call center for Kenyan farmers where they can get instant help from agricultural experts in Swahili, English, and other relevant local languages (Pshenichnaya and Westhead, 2012).

Also, Kenya has implemented m-Utility where citizens can make payment for utilities bills via their mobile devices etc. (Howtodoit, 2016). The Kenya mHealth, blood bank system implementation allows healthcare workers from remote hospitals in the eastern part of Kenya to report on the current state of their blood repository by using Short Message Service (SMS) (Nzoka and Ananda, 2014). This system allows an SMS-based alert to be triggered automatically when blood repositories at any of the district hospitals fall below a predefined threshold level. In Uganda, the National Water and Sewerage Corporation allows consumers to pay water bills using mobile money (Agnes, 2014).

Furthermore, Willard and Mungofa (2014) provide a summary of various m-government projects that have been implemented over the past couple of years. This summary is provided in the Table 2.1 below:

Table 2.1: M-Government Readiness Index for Africa

Country	Project	Description
Rwanda	TRACnet	A national program supporting those living with HIV through the use of mobile devices
Kenya	NAFIS/NALEP	M-government system implementation providing agricultural information service for farmers to call in for recorded information
Tanzania	Agricultural Marketing Systems Development Program	M-government system providing commodity price service through SMS, which is administered by Vodacom and Ministry of Industry and Trade
Uganda	The Question and Answer Service (QAS) Voucher System (VS)	M-government system implemented which is a voucher system that enables personalized advice for farmers, run by the Rural Empowerment Network by the government of Uganda
Tunisia	Mobile Gov	M-government system implementation run by the central government of Tunisia which provides information services to the citizen of Tunisia on travel, weather, education etc.
Egypt	Government e-procurement Portal	This system provides an SMS service on government employment opportunities and health. The project was handled by the Ministry of State for Administrative Development in collaboration with Vodafone Egypt

Egypt	Farmers' SIM	This is an initiative of the central government of Egypt through the distribution of free SIMs to one million farmers
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Furthermore, the kingdom of Bahrain has implemented a mobile portal that serves as the new channel for the delivery of e-government services where key services such as eWeather, Doctor Search, Embassy Contact, Mobile blogs and Mobile polls, payments for electricity, water bills, or traffic fines payment are listed (Ali AlSoufi, 2013). Also, the government of Mexico has implemented a mEmergency system (NenaMexico, 2014) to send alert messages to citizens about meteorological and high rain risks, emergency locations, potential disasters, low temperatures, and contact numbers. This is done using SMS.

The government of Hong Kong in China has also developed an mPolicing system which serves as a system for Field Inspection (Eskandar et al., 2011). This m-government implementation enables inspectors to use their mobile devices to enter information inspected on the scene and to review the results of inspections made in the past. This system allows inspectors to send reports through their mobile phones without having to go to the office. The government of Ghana implemented the mPedigree to tackle the issue of counterfeiting of legal drugs. The system allows information about the authenticity of the drug to be sent to the consumer after purchasing the drug (Carole, 2012).

Madden et al. (2013) conducted an empirical study to explore the impact of various factors on the potential demand for m-government service adoption in Japan. This was achieved by analysing responses from a Japanese survey.

Except for Bahrain and Ghana, most these are G2C and are therefore not usable by the citizens to initiate communications with the government. Also, the majority of these implementations are not scalable and sustainable due to constraints such as lack of long-term financial viability, system architecture, increasing number of users, lack of

business model, lack of consistent and effective monitoring model, etc. (Best and Kumar, 2008).

2.7.2 South Africa

In South Africa, it is imperative for citizens to interact with the government for a host of reasons. They need to gain approval or permission for various activities such as obtaining a driving licence, travelling abroad, starting a business, building, paying taxes, and other duties as required by law. In the same way, governments pay the citizens certain grants, social pensions, subsidies, and provide information on various issues ranging from applying for services to the status of their application as may be required by the citizens (Singh and Sahu, 2007). Due to this, various m-government research studies have been conducted.

Mehlomakulu (2014) conducted research to determine the readiness of South African provincial governments. The study sought to research the extent of readiness of the government and that of the underprivileged citizens for the introduction of m-government within the Western Cape Provincial Government. The study further developed a reference model from the perspective of the province under study. Maleshoane (2014) conducted a study to develop a framework for the successful implementation of m-government using the Department of Home Affairs as the case study. Furthermore, Mitrovic et al. (2013) conducted a study to explore policy implications of the Western Cape Provincial Government's intention to introduce Cloud Computing-based m-government in the province. The study was based on two ICT benefits models (IMBOK and Access-Adoption-Appropriation model).

Also, Mukonza (2013) conducted a study that seeks to give a snapshot about the opportunities that m-government brings to local government in South Africa, by using an urban municipality, Polokwane Municipality, as a case study. Munyoka and Manzira (2014) conducted a study that outlines the relationship between e-government and m-government by bringing out the challenges that are encountered by sub Saharan African nations in their endeavours to implement m-government systems. Van Belle and Cupido (2013) conducted a study that investigated the opinions of South Africa's youth about interacting with government via their mobile phones. The study focused on local government participation, because the local arena is seen as a more immediate concern to respondents.

However, the majority of these studies are limited, due to the fact that they only looked at three segments of the government service delivery value chain, which are the Government-to-Citizen (G2C), Government-to-Employee (G2E), and Government-to-Government (G2G). Al-khamayseh and Lawrence (2006) argue that m-government is largely a matter of getting public sector IT systems geared towards interoperability with citizens' mobile devices and citizens being able to talk back to governments.

Furthermore, various m-government systems have been implemented in this regard (Blessing et al., 2007). The South African Revenue Service (SARS) has adopted the use of SMS as a way to alert individuals and businesses about the status of their tax returns. The Department of Education has been using SMS to inform students about the availability of their matriculation examination results which indicates that the candidates' results are ready for collection at the writing center. The Department of Education in the North-West Province has partnered with both Nokia and Mindset for the development and provision of educational content (which targeted mathematics competencies) for girl learners on their mobile phones. The Department of Home Affairs SMS notification is used to inform customers about the status of their applications (this indicates the state of the application(s) made and also notifies the applicants when the application(s) is ready for collection). The Department of Health is also currently using mobile cellular technologies to send SMS medical alerts to tuberculosis and arthritis patients to remind them of their medication.

However, all these systems are one-way communication by the government to the citizens; they are not usable by the citizens to communicate with the government. This shows an indication of G2C. This means that majority of these implementation do not adhere to the argument of Al-khamayseh and Lawrence (2006), that m-government is a matter of getting public sector IT systems to lean towards interoperability with citizens' mobile devices and citizens, on the other hand, are able to communicate with the governments at any given time. Therefore, an m-government implementation such as those mentioned above which will take into consideration both G2C and C2G is inevitable in South Africa and throughout the developing world where mobile phones are used as the computer of the masses.

2.7.3 Nigeria

Nigeria is the most populous country in Africa with a population of more than 180 million (WPR, 2015). It is therefore easy to envisage the challenge that goes with the logistics of any central government service that is accessed nationwide. However, it is important that the citizens interact with the government for a host of reasons. They need to conduct business as well as gain or permission for various activities such as obtaining a driving licence, home immigration services (such as application for international passports), registering and starting a business, registering and renewing of business premises, payment of taxes, payment of fines, registration of land use, verification of various government issued certificates through mobile devices, checking and verification of matriculation examination results via mobile devices and technologies, etc.

However, in spite of the recent upsurge in mobile technology and telephony across Nigeria, the country remains at the extreme end of a digital divide, a situation which remains a challenge. This challenge has translated into a lower than world average m-government development in other parts of the world. Nigeria was ranked 141th in the world and 19th in Africa (behind Cape Verde, Ghana and Gambia) in e-government and m-government ranking carried out by the United Nations (UN, 2014). In 2013, the number of Nigerians that were connected to the internet via their mobile devices surpassed the number of desktop internet users (StatCounter, 2014). This trend has continued since then. Mobile is fast becoming the computers in not only the pockets of Nigerians but Africa at large.

This study searched various literature, in respect of m-government implementation in Nigeria and found that the Nigerian government has implemented two m-government systems. The government has implemented a mobile system that allows prospective university's students to check their Joint Admission and Matriculation Board (JAMB) results online. The "Forward Nigeria" (TechCity, 2014) system allows Nigerians to follow and monitor government activities.

The reason for the lack of m-government implementation in Nigeria is largely due to the fact that there is no clear articulation of the potential role that m-government implementation can play as the nation continues to experience an upsurge in the mobile

technologies. Given the role that mobile has played in the African economy and culture in the last decade, this can be changed. Therefore, an m-government implementation that can be relevant to services required by the citizens such as those mentioned above which will take into consideration both G2C and C2G is inevitable in the Nigerian government space. In addition to these, Olanrewaju (2013) suggested various m-government implementation systems which could be implemented by the government, based on the needs of the Nigeria's citizens. These are but are not limited to:

- mPayment (use of mobile technologies for Tax collection purpose)
- mAgriculture (use of mobile technologies in Agricultural sector)
- mSecurity (use of mobile technologies for alert and disaster management purpose)

2.8 M-government Projects Scalability and Sustainability in Developing Countries

M-government project scalability and sustainability in the context of developing countries are key issues relating to ICT in the field of Information Systems, yet these issues are not extensively explored (Ali and Bailur, 2007). The aim of this section is to provide a broad understanding of the issues around sustainability and scalability of m-government projects in general and mobile phones-based projects for service delivery in particular. To understand these issues, definitions of these two concepts will be provided; these definitions are followed by an overview of the challenges of scaling up and sustaining m-government projects in developing countries; and, lastly, an exploration is provided of how sustainability and scalability can be achieved.

2.8.1 Defining Scalability and Sustainability

Scalability and sustainability can have different meanings in different contexts. Therefore, before going into the details of the issues of scalability and sustainability of m-government projects in the developing countries context, these terms are defined in the context of this study.

a. Scalability

While a substantial amount of research has been conducted on the use of ICT in developing countries in areas such as public administration, education, health, e-government etc., a key challenge remains the issue of scalability (Walsham and Sahay, 2006). This relates to how pilot projects which are considered to be small-scale, and are quite common, can be rolled out to reach much wider areas of provinces, districts, or countries and/or expand the outcomes of the pilot to more beneficiaries (Walsham and Sahay, 2006; McConnell, 2006). Scalability can also be seen as trying to increase the complexity of services offered over time (Walsham and Sahay, 2006).

This is, however, different from a mere replication of the pilot project. McConnell (2006) suggested that a distinction should be made between scaling up a pilot project and replicating a project because replicating a project might be concerned with testing research questions for further evidence in a different setting, but not the whole implementation of such a project to reach a greater number of potential users. The term scalability in this context relates to m-government project scalability and should not be confused with scalability as an attribute of an Information Systems which refers to the capability of an application to handle work load (Kimaro and Nhampossa, 2005). Furthermore, as argued by Walsham and Sahay (2006), scaling is not only about numbers; it also involves socio-technical networks and question of what and how to perform the scaling. Also, there are two aspects of scalability in the context of this study. These are (a) internal scalability which relates to the organizational capability and dynamics, and (b) external capability which relates to the demand for services and social settings.

b. Sustainability

The term sustainability is used in various contexts and different disciplines, and it has varying meaning for different factions (Kimaro and Nhampossa, 2005). Ali and Bailur (2007) explain that although the term sustainability is very common, finding a clear definition is problematic. In the definition and explanation given by InfoDev (2005), sustainability is concerned with the possibility that the benefits from an intervention will be maintained at an

appropriate level for a reasonably long period of time after the withdrawal of support from contributor or sponsor.

One key aspect from this definition is that of the withdrawal of sponsor. In the context of developing countries, reliance on sponsor or donor support on various projects implementation, including m-government projects, is almost total. This leads to the following question: How can sustainability of m-government projects be envisaged in a context where there is a reliance on sponsors or donors? InfoDev (2003) proposes that the sustainability definition will be considered in the context of mobile phone-based applications but without a major emphasis on the withdrawal of sponsors. Sustainability is, therefore, defined as the likelihood that the benefits from mobile phone-based applications (in this instance, m-government) will be maintained at an appropriate level for a long period of time.

However, most m-government projects implementation start with funding from aid agencies, NGOs, or from local or central government. Therefore, long-term financial sustainability suggests the need to develop indigenous funding models and sources as well as sustainable revenue streams (Madon et al., 2009). Sustainability is not only a matter of money; it also implies that there is a need for the development of institutional arrangements for the continuousness of staffing levels, long-term cultural and political support for the initiative from government officials regarding m-government project implementation, politicians, and the community itself. This is because there is a possibility that specific projects may deliver value and be sustainable, but the scope of such projects is often limited (Madon et al., 2009).

Yet sustainability is not restricted to the need of m-government projects to fund or cater for themselves. The International Institute for Sustainable Development lists three underlying common characteristics of sustainable development as concern for equity and fairness, long-term view, and systems thinking

Concerns for fairness and equity echo the requirement for the benefits of m-government project implementation to reach those who are the least endowed

with resources, the most vulnerable, and the least privileged. This category falls in the bottom of the pyramid in any society in the majority of the developing countries and, as a result, are the ones that could maintain the sustainability of m-government project implementation (i.e. their continued use). This is something that most ICT development efforts often fail to achieve.

The long-term view involves the fear that those at the forefront of implementing m-government project often holds for the undesirable and unexpected results of development efforts as well as the tension that arises between implementers with short-term project orientations and beneficiaries with long-term process considerations. For example, implementing an m-government system is a short-term project, whereas the continued use of the system by the citizenry as well as the maintenance of the system is a long-term process.

Systems thinking in m-government project sustainability stimulates different perspectives, such as the process of identifying feedback loops, the consideration of the consequences of actions, acknowledgment of the complexity of the system and how everything else is inter related.

Therefore, the sustainability of m-government project implementation has emerged as a significant issue in the debate surrounding the use of ICT for government service delivery. In most cases, the discussion refers to financial sustainability, which is often regarded as a condition for continued existence of the centre. However, review of various m-government projects implementations which have not been sustainable, alongside the review of various factors that can influence sustainability of ICT projects implementations suggest that four types of sustainability exist for m-government project implementation:

- Financial sustainability (Hudson, 1999).
- Staff capability sustainability (Baark and Heeks, 1998).
- User acceptance sustainability (Whyte, 1999).
- Service delivery sustainability (Colle and Roman, 1999)

Financial sustainability refers to the capability that an implemented m-government project has for generating sufficient income to cover its costs of

continued operation, as well as the cost of establishing it at the initial stage. While the project has the ability to generally generate revenue directly from those who use the system, it does not exclude the possibility of other continuing sources of revenue, for example, from government (Hudson, 1999).

Baark and Heeks (1998) argue that projects that require new skills need to uphold the sustainability of the capabilities that are created from such projects. This will be guaranteed only to the point that people who are trained in this regard, or their trained substitutes, continue to work in the same area and that their competences are sustained and utilized. On many occasions, trained staff discover a better market for their skills and are enticed away from the project (Baark and Heeks, 1998).

It is important to understand that the sustainability of an m-government system will be determined by the level of acceptance by its users. Therefore, successful implementation of an m-government project is going to have a major impact on the users of the systems. If m-government systems are seen as mere technology implementations rather than social and cultural systems that can be used as viable communication tools, they will be less sustainable. The degree of users involvement in, as well as commitment to, an m-government system is often presumed to be a success factor and measures of users' behaviour and opinions are at the center of any evaluation of ICT for development project implementation (Whyte, 1999).

Service delivery sustainability is the continuation of the movement of information that users of m-government systems (in this case, the citizens) find useful. But it also relates to sustaining the overall services the government provides in terms of adapting to evolving citizen needs, proactively seeking new sources of useful information and alerting the users to the value of the system. The strategies for sustainable m-government implementations which in turn foster sustainability of service delivery, include having local champions or innovators (in a particular community) that mobilise others to accept the vision of the m-government system, raising awareness about information and ICTs as a valuable resource for individuals, families, organisations and communities,

and focusing on service delivery that can be provided through the use of the system rather than on technology implementation itself to build an institution that is fully interlaced into the fabric of the community (Colle and Roman, 1999).

2.8.2 Challenges for M-government Scalability and Sustainability

Although scalability and sustainability in developing countries can be achieved, the realities of developing countries implementing and adopting m-government become very complex and difficult processes. Crawford and Lester (2004) argue that developing countries continue to face dramatic shortages in resources, trained personnel, retention mechanisms, and the culture and systems necessary to address overwhelming needs. Based on this, it is evident that the effective use of ICT (which mobile technologies are part of) in developing countries is likely to be hindered by factors such as: poor infrastructure, lack of appropriate skills and other resources, lack of government commitment, socio-economic and political instabilities, illiteracy, poverty, etc. These have implications on sustaining and scaling ICT projects for development in general and for m-government projects for improved services deliveries.

In the case of m-government sustainability, Bassara et al. (2005) identified the following factors as being big challenges to achieving sustainability:

- Inadequate infrastructure
- Inadequate human resources capacity
- Inappropriate policies and strategies to manage the sustainability problem
- Inadequate or no funding

Apart from the above mentioned contextual challenges, there are possibly additional factors and technical challenges that can influence sustainability and scalability. InfoDev (2005) identified the following as possible factors affecting sustainability: social support, technological soundness, government commitment, commitment of other stakeholders, economic viability, financial viability, institutional support, environmental impact and protection, resilience to exogenous factors such as price variability and market access, natural disasters and unstable security in the project area, replication of the project approach as an indicator of sustainability.

Furthermore, additional challenges could include the lack of a business model that can ensure financial sustainability of m-government projects in general and the lack of a general framework of reference that can be used to address the complexities of scaling up and sustaining m-government projects for service deliveries in a developing country's environment. How can these many challenges be addressed?

2.8.3 Addressing the Challenges of Scalability and Sustainability of ICT Projects

Analysis of the definitions of scalability and sustainability reveals that there are key aspects that arise and that need to be well understood and dealt with at project level. From the definition of sustainability, the following elements are highlighted (Kimaro and Nhampossa, 2005):

- Identifying and managing the risks that threaten long term viability
- Maintaining the project after the withdrawal of sponsors
- Maintaining the benefits for a long time (Ensuring project viability)

The following elements can be derived from McConnell (2006) proposed scalability definition:

- Replicating the output of the pilot project over a wider area
- Extending the outcomes of the pilot to more beneficiaries

It is evident that there are possible risks associated with each of the above mentioned elements. In this regard, there is a need to have certain measures at the project level that will ensure that these risks are dealt with effectively. These measures are likely to have positive or negative impacts on the process of sustaining and scaling up m-government projects. The primary concern would therefore be to identify the risks associated with maintaining the benefits for a long time, maintaining the project running with or without sponsors, replicating the output of the pilot project in other areas, and extending the outcome of the pilot project to more beneficiaries; the secondary concern would be to establish measures that will help in dealing with the identified risks.

The ability to extend the outcome of the pilot project to more beneficiaries would imply that the pilot project was successful. In this regard, Ferguson and Ballantyne (2002)

note that effective pilot implementation is a pre-requisite for project sustainability and scalability. However, possibilities of failed pilot implementation are not to be excluded. Ferguson and Ballantyne (2002) also explain that the failure of a pilot project should not necessarily lead to closure but rather it should be a learning process and an opportunity to redefine processes; and that in some cases “downscaling can be more appropriate in terms of sustainability”. It is therefore critical to ensure pilot project success and, in case of pilot project failure, to consider downscaling as a project sustainability measure. This is because ICT-enabled implementation has some specific characteristics and effects on the people (i.e. the citizens) and the organizations that engaged in it (i.e. the government).

Sustainability should not be looked at only from a financial perspective because it encompasses other dimensions. To this end, Ferguson and Ballantyne (2002) argue that sustainability also involves a look at the social, environmental and economic implications of actions that are taken by organizations, which implies finding solutions to problems at a local level on a scale that citizens can understand.

There are other aspects of sustainability that can be identified and that should be addressed appropriately. Pade et al. (2006) identified the following categories of sustainability that can affect ICT projects in different ways in the context of developing countries (these apply to m-government projects as well): Social and Cultural Sustainability, Institutional Sustainability, Economic/Financial Sustainability, Political Sustainability, Technological Sustainability, and Harmonious Development. Therefore, it is imperative that m-government project sustainability be viewed beyond the financial sustainability context and that these different aspects of sustainability also be taken into account and addressed.

Sustaining and scaling up of m-government projects has been described in the previous section as being a big challenge, specifically in developing countries. Mobile phone-based applications for service deliveries are not an exception to this reality. When envisaging sustainability and scalability of mobile phone-based application projects for service delivery, it would therefore be required that steps to deal with the above described challenges should be taken and that actions and procedures to address the

identified risks associated with sustaining and scaling up m-government projects should be practically planned for.

In the context of this study, and with regard to the use of mobile phone-based applications to enhance the quality of service deliveries, it is imperative that the difficulties in the dynamics of mobile phone-based projects be well understood so as to gain knowledge about the consequences of the various sustainability and scalability influential factors. This will eventually contribute to the development of more sustainable and scalable mobile phone-based projects for m-government. In this study, the assumption is that the prospects of developing more sustainable and scalable mobile phone-based projects can materialise as follow:

- Evaluate the contextual factors that are likely to impact on attaining sustainability and scalability objectives.
- Assess the interdependencies between these factors and other possible influential elements at project level, technology level, organisation level or stakeholder level.
- Evaluate existing mobile phone-based projects for m-government elsewhere, their potential use and acceptance in a developing country context, and assess the implications for sustaining and scaling up these projects.
- Use appropriate theories and models to develop a deep understanding of the challenges of and the possibilities of sustaining and scaling up mobile phone-based projects for m-government.
- Develop and implement practical sustainability and scalability guidelines and good practices requirements to be adhered to at the different levels (project level, stakeholder level, technology development level and technology implementation level).

2.9 M-Government Readiness and Opportunity

The development and deployment of e-government services around the world has been motivated by various factors such as improved service delivery, broader access to government services, efficiency, accountability and transparency, citizen empowerment, and the growth of the internet usage (Ma et al., 2005; Lam, 2005). The transformative power of the internet across the world has been recognized. However,

in Africa and the developing regions, the full attainment of e-government integration and maturity levels of the e-government have been met with challenges.

The uniqueness of Africa's developmental challenges has generated debate on the need to access the relative value and impact of the traditional e-government model of service delivery and evidence has suggested that e-government implementations that are not human-centered have shortcomings which must be overcome (UN, 2003). Therefore, the extent to which e-government can be effectively used for service delivery, including the participation of citizens in the democratic process, depends on how it resolves the digital divide dilemma. This means that it remains to be seen whether e-government can fulfil the objectives of usefulness, transparency, accountability and access to government services.

Bridging the digital divide through using the traditional internet has proved to be a challenging task, given that more than a decade has passed since the commercial availability of the internet and still only 64% of the world's population is online (Maumbe et al., 2007). The picture is even darker for Africa where only one in every 700 people has access to the fixed internet as compared to Europe where one in four has access (InternetWorldUsers, 2014). However, as the communication landscape changes rapidly, mobile devices and technologies are attracting a lot of attention as the next generation of information and service provision (Maumbe et al., 2007), an argument we are already witnessing. This marks the point of entry for m-government implementation, which serves as an alternative new vision of expanding quality service delivery.

As stated previously, the rate of mobile phone penetration in Africa and particularly in developing countries cannot be overstated, and this has shown that the citizens who are the largest consumer of government services are also the leading consumer of mobile devices and technologies. Furthermore, the social and economic development of a country depends on the government's ability to respond to the challenges facing the citizens of the country. It is therefore important for government to probe how m-government can target the benefits to the citizens with critical needs. This means that exploring the potential for m-government as a mechanism for advancing the

developmental needs of the citizens is expected to significantly address the key challenges facing governments in Africa and developing countries.

2.10 Chapter Summary

In this chapter, the background of this thesis has been presented. We also presented the literature review and technology surrounding m-government implementation. The discussion around e-government maturity models and m-government maturity models were also presented. This chapter also presented a literature review on scalability and sustainability.

The next chapter discusses the theoretical framework underpinning this research study.

CHAPTER THREE

UNDERPINNING THEORETICAL FRAMEWORK

3.1 Introduction

Theory plays three important roles within academic research (Einsenhardt, 1989): first, as a guide to research design and data collection; second, as part of an iterative process of data collection and analysis which will eventually lead to theory being refined with each iteration involved in the process; and finally, as a product of the research itself. ICT adoption and government activities are two very socially oriented activities (Kushchu, 2007) and organizational activities in nature. Therefore, this study seeks to use theoretical frameworks that will help to understand organization activities, human activities as well as technology adoption, cognition, practices and organization processes that surround the implementation of m-government as well as adoption of the same by the citizens. To this effect, this research employed Structuration Theory and Actor Network Theory as the theoretical frameworks for the analysis of the research study. The data that was gathered in the pilot phase of the study, the analysis of these data, and the successive interpretation of the results were undertaken using the ontological and epistemological bases implied by the underpinning theories. The core tenets of Structuration Theory and ANT are discussed in the following section respectively.

3.2 Structuration Theory

The research questions presented in section 1.7 demonstrated that m-government system implementation is seen in larger social contexts and processes, even when they are compared with conventional organisational information systems. Structuration theory is used to theorize the relationship between context and process in the society; therefore, it is a good candidate for analysing these types of questions. This is because a number of studies have used structuration theory to analyse the way in which context is used in the construction of action. This body of research has been broadly associated with content-process-context schema research (Walsham, 1993). It was therefore predicted that structuration theory could play an important role in helping this study to understand the organizational, personal and societal contexts within which m-government systems are entrenched. Due to this, structuration theory argues that this relationship is imperative for understanding m-government system implementation to

enhance government service delivery, and also it is an avenue for maintaining or altering that context. Because this is a logical starting point of analysis, structuration theory will be discussed further. Structuration theory attempts to bridge the gap between the two schools of sociology; these schools are those that are predominantly concerned with structure and those that are predominantly concerned with agency (Giddens, 1984). The structuralists and the functionalists argue that the social structures have direct influence on human behaviours; however, the hermeneutics and phenomenologists believe that the social structure is the product of action by the human agents. On the other hand, according to Giddens (1984), the structure and agency are not independent and/or conflicting entities, but are a mutually interacting duality. Therefore, social structure constrains and enables the actions of human agents, and the human agents draw on the existing structures to produce and reproduce social structure.

According to Giddens (1984), Structuration theory suggests a duality of structure which shows that structure, which includes both rules and resources, is both the outcome and the medium of the conduct it continuously organizes and that the structural characteristics of social systems do not exist in isolation of action but are frequently implicated in its production and reproduction.

However, Whittington (1992) argues that structures can be seen as existing virtually, which means that structure has no reality except that their abstract concept can be presented in activity. This was made clear by Giddens (1989) when he states that “*a position I want to avoid, in terms of which structure appears as something ‘outside’ or ‘external’ to human action. In my usage, structure is what gives form and shape to social life, but is not itself that form and shape – nor should ‘give’ be understood in an active sense here, because structure only exists in and through the activities of human agents.*”

Giddens describes structure as the resources and rules, whose abstract concept are presented in persistent social practice which only have virtual existence as suggestions in the mind. However, “*we are unaccustomed to conceiving of rules and resources as only existing ‘in and through the activities of human agents’, largely because of our conventional views of them as either external entities (e.g. corporate policy, traffic regulations, land, factories, money) or internal schemas (e.g. rules of thumb, expertise,*

judgement). From a structurational perspective, however, external entities and internal schemas are only constituted as rules and resources when they are implicated in recurrent social action. Our conventional view of rules and resources as external entities suffers from what Taylor (1993) refers to as an “objectivist reification”, while the view of rules and resources as internal schemas suffers from a “subjectivist reduction” (Orlikowski, 2000).

For the purpose of analysis, Giddens (1984) explains the difference between different structurational dimensions, namely, domination, legitimation, and signification. The facilitating components, which are interpretative facilities, schemes, and norms are associated with each structural dimension. These components are concepts that are embedded within the structure and are given specifically by social agents through their actions (see Fig. 3.1).

Therefore, as human actors interconnect, they make use of interpretative structures to assist them in making sense of the interaction. However, those interactions produce and reproduce structures of significance. Likewise, the facility used to assign resources is ordained in the exerting of power, which produces social structures of authority. Finally, the norms assist in determining what can be authorized in human interaction, which iteratively produces structures of legitimation.

This research applies Structuration theory to study the types of structures that exist during the development and implementation of ICT strategy, and the structures that essentially arise as a result of human action in the computing unit of various government organisations.

3.2.1 Applicable Structuration Theory Concepts

This section will highlight the key concepts of Structuration theory that are applicable to this study

3.2.1.1 Agency

Human agents are defined as informed beings. This means that they are knowledgeable and endowed with causal powers to make a difference. Giddens, (1984) classifies human agents as agents with ‘transformative capacity’. The capacity of the human

agents to self-reflect on what they have done and understand what they are doing is carried out on the practical consciousness level. Practical consciousness, however, differs from discursive consciousness in that the former refers to the *capacity* of human agents to engage in day-to-day interaction without necessarily been able to articulate what they know, while the latter articulates that the human agents can always describe what it is they are doing. In addition, the knowledgeability of human agents is always constrained by the unintended consequences of action which may become the unacknowledged conditions of further action (Giddens, 1984). According to Giddens (1984), the reflective form of knowledgeability is very much involved in the recursive ordering of social practices. Giddens (1984) defines reflexivity as the activity of monitoring the character of the ongoing movement of social life. This means that human beings are purposive agents, who have reasons for their activities and have the ability to broadly elaborate upon these reasons. However, Giddens (1984) warned that using the terms “purpose”, “reason” and “intent” should not be extricated from the context. Instead, the actions of humans should be seen as timely, which means conduct flowing continuously as human cognition does. To this end, purposive action is not made up of a sequence of separate intentions, reasons or motives.

Therefore, reflexivity should be expressed as the activity of monitoring the character of the ongoing movement of social life, and not as a collective or sequence of separate purposes, motives and reasons. Giddens (1984) argues that this act of monitoring reflexive actions depends on rationalisation. Rationalisation is a process that is characteristically related to what an agent can do, and not as a state. Moreover, action cannot be separated from history. Also, action should not be seen as an amalgamation of acts but should be observed together with the surrounding world of the agent and what is termed as “acting self” by Giddens. Due to this, reflexive monitoring, motivation and rationalisation of action are treated as integrated sets of methods. These dimensions are seen as repetitive in how human conduct themselves. Actually, an actor is assessed by other actors based on the competence level displayed in the rationalisation of his or her action.

However, not all methods are available to the discursive realization of the social actor. Giddens (1984) argues that the “*mutual knowledge*” or “*stocks of knowledge*” combined are not directly available to the realization of actors. Most knowledge in social

encounters have a practical nature which are retrieved within the practical consciousness of an agent that allows the social actors to move forward within the procedures of life. However, Giddens (1984) clarified that the lines between discursive and practical consciousness are not stable and penetrable, and it depends on the understanding of each agent and the assessment between social actors engaging in different social situations. Discursive and practical consciousness are observed separately from the unconscious purposes of the agent. Giddens (1984) differentiates between discursive consciousness and. Discursive consciousness is a situation that arises for reflexive monitoring, motivations and the ability to overtly describe actions to occur while practical consciousness is the aptitude to perform in a knowledgeable way and where there is rationalisation of action and unconscious motives take place. However, it is imperative to understand that the unconscious does not provide any assistance to us in advancing our understanding of how social actors have the power to control and sustain their conduct.

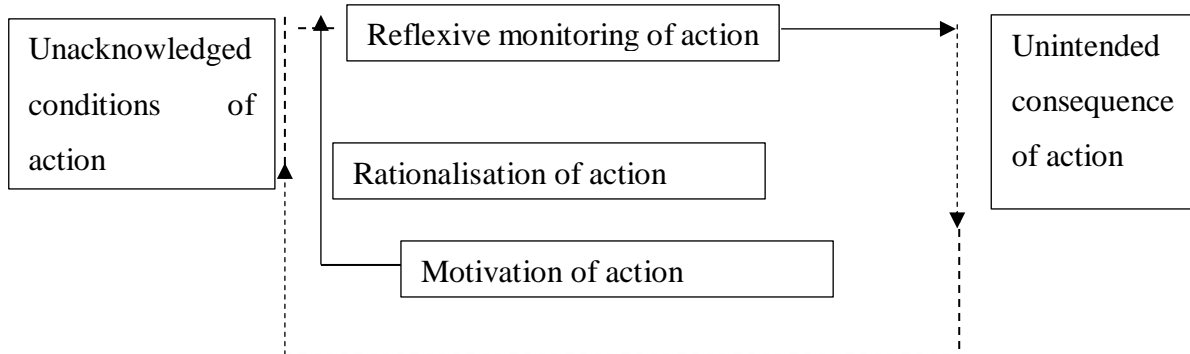


Figure 3.1: The Stratification Model of the Agent. Source Giddens (1984)

The stratification model of the agent presented in Figure 3.1 demonstrates how each of the actors repeatedly monitor how their activities flow. Giddens differentiates between rationalisation of action and reflexive monitoring from its motivation. He did this by contrasting “*reasons*”, as the basis of action, with “*motives*”, which means the wants demand the action. Motivation is explained as the possibility for action. Reflexive monitoring and rationalisation are directly linked together in continuity, while motivation happens in moderately unusual situations and helps to break with routine. The overall projects, programmes or plans seemed to be supplied by the motives. However, much day to day conduct of the social actor is not directly motivated. Giddens (1984) explains the difference between the ability of competent actors, providing explanation on the reasons and motives for their actions.

This difficulty may be linked with the fact that motives are connected to the unconscious. However, unconscious motives are a significant part of human behaviour, while practical consciousness is the focal point in structuration theory. Giddens (1984) argues that practical consciousness highlights what the agent does in everyday life. But every day life happens as a flow of deliberate action. However, unintended consequences are the characteristics of acts, which are fed back to the unacknowledged consequences of extra acts. Giddens (1984) also provide clarification between intentional and unintentional actions. An act that is characterised as one in which the initiator understands the consequence of such an act and how to achieve the act is called intentional actions. Unintentional actions, on the other hand, are those actions which would not happen if the initiator of the actions understands the outcome of the consequences. That is, the initiator would have behaved differently, but does not have the agent's power to have done otherwise.

However, Giddens (1984) does not see agency as people's intentions in getting things done, but he sees it as their ability to do things; therefore, for Giddens, agency infers power. Agency deals with a situation in which an individual is the initiator, such that the individual, at any point, has the opportunity or power to act differently. Therefore, agency means getting things done. Giddens (1984) argues that human agency is the "*capacity to make a difference*", which is also referred to as "*transformative capacity*". This means that agency is closely related to power. One of the significant features of agency is power, since the inability to make a difference means powerlessness. Therefore, Giddens (1984) explains that "*there is no more elemental concept than that of power*". Practically, transformational capacities are almost always retained by human agents, although small. This shows an indication that power plays an important role in the process of exploiting resources. Therefore, power is intrinsic in social action, because it relates to control which involves authorisation over resources as well as allocation of resources. However, authoritative resources are derivative of coordinating the activity of human agents, while allocative resources are derivative of controlling the material products or areas of the natural world.

According to Giddens (1984), action is not only about individual instances of getting things done, but rather the term of human life, the "*continuous flow of conduct*". Giddens is predominantly interested in the problem of order (Jones, 1999). The continuous and recursive ordering of social life is of significant importance. According

to Giddens (1984), recursive ordering can only be made possible due to the continuousness of practices that make them markedly comparable across space and time. Therefore, recursive ordering assumes reflexivity. Monitoring Reflexiveness of action has its background in some kind of rationalisation, which is based on motive, an overall planned strategy, or programme for the variety of behaviours.

This means that both discursive and practical consciousness are “*directly bound up with the continuity of action*” (Giddens, 1984). Individuals specifically obtain ontological security through their participation in routines which are predictable. Although Giddens (1984) argues that routine is the major arrangement of social activity, this does not suggest that action is planned. However, routinisation in the majority of social conduct has to be repeatedly “*worked out*” by those who tolerate it in their everyday activities. Therefore, local practice is constantly unknown. Communications are always designed by actors as they understand their local context, even when such communications are routine.

Routines are very significant due to the fact that most of the everyday practices are not directly motivated. Furthermore, the knowledgeable of human actors is to some extent restricted by the unconscious on the one hand, and by unintended consequences of their actions on the other. However, this does not mean that actors do not intelligently engage in their everyday practices. The level of the practical consciousness assumes that all human beings are agents of knowledgeable character, who understand what they are doing in such a way that is not secondary to their actions. That is, human actors have the ability to monitor and reflect on their own practices and on the practices of other actors. They possess the ability to reflect on the result of the planned and unplanned effects of their deliberate actions. Subsequent actions are grounded on reflexivity, which suggests that these actions are not mere duplications of what was done before. Therefore, the observation which suggests that agents participate in routine should not be interpreted as prearranged or even simplified behaviour. Instead, Giddens (1984) explains that knowledgeable is entrenched in the practical consciousness and it displays an astonishing intricacy. The purpose of the duality of structure, therefore, can be construed as the complexity of human action inside the ongoing flow of life which extends over lifetimes, and institutions giving continuity to social practice. This means that action is critical to the steadiness and general existence of social life.

However, it follows that all actions contain the seed of change within them, which is the ability that human actors possess to monitor their own conduct in a reflexive way with unintended consequences (Walsham, 2001).

3.2.1.2 Structure

Structure refers to the rules and resources that are implicated recursively in social reproduction. The features of social systems have structural properties such that relationships are stabilized across time and space. Giddens (1984) argues that structure can be conceptualized abstractly as two types of rules; these are normative rules and interpretive rules. Normative rules symbolise structures of acceptability. The social agents translate normative rules as specific rights and obligations (e.g., norms, customs, standards, etc.). The rights and responsibilities are complemented by sanctions or rewards. The government established institutions such as the Department of Home Affairs which regulates the issuing of ID documents to the South African citizens, the Department of Transport that administers the issuing of drivers' licence, learners, licence etc. by law are examples of a legitimating social structure. For example, the normative rules, such as the rights to have a legitimate ID document as a South African citizen, the right to have a driver's licence and to obtain it through a laid down process, the right to be registered to pay for tax in Nigeria are translated into laws upon which sanctions are imposed on those members of society who act contrary to the rules and/or laws guiding the process of issuing them.

The interpretative rules offer ways for actors to see and interpret events. Agents automatically apply interpretative schemes and stocks of knowledge. The result is communication among the social agents. The signifying structure represents the general rules of language. The mediating dimensions are the presentation of syntax or grammars and semantics that give the language its specific form and meaning as well as the knowledge and experience of the agents.

Structuration theory consists of integrated theory that strives to include the objectives and inter-subjective characteristics of ICT applications, as well as the context in which these characteristics are shaped (Bouwman et al., 2005). Structuration theory holds that human actions are embedded and constrained by structures, but emphasises that it is only manifested in the structural properties of social systems and consists of rules and resources that are used by human agents within the organizational environment (i.e. the

government organisations that implements mobile government projects) and the technology (i.e. the mobile software and hardware that combine to form a mobile government implementation) (Bouwman et al., 2005; Orlikowski, 1992).

Giddens (1984) provides an exclusive conceptualisation of what structure is. According to Giddens (1984), structure can be seen as “*normative elements and codes of signification*” that occur as traces of memory in the mind of the agent. Therefore, structure should not be seen as an object or morphology (Orlikowski, 1992). Instead, structure should be seen as rules and resources that are recursively occupied in social reproduction. Social systems’ features that are institutionalised have structural properties, but in the sense that relationships are stabilised across time and space (Giddens, 1984). Structuration theory structure is seen as “*a source of constraint on the free initiative of the independently constituted subject*”. This is different from conservative views of sociology, which see structure as something that is “*external*” to action (Giddens, 1984). Due to this school of thought, social practices are not made of “*structures*”, but rather show “*structural properties*” (Giddens, 1984). This structuring property enables the “*binding*” of time and space in social systems. This also makes it possible for perceptibly similar social practices to exist for various lengths of time and space and offers them a “*systemic*” form.

Structural properties that are manifested in action (social practices) are regularly entrenched in recursively replicated practices. As a result, they act as rules and resources for action, and they also enable the form of action that can take place. The “*structuring properties*” (i.e. the rules and resources), like the structure itself, should not be seen as “*things*” or “*objects*”, because such viewpoints preserve an automatic view and deterministic outcomes. It is therefore beneficial to have a temporary consideration of rules and structure.

What makes structuration theory unique from other social theories is its rejection of the traditional philosophies of rules as standard prescriptions external to the human agent. But from a structuration point of view, rules do not occur remotely; however, this happens in continuous practice in the replicated relations between individuals that was recognised by this study as social systems. The capacity exhibited by the human agent to deal with randomly unidentified circumstance is allowed and controlled by rules that are embedded in the agent’s mastery of social practice. Therefore, rules can assist to

establish meaning in a context and to place sanctions on the behaviour of the human agent. Apart from determining how to act, the agent has the ability to act which depends on the available resources. This ability to act can be authoritative or allocative. As stated earlier, “*authoritative*” refers to the command over actors or persons by the human agent, while “*allocative*” refers to the command over objects, material phenomena or goods by the human agent (Giddens, 1984). Rules and resources, irrespective of our ability to identify a “*real existence*” (laws, people, raw materials, procedure manuals) for them, become rules and resources “*only when incorporated within processes of structuration*” (Giddens, 1984). This simply means that “*the rules and resources constituting structure exist only in the agent’s heads*” (Jones, 1999). There are various structures enacted by the agents when participating in a social context. This means that in any structural analysis, it is imperative that one foregrounds some structures and backgrounds others (Giddens, 1984).

Finally, the main aim of Giddens’s Structuration theory is based on the idea that it draws together the two principal strands of social thinking: structuralism and functionalism which lays emphasis on the philosophies of social structure; and interpretivism, bequeathing importance to human agency and meaning. However, Giddens is not concerned with either the social actor’s experience or the presence of any form of social totality. Giddens’ main emphasis was to understand how social practices are ordered across time and space. But Rose (2002) argues that the effort of Structuration theory is to recast structure and agency as a mutually dependent duality.

3.2.1.3 The Duality of Structure

According to Giddens (1984), structure consists of rules and resources that are formed through the actions of individual which occur through their routines. A duality emerges as an action is constrained by structure, but action serves to maintain and modify structure at the same time. Giddens (1984) argues that structure and agency are better viewed as a “*duality*” as opposed to viewing them as two independent sets of phenomena (dualism) Therefore, structure and agency are portrayed as dependent on each other and are recursively related. This means that structure enables and constrains human action, and, at same time, the result of human action is structure. To this end, the focus of “*duality*” in Structuration theory is the way in which action and structure presume each other. Thus, the structural properties of social systems can be seen as

both medium and outcome of the practices they recursively organise (Giddens, 1984). Figure 3.2, which is a well-known Structuration theory diagram presents the dimensions of the duality of structure. The separation of this duality into vertical dimensions is basically for analytical expediency.

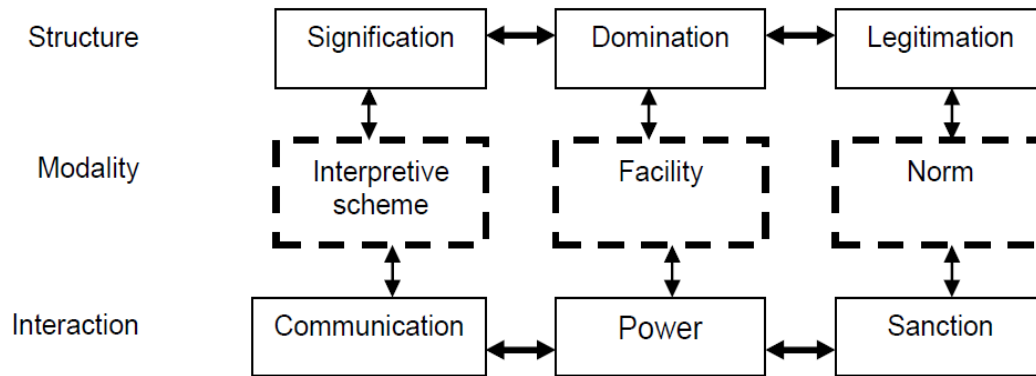


Figure 3.2: Dimension of the Duality of Structure. Source (Giddens, 1984)

Giddens work depends on the previous work of Durkheim, Marx and Webber (see (Giddens, 1984) to break down the human interaction and the social structure into three dimensions which are signification, legitimization and domination. These are interwoven by the three modalities as described: Signification is the rules that establish meaning, while legitimation describes the resources and the norms that govern relations of domination. Taking into consideration that these structural properties have manifested evidently in action, the latter are also critically analyzed into communication, power and sanction. Also, Giddens (1984) presents modalities of structuration for further clarification of these analytical dimensions. Giddens (1984) argues that based on this, we can “*relate the knowledgeable capacities of agents to structural features*”. Due to this, the three modalities concerning signification, legitimization and domination are interpretive schemes, facility and norms.

Giddens (1984) defines the duality of structure as the ‘essential recursiveness of social life, as constituted in social practices’ which can be seen as both the medium and outcome of the reproduction of practices. Giddens then recognizes structure and agency as a duality, which are dependent upon one another and recursively related, rather than two independent sets of phenomena.

Giddens (1984) argues that interpretative schemes are the frameworks of knowledge that allow actors to acquire an understanding of things as things, whether they are physical (e.g. computers, vehicles) or more abstract and conceptual (e.g. proceedings, watching). This background and foreground knowledge are gained through experience. Actors chart their knowledge of the world into cognitive schemes. These are utilized in making sense of their own actions as well as actions of others (Walsham, 1993). Specifically, communicative action is sustained by structures produced by signification through interpretive schemes. While interpretive schemes are the rules that allow for the understanding of what to know, norms are defined as the rules that allow for the understanding of how to act. Actors utilize rules, for instance, standards of morality to legitimate (i.e. legitimize) or sanction their actions as suitable behaviour. Therefore, norms establish the structures of signification. Facilities is seen as the material and non-material resources brought by actors in order to bear on their actions, which allow them to exercise power on the social action. Those who control material resources allocate them. Non-material resources include “*status, special skills, charisma etc. that an actor may bring to an action situation*” (Lyytinen and Ngwenyama, 1992). These facilities allow actors to use and reproduce structures of domination, or the unevenness of authoritative and allocative resources. These structures are fluid instead of being concrete, due to the fact that they expose what Giddens (1984) refers to as “*dialectic of control*”. This means that the activities of superiors can be influenced by those who are their subordinates. The implementation of this dialectic can lead to asymmetry that can be dramatically or indiscernibly loosened over time.

Furthermore, Giddens (1984) explains two more concepts: system integration and social integration. According to Giddens (1984), system integration is the mutuality between actors or collectiveness across protracted time-space while social integration is the mutuality that is dependency and autonomy between actors in the contexts in which human individuals interact with one another face to face. Giddens (1984) differentiates between the cohesive effects of social interactions and argues that it takes place when actors are present physically. He further argues that while social integration provides a conservation for the concern of praxis in “*situ*”, system integration is the reciprocities that occur between absent agents (i.e. agents who are physically and/or temporally situated in different settings) (Cohen, 1990). Social integration is mostly useful for social practice involving m-government system implementation of larger-scale practices as opposed to when face-to-face interactions are pragmatic.

Another important idea in Structuration theory is the distancing of time-space. This involves the "*stretching of social systems across time-space, on the basis of mechanisms of social and system integration*" (Giddens, 1984). As the impulsive and recurrent structuration of social interaction spreads between people over geographical distance and over time, so does the "*bite*" or embeddedness of those practices increase. For example, the user, equipped with mobile phone with access to the internet, may expect to have successful access to the m-government system in most parts of the world where there is access to internet, given that these practices have been more widely accepted for some time. However, the user may wish to conduct a transaction with the government in another country, where security is a major concern, but where, in the future, security may become less of a concern. If social practice becomes reasonably stable over time and space, then routine practices in which actors habitually engage may develop. Routines then establish "*the habitual, taken-for-granted character of the vast bulk of the activities of day-to-day social life*" (Giddens, 1984).

Linking the above with technology, Orlikowski (1992) proposes a structuration model of technology which is based on two principles as follows:

- Duality of technology, which explains that technology is both the result of human action (for example, technological innovation) and a tool for humans to accomplish some actions (for example, organizational innovation).
- Technology is interpretive. That is the interaction between technology and an organization is a function of different actors and socio-historical context implicated in its development and use. This model is represented in Figure 3.3 below.

Therefore, the duality of structure assists organisations (especially government and other organisations) to understand the circumstances within which ethical problems are resolved. Structures enshrine the ethical norms, which influence actions. Actions by agents, on the other hand, lead to changes in how rules and resources influence interactions and strengthen the norms upon which these interactions are based. Immediately these are put in place, the new processes promote the changes through interacting method.

Given the circumstances that there is every possibility for change (for example, the implementation of ICT strategy in a mobile context) in a specific structure to occur by the structure, Giddens (1984) provides a model measurement of change to help understand the level of the change that is likely to take place. The measurement of change is discussed in the next section.

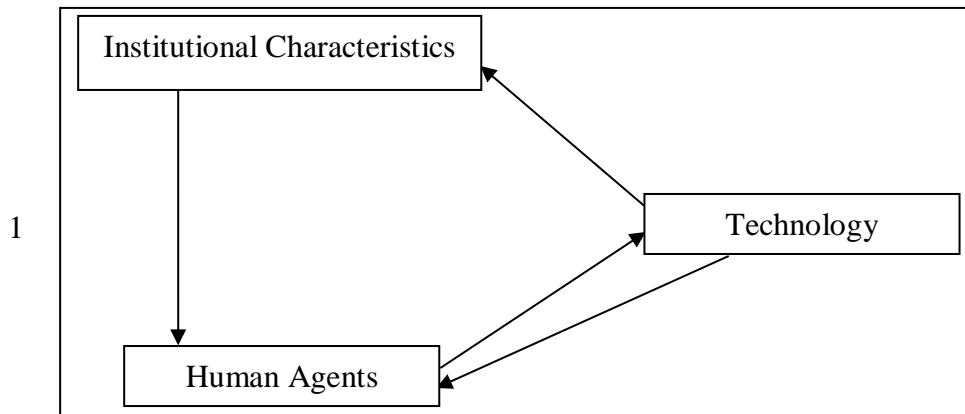


Figure 3.3: Structuration Model of Technology: Source (Orlikowski, 1992)

3.2.1.4 Dimension of Social Change

When ICT strategy is developed and implemented, it is certain that change will occur. Giddens (1984) offers a model for the dimension of social change. The dimension of change is presented in Figure 3.4 below. It consists of:

- i. Origin – referred to as the original source of the change.
- ii. Type – this is an indication of how extensive or intensive a change could be. This means, how deeply a series of changes unsettles or reshapes an existing alignment of institutions.
- iii. Momentum – this denotes the speed at which change occurs.
- iv. Trajectory - defines the overall direction of change.

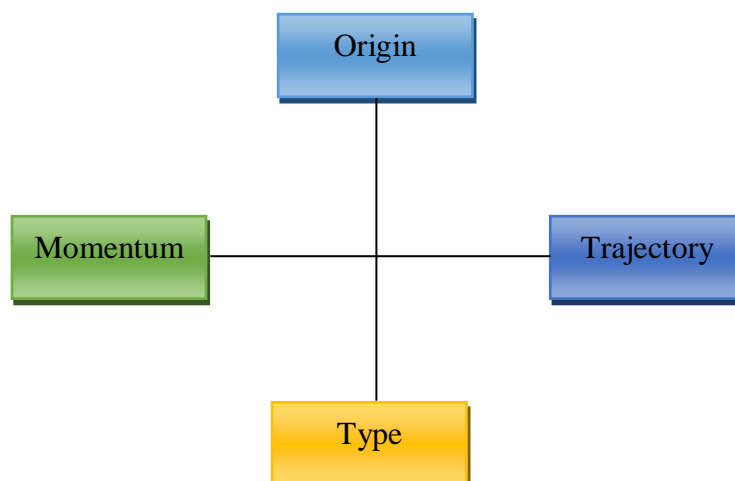


Figure 3.4: Dimension of Social Change. Source (Giddens, 1984)

The dimension of social change according to Giddens (1984) sets its focus on two aspects of social practice: orderliness and change. It takes into consideration the importance of representing situations in terms of moving from accustomed to experts and also to explicitly consider Information System as an integral part of social practice. Pozzebon and Pinsonneault (2000) argue that Structuration theory is very important to the development and use of ICT in the organisations that deploy it. The next section discusses the Structuration theory that is used in information and communication technology.

3.2.1.5 Structuration Theory in Information Systems Research

Structuration theory has been adapted and documented in the literature by different researchers interested in the study of relations between Information Systems and social structure (Walsham, 2001; Walsham, 1993; Rose and Scheepers, 2001; Orlikowski, 2000; Orlikowski, 1996; Orlikowski, 1992; Barley, 1986). There have been various attempts to integrate information systems within the theoretical framework of Structuration theory, for example in (DeSanctis and Marshall, 1994; Orlikowski, 1992). After Giddens (1984), Orlikowski and Robey (1991) studied the “*duality of technology*” and claimed that an individual’s actions are neither determined by technology, nor do they have the ability to construct technology as they see fit. They argued further that duality of structure exists, so that technology can constrain and enable individual action, while at the same time being a product of individual action. This means that, although human beings develop technology, technology still affects human activities. This recursive relationship shows that, while individuals design and develop technologies to perform new actions, our actions are constrained by these technologies. This is often regarded as technologies constrain/enable action.

The views of Structuration theory are applied in Orlikowski and Robey (1991) in order to help in understanding the relationship between organisations and IT usage. This led them to explore the “*duality*” of technology in their work. IT is viewed as the social product that emanates from subjective human action within a precise structural and cultural context as well as simultaneously an objective set of rules and resources

involved in facilitating human action. Hence, the contribution to the transformation, creation and recreation of those contexts. The idea of the duality of technology is explored further in Orlikowski (1992). Orlikowski applied a rethinking approach to information technology in the spirit of keeping with the tradition of Giddens' work.

DeSanctis and Marshall (1994) borrow from the Structuration Theory to propose an Adaptive Structuration Theory (AST) as an approach to study the role of advanced information technology in organization change. Adaptive Structuration Theory is based on Giddens' Structuration theory. It is a theory that is formulated as the production and reproduction of the social systems through members' use of rules and resources in interaction within an organization (Hossam, 2011). DeSanctis and Marshall (1994) use AST to develop a framework to offer an understanding of group decision support system (GDSS). However, AST comes at a time when there is a sustained attack from Jones (1999), who argues that Giddens' idea of structure is not compatible with the extra traditional view adopted in AST, and that no practical theoretical justification is presented in order to produce a contingency-type prototype of technology "*impacts*" which Giddens has precisely criticised.

The "*meta-theory*" from the point of view of a social constructivist, structuration theory does not offer "*middle range theory about specific phenomena that can be explored or tested directly and empirically*" (Orlikowski and Robey, 1991). "*Neither is it specific about the technology*" (Monteiro and Hanseth, 1996a). This research style is basically not compatible with Giddens' research style. This may have a tendency of leading to tensions. However, the intrinsic weakness of some of these theories is that they have the tendency to strengthen the technology equation with structure and structural constraint. In Information System, there is a propensity to take the view that technology is built by human agency. therefore putting constraints on what we do, which will be characterised as the "*discontinuous separation of design and use*" (Orlikowski, 1992). This technology equation with structural constraint cannot be seen as consistent with Structuration theory. Nevertheless, the deployment of further Structuration theory ideas, such as routinisation, system integration and time space distancing assists in explaining Information System research practice while all effort is made to avoid this problem (Rose, 2002).

The study by Barley (1986) provides an introduction of computer tomography scanners into American hospitals. Barley explores how the actions of the stakeholders and the institutionalised traditions within the organisation influenced each other as “*occasions for structuring*”. The starting point for Barley’s study is the model of “*dimensions of the duality of structure*” (see Figure 3.2), using Giddens’ Structuration theory’s concepts as a checklist for managing social analysis. Karsten (1995) made a straightforward utilization of these concepts by analysing Lotus Notes implementations in three organisations. However, Jones and Nandhakumar (1993) go further by providing analysis of the development of an executive information system and reflect upon the theory, thereby completing the circle. Walsham (1993) conducted a sustained longitudinal case study analysis on the issues of IS strategy, development, implementation and evaluation in three contrasting organisations. Walsham, G. and Sahay (1999) used Structuration theory in conjunction with Actor Network Theory to investigate problems that may arise in developing geographical information systems (GIS) in an Indian government department. An analysis of the social context and process of implementing GIS in India, and the connection between them was further conducted. They explain two aspects of social context concerning government organisational structures as well as the tradition of science. These were linked with the operationalisation, initiation and continuation phases of the GIS implementation process. Furthermore, Lyytinen and Ngwenyama (1992) discovered that social activity, including work processes, is constrained and enabled by social structures that are created and recreated through human action.

Bostrom et al. (2009) viewed Structuration theory as a theory for examining the use of information and communication technologies as well as information systems (IS) within the organizational context. Their research study looked at the role of a meta-theory in information systems and built a case for the use of AST as a meta-theory. They view the concept of a meta-theory as a theory that links across theory domains, which is lacking in the study of information systems and advancement of technologies such as mobile technologies. Also, Orlikowski (2000) revisited the use of theory of Structuration in order to replace the notion of embedded properties. The focus of this research allows a researcher to investigate how people, as they relate with technologies in their ongoing practices, endorse structures which form their emergent and position the use of that technology. An extension to the structurational perspective was proposed by Orlikowski (2000). In doing so, Orlikowski develops a “*practice lens*” which

examines improvisation, emergence and change over time as people reconfigure their technologies or alter the way they use it, leading them to endorse different technologies-in-practice.

Although Orlikowski's work has focused on multinationals and corporates, it is equally applicable to the technology cultures which have become known in government organizations, and can be further adapted through the lens of sensitivity to community differences in approaches to the governance of community with the use of technology.

Also, Pang (2010) applied Structuration theory to provide another perspective by which peer-to-peer network (P2P) concepts, processes, and its dynamics could be considered as a form of cooperative network which arose or was propelled largely because of technological innovations in information and communication, and the explosion of the world wide web. Despite the growing popularity of m-government initiatives in the developing world, there is little evidence of any reference that points to the structuration approach to understand how government in developing countries can enhance the quality of government service delivery through the use of mobile technology.

Therefore, this study uses Structuration theory as a rich framework to analyse empirical relations between government organizations (or agencies) and mobile technology as well as how governments can make use of the technology at hand to deliver quality service to citizens who are the users of the mobile technologies.

3.2.1.6 Critiques and Limitations of Structuration Theory

Despite its acceptance and wide popularity in information systems research studies, a number of social theorists have shown their concerns about how Structuration theory treats structure and agency. Archer (1982) claims that the problem of plummeting structure to action, or vice versa, deteriorates the analytical strength of Structuration theory. Archer (1982) proposed that to allow their analytical separation, human action should be seen over the short term, while structures should be viewed as more lasting. Furthermore, the conceptualisation of structure by Giddens as “*rules and resources*” which exist in the memory traces alone, has given rise to the criticisms of subjectivism. Clegg (1989) argues that the dualism of action and structure is not resolved by Giddens, as a way to offer victory to the knowledgeable human actor.

Another criticism is an argument directed at the inability of Structuration theory to provide an explanation of the historical change. The concept of structuration presented by Giddens offers a conceptual machinery for the explanation of the reproduction of social structure. However, Stinchcombe (1990) argues that a notable question of more relevance to contemporary researchers is why some forms of social reproduction are successful and become institutionalised, and others aren't? It seems that Structuration theory suggests no answer directly for these types of questions.

It is also not clear how structuration enables improvisation as a kind of determined behaviour. Ciborra and Lanzara (1994) suggests that there is a distinct difference between formative and structuring properties. Formative properties propose a background of meaning that can provide explanation for drift and shift phenomena. However, when a closer examination was conducted, it followed that there is little difference between structuration and formative properties. As a matter of fact, the handling of the formative context is not unlike the suggestion of Giddens (1984) that structure is paradigmatic.

Other criticisms have been based on the fact that Giddens work did not provide concrete examples which are empirical to Giddens' own work. Critics argue that Giddens' focus on abstract concepts provides little evidence on the useful understanding of the world of practice (Ciborra and Lanzara, 1994).

The limitation of structuration in information systems research studies is that there is no provision to examine the relationship between people and technology outside the acknowledgement of the fact that technology both enables and constrains us. After all, structuration is a social organisation's theory which explains stability and change in a social system over time. For instance, how power and values are found or embodied in the use of technology are not directly addressed by structuration. Due to this, critics argue that structuration does not have the capability to unpack precisely how humans are regulated by technology, and how humans react to technology. This enables Monteiro and Hanseth (1996a) to claim that in a simple terms structuration does not provide a complete analysis of the interaction between technology and individuals. Supporters of the use of structuration theory in information system also argue that there

is a need for researchers to better theorise information technology artefact and move beyond the modest constrain-enable distinction (Orlikowski and Iacono, 2001).

The application of Structuration theory in information systems research has also been exposed to criticism for neglecting technology (Orlikowski, 1992; Barley, 1986; Archer, 1982). According to Giddens (1984), structure cannot be seen to exist in material artefacts, such as technology, but in the traces of human memory and can be seen and ratified through social practices (Jones and Karsten, 2003; Giddens and Pierson, 1998). Giddens and Pierson (1998) argue that “*technology does nothing, except as implicated in the actions of human beings*”. Monteiro and Hanseth (1996a) provide the following criticism of neglect of technology by Structuration theory:

“Our principal objection to conceptualizations like [Orlikowski and Robey 1991; Orlikowski 1991; Orlikowski 1992; Walsham 1993] is that they are not fine-grained enough with respect to the technology to form an appropriate basis for understanding or to really inform design”.

The claim of Monteiro and Hanseth (1996a) was not that Structuration theory cannot deliver a satisfactory level of precision. Researchers may have been unsuccessful in deriving a more complete analysis in its application. Therefore, in applying Structuration theory to the case analysis, this study will assess the extent to which structuration theory gives itself naturally to how more precise technological elements and functions of an information system relate to organisational implementation of m-government system.

What is properly explained from structuration theory are ideas that enable the cross-examination of the relationship between technology and individuals. However, such concepts can be found within Actor Network Theory (ANT). The tenet of ANT is largely based on the interactions between technology and individuals. According to some of the most prominent interpretive researchers in information systems, ANT comprises a wealth of concepts that can be utilized to understand the relationship between technology and individuals, such as actors, networks, reconfiguration and the process of inscription (Hanseth and Aanestad, 2004; Monteiro, 2000; Monteiro and Hanseth, 1996a). They argue that adding these concepts will enable further theoretical

development for interaction between technology and social practices. These concepts will be discussed in section 3.3.

3.2.1.7 Conclusion of Structuration Theory

Considering Structuration theory beyond the criticisms presented above, shows several the key concepts of Structuration theory are still very relevant and appeal to the study of contemporary phenomenon like m-government system implementation for various reasons. First, Structuration theory suggests that importance to either the social totality or the experience of individual actors should not be given to social enquiry, but instead focus should be placed on social practice that is placed at the root of the constitution of both society and individuals. Second, knowledgeable agents create social practices with underlying powers, that is, powers that are vested in the agent to enable it make a difference. Therefore, instead of seeing human agents as the artefact of class forces, focus should be placed on their capability to perform a self-reflection in their interaction on a daily basis. This is a business of “*tacit*” consciousness of what they are doing and the aptitude to do it under certain conditions. Thirdly, Structuration theory suggests that social practices are not voluntary or random, instead they are stable and ordered over space and time. This simply means that they are recursive and routinized. In the process of creating social practices from which society is constituted, actors benefit from rules and resources (i.e. structural properties) which are institutionalise features of society.

Finally, Structuration theory recommends that structure is dependent on activity. Structure can be seen as both medium and outcome of practices over time and space. Giddens (1984) argues that this process is the “*double hermeneutic*”, the double participation of individuals and institutions. Giddens (1984) states, “*we create society at the same time as we are created by it*”. These concepts of Structuration theory assist in broadening our understanding of how government can enhance the quality of government service delivery through using mobile technologies.

3.3 Actor-Network Theory

Although the adoption of structuration theory to understand how government can enhance the quality of its service delivery through the use of mobile technologies (i.e. m-government implementation) offers a natural take-off point for addressing the research questions presented in this study, this section explores the Actor Network

Theory (ANT) as a possible addition that will assist to further understand the case studies.

One of the main motivations for adopting ANT as part of the analysis in this research study is that it offers additional understandings regarding the social dynamics of m-government implementation. This is because Structuration theory, including its improvements, has a strong propensity to neglect the role technologies (mobile devices, m-government systems) play in the social context. However, this study argues that implementing information systems has both technical and social advantages concurrently; therefore, for a better understanding, it is appropriate to overcome the differences between technical and social. What distinguishes ANT from conventional theories is that the intrinsic properties of the technology and some properties of the social context (such as user behaviours and other actors) do not drive the success or failure of IS implementation. Instead, what drives the success or failure of IS implementation are the associations that exist and are created between the technology and its surrounding actors (that is, actors that are both social and technical). ANT offers the concept of translation, which is radically different from some of the concepts proposed by Structuration theory, when focusing on associations rather than focusing on properties. Note that ANT uses an idiosyncratic vocabulary and terms which at first appear similar to other theories, such as systems theory, but have relatively different meanings in ANT. For instance, ANT provides its own “*interpretation*” to a notion such as “network”, “*black-box*” and “*translation*”.

The origin of Actor-Network Theory comes from the studies of Science, Technology and Society (Latour, 1987; Callon and Latour, 1981; Callon, 1986b; Callon, 1986a) in order to trace the heterogeneous networks of actors that constitute the production of science and technology. Latour (1987) went further and argued that science and technology must be studied in action and that focus must be shifted to the dynamics of their interaction rather than on the stability of their relationship. He, therefore, proposed ANT as an analytical tool that provides the theoretical and methodological underpinning for the study of these dynamic relationships.

ANT helps to address the abstract nature of Structuration Theory. This is because it is more empirically focused and it recognises the absence of specific references to ICT,

simply because it theorises the construction of information and communication technology. Furthermore, the study of how networks (which include technology) form and become more stable may help address the problem of understanding how some social practices become institutionalised (e.g. successful in some advanced countries) whereas the reverse is the case of developing countries.

3.3.1 The Perspective of ANT

An actor-network is a combination of actors that are connected through various interests. Actor-network theory is a powerful theory within the sociology of science that strives to elucidate and translate social and technological developments (Tatnall and Gilding, 1999b). ANT does not give opportunity to both technical and non-technical factors. Rather, it integrates a “principle of generalised symmetry”, where both human and non-human elements are actors and both elements can affect each other. ANT highlights the mixed nature of actor networks which consist of and link together both technical and non-technical elements (Callon, 1991).

The focal point of ANT is a perspective of the social world that shows how people and objects interact together in stable, heterogeneous networks of affiliated interests through processes of translation and negotiation. These heterogeneous networks form actors (Callon, 1986c; Law, 1992). In ANT, emphasis is placed on the fact that heterogeneous networks overwhelm the issues that are associated with identity, and circumvent arbitrary dichotomies and structures (Latour, 1996b). According to Latour, the heterogeneity is reflected in different organisational principles that are in simultaneous action. The combination makes it possible to engage in a balance between identified and or known different interests and values (Latour, 1996b). According to Law (1992), persons are made out of a heterogenous network. This is described by Law (1992) as follows:

“However, I will press the argument in another way by saying that, analytically, what counts as a person is an effect generated by a network of heterogeneous, interacting, materials. This is much the same argument as the one that I have already made about both scientific knowledge and the social world. But converted into a claim about humans it says that people are who they are because they are a patterned network of heterogeneous materials. If you took away my computer, my colleagues, my office, my

books, my desk, my telephone I wouldn't be a sociologist writing papers, delivering lectures, and producing 'knowledge'. I'd be something quite other – and the same is true for all of us. So, the analytical question is this. Is an agent an agent primarily because he or she inhabits a body that carries knowledge, skills, values, and all the rest? Or is an agent an agent because he or she inhabits a set of elements (including, of course, a body) that stretches out into the network of materials, somatic and otherwise, that surrounds each body?"

To understand social phenomena, researchers need to study actors without forcing on them *a priori* definitions or expectations. Precisely, ANT researchers must step back from *a priori* differences between the social and the technical. In other words, actor-network theory avoids both technological determinism and social reductionism (Monteiro, 2000).

ANT does not tolerate any form of reductionism, either social or technological, that separates technical from social and assumes that one drives the other. ANT argues that there is no reason to assume, *a priori*, that either people or objects in general determine the character of social stability or change. Due to this, ANT supports treating objects and people analytically and in the same way; humans and non-humans form the heterogeneous networks. This is best explained by means of an example. In our day-to-day lives, we are influenced by a wide range of factors, including social and technical, but also political and historical factors. For example, when using a mobile phone, we are influenced by internet connectivity and applications that run on the phone (Monteiro, 2000). To understand the phenomenon of using a mobile phone, we should consider all these influencing factors together.

According to Law (1999), ANT provides three methodological principles that are used to meet the resources needed to treat actors (both non-human and human actors) equitably (Callon, 1986b). These principles are: the principle of free association, the principle of generalized symmetry, and the principle of agnosticism. The principle of free association suggests that the researcher should be instructed to excuse all previous differences between the social and the natural, such that there is no boundary between the two, although it is possible that they could be separated later, as output of analysis and understood as effects or outcomes, but cannot be divided *a priori*, if this is the given

order of things. In agnosticism, the principle states that the researcher should be instructed to refrain from judging or censoring both the human or non-human actors. According to ANT, there should be analytical neutrality towards both non-human and human actors. In the generalised symmetry principle, ANT demands that researchers clarify conflicting viewpoints of all the actors in the same terms by using abstract and neutral terminology. This rule forbids change registers when transiting from technical to social aspects of the problem under study and discards the affordance of any fortunate explanatory status to technical or social actors.

Further to the above, Callon (1991) states that: “*ANT was developed to analyse situations in which it is difficult to separate human and non-humans, and in which actors have variable forms and competencies.*”

The treatment of non-human and human actors discussed above has an appeal for understanding contemporary forms of information systems innovations such as understanding how government can employ the use of mobile technologies to enhance the quality of government service to the citizens.

Some of the strong points of Actor-Network Theory are as follows:

- ANT offers a fresh viewpoint on the significance of interactions between various actors (both human and non-human actors). This perspective is imperative in the design, development and implementation of technology that can assist an organisation in the discharge of its duties. However, the design, development and implementation of technology within a particular organization, need the process of negotiation, interest and norm (Akrich, 1992).
- ANT analytically avoids the methodology of dualism, that is drawing on *a priori* discrepancy between technical and non-technical features (Bloomfield and Vurdubakis, 1997). By this action, the intricacy of assumption and pretence of dealing with two distinct, but related, ontological domains is simplified. This mean that they should be viewed as stages of the same essential action (Latour, 1991).
- ANT tries to respond to the question of how a varied group of actors have an agreement among themselves. This means how a social order creates a

convincing level of stability or shows structural properties. According to ANT, stability is the consequence of the social process that supports an initially varied gathering of interests into a satisfactory stability (Callon, 1991).

- ANT provides a detailed and non-functionalist interpretation of how actors develop and become powerful through the steadiness of the networks that go through them. The actor (both human and non-human) that is a mandatory passing-point in a network has “power”, and the more the networks, the more “power” that actor has. Due to this, the capability of an actor to act efficiently on a higher scale becomes established over time (Callon, 1991).
- The interactive and development-oriented sociology of ANT offers a concrete theoretical groundwork for separating and understanding the effect both human and non-human elements have on each other (Tatnall and Gilding, 1999b).

ANT, like Structuration Theory, recognizes the interaction between society and agents. However, ANT places an equal amount of emphasis on non-human actors (i.e. the artefacts) and describes how actors form alliances and enrol other actors as well as applying non-human actors to strengthen the network via common interests.

3.3.1.1 Understanding the Concept of Actor

Latour (2005) argues that an actor-network “*is made to exist by its many ties: attachments are first, actors are second*”. Furthermore, Latour (2005) proposes that large network of attachments that make the actors act are always added. As stated earlier, those elements that shape action in a context while pursuing their interests are referred to as Actors. An actor is an object that acts or an object that to which activity is granted by others actors. This means that human individual actors, or humans in general, have no special motivation. An actor can be anything, provided it has an approval to be the source of an action (Latour, 1996a). However, Law (1992) explains that actors can also be seen as an effect that is generated by network of heterogeneous, materials, interacting,. This means that social agents are not only located in bodies, but they are networks of heterogeneous relations. Through black-boxing or punctualisation, actor-networks “*make up an actor*”. Therefore, each actor is a combination of actors and subsequently part of an actor.

Furthermore, Law (1992) argues that all properties we usually link with human beings, for instance writing, acting, thinking, earning and loving, are created in networks that exist beyond the body. Therefore, an actor is always a network in infinity (Monteiro, 2000). Due to this, Monteiro (2000) argue that the fact that actors are actor-networks in infinity, means that researcher must choose how the network under study is “*zoomed in and out*” and which actors are involved in the study. It means that the “*actor*” of an analysis is equivalent to the “*size*” the researcher chooses as suitable, relative to the path of the analysis (Monteiro, 2000). However, being viewed as an actor and produces simplification of difficulty, either by researcher or, more importantly, by other actors, shows the concept of a mobilisation process with the effect of black-box (i.e. black-boxing effects). The organization produced by this simplification is neither natural nor “*obvious*”. They are natural or obvious to accomplish an effect, which is to control the alternatives or opposition. In the process of choosing the shape or size of an actor, the researcher is not totally at liberty, but bound by the practice of other actors and what is natural and obvious to them (Monteiro, 2000). Therefore, actors should have some naturalness and obviousness to them. In summary, in ANT phraseology, an actor is the result of heterogeneous relationship that occurs objects and humans and, according to Law (1992), an actor is always a network.

3.3.1.2 Understanding the Concept of Actor Network

According to McLean and Hassard (2004), actor-network is achieved through shared “*enrolling*” of non-human and human participants (i.e. actors) into a network. This is done through the processes of translation and negotiation. The actors, through the alignment with each other form an actor-network. This alignment is made possible through the translation of interests and the enrolment of actors into the network. Translation of interest is the process of showing how the non-aligned interests of an actor become aligned. Therefore, an alignment is established in captions that give a specific preference in terms of a point of view. The term “*immutable mobile*” is extensively used by Latour (1999) to describe the elements of such network. This means that when the elements are shuffled around in time and space, they become stable and unchanged (Latour, 1999; Tatnall and Gilding, 1999a). For instance, a mobile phone can be considered an immutable mobile when it shows a relational pattern of assertive properties (such as Bluetooth, internet accessibility, ability to make calls, ability to have internet enabled application, etc.). Such a network can endure through time and space

without having to change these properties, which means that irreversibility properties are displayed (Walsham, 1997)

Law (1992) argues that the actor-network approach is interested about how actors and organisations mobilise, compare and hold together pieces of their composition. Law (1992) was also curious about how actors are sometimes able to prevent those pieces from following their own dispositions and “*making off*”. Furthermore, there is particular interest in how they strive conceal for a while (i.e. time) the process of translation itself and so turn a network from some heterogeneous pieces, each with its own dispositions, into something that passes as an on-time actor. Law (1992) places more emphasises on “*time*” due to the fact a network is not formed once and for all once it is formed. There is the possibility that it can become unstable, because new actors, changes in alliances or abandonment of existing actors can cause the “*black-boxes*” of networked actors to be opened and their contents reviewed (Callon, 1986a). A black-box, which itself is also a network, is another viewpoint of explaining the simplified points that are linked together in an actor-network (Callon, 1986a). According to Latour (1987), there are five alternative strategies that can be adopted in enrolling others in the creation of a black-box. These are:

- To get the others to follow our interests (‘You want what I want’)
- To appeal to the other’s explicit interests (‘I want what you want’)
- To reshuffle interests and goals by tactics such as inventing new goals and inventing new groups (‘We all want this’)
- By becoming indispensable to others (‘You need me to get what you want’)
- To suggest a short detour (‘I will take care of your interests, if you follow me’)

A network generates and reproduces itself recursively. It also depends on the active maintenance of its simplifications for it to continue existing. The term “*network*” does not imply a fixed thing, but designates an alliance of actors that are dynamic. The durability of network becomes guaranteed in a structure where each point is at the intersection of two networks. That is, “*one that it simplifies and another that simplifies it*” (Callon, 1986b). As stated earlier, actor networks are produced and reproduced persistently. The argument presented here is not whether the actors of a network are technical or social, but as Latour (1987) explains, the argument is about “*which associations are stronger and which are weaker*”.

The issue of power is the tenet of ANT. It has been argued that through production and reproduction, power is affected. The concept of power is better explained using the sociology of translation. This is discussed in the next section.

3.3.1.3 Sociology of Translation

In ANT, translation is a key concept. There is a translation process which is the creation of an actor-network. Hence, Actor-Network Theory is also referred to as the "sociology of translation". Latour (1991), explains that there is no social measurement to existence, but instead "the social" is already technical, just as "the technical" is already social. The purpose, according to Latour (1991), is: *"to avoid the twin pitfalls of sociology and technicism. We are never faced with objects or social relations, we are faced with chains which are associations of humans . . . and non-humans . . . No one has ever seen a social relation by itself . . . nor a technical relation"* (Latour, 1991).

The principal building blocks of actor-networks are interactions. Furthermore, the various manifestations between them are referred to as "translations" (Latour, 1987; Latour, 1991). The translation of interests between the human actors is unevenly equivalent to the inducement as well as the conciliation of mutual interests. The translation, however, occurs between humans and objects, during the design and development. This occurs when the object is infused with its determination, script or program of how it would interact with other actors (Akrich, 1992). Additional translation occurs between the objects. The actors it meets as the preliminary program or script is improved through the interaction.

The translation process involves four different stages (Callon, 1991) with possible repetition of cycles upon unsuccessful moments of translation. These stages are: problematization (the first stage), interessement, enrolment, and mobilization (Latour, 1987). Figure 3.5 depicts these four stages.

During the problematization stage, focal actors are used to establish the identities and interests of other actors that are consistent with their own. The focal actors are established as a situation where they set out the problems and solutions, as well as attributing the roles and identities of other actors in the network. The second stage of

translation which is interessement is convincing other actors that the interests that are defined by the focal actors are indeed aligned with their interests. New allies will be locked in, and those that have not been co-opted will be restricted.

Enrolment, which is the third stage, involves attributing the different roles to each of the actors in the actor-network. Various methods are used by the focal actors to convince other actors to embrace the new actor-network and play their assigned roles in the network. The final stage of translation, which is mobilization, includes deployment of various strategies by the focal actors to ensure that allied spokespersons act in accordance with agreement and work in harmony. The actor-network is said to achieve stability when allies are mobilized (Callon, 1991).

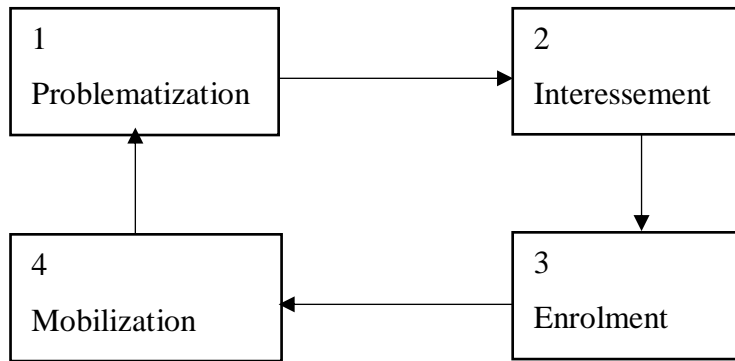


Figure 3.5: Four Moment of Translation. Source: (Callon, 1991)

In addition to the translation process, two other concepts, inscription and irreversibility, are also critical in the formation of an actor-network. Inscription is the consequence of the translation of one's interest in artefacts (Callon, 1991). The social-technical stability is attained when ideas are inscribed in technologies that are being diffused in the context of relevance (Latour, 1987). Irreversibility refers to the state where the actor-networks become so durable that they can withstand assaults from competing translations and it is impossible to go back to a point where alternative options exist (Callon, 1991).

3.3.2 Actor-Network Theory in Information Systems

The potentials of adopting Actor Network Theory to investigate the failures and success of innovation in technology have long been recognised by various researchers. Some influential examples include the study on the failure of the domestication of the scallops of St Brieuc Bay by Callon (1986b) and the development of the electric vehicle by the Electricité de France by Callon (1986b). Actor-network theory has also been used by Latour (1999) to analyse the development of a ground-breaking public transportation system called Aramis (Latour, 1996a) and to highlight the successes of Louis Pasteur (Latour, 1999). There have also been some organisation studies which have applied ANT in organisational analysis (Hassard et al., 1999) and studies in accounting systems (Lowe, 2001; Lowe, 2000).

Many information systems researchers have demonstrated extensively the effectiveness of ANT in information systems research. The use of ANT in information systems has been well documented by Scandinavian researchers through the application of sociology of translation to the study of information infrastructures (Monteiro and Hanseth, 1996a; Monteiro, 2000). Monteiro and Hanseth (1996a) investigated the role

of standards in electronic data interchange (EDI) systems and information infrastructure. Wagner (2003) employed the use of ANT to investigate the design and implementation of an Enterprise Resource Planning (ERP) system in an academic environment. Mantovani and Spagnolli (2004) utilized the concept of ANT to describe the struggle a company faces in order to negotiate and legitimate a new network technology.

Antonio and Maha (2006) used ANT to describe and inform the role of technology in the process that shapes the relational outcome of the interplay between technology and people. They argue further that the most common use of ANT is as a powerful methodology used to gather and analyse data that are seen within the interpretive ontological constituency. The interpretivist ontological foundation, however, clarifies that reality does not already exist but it is constructed in the very act of interpretation.

ANT has been seen as a significant tool in the political process of implementing Information Technology (IT), for example (Walsham and Sahay, 1999; Tiko, 2007). Furthermore, the use of ANT to treat the implementation of information systems as a composite socio-technical and heterogeneous network involving institutional arrangements, actors, work practices, textual descriptions, and technical artefacts has a specific application for this study. For example, Walsham and Sahay (1999) used ANT to demonstrate the mutual dependency between technological properties and the social framework in the implementation of GIS systems in a local Indian setting by developers in the Western world. Tiko (2007) utilized the concept of ANT to gain an understanding of the socio-technical factors influencing the implementation of IT strategy in organisations.

Lee (1991) argues that research that employs the concept of ANT seeks to:

examine more than just the technological system, or just the social system, or even the two-side systems side by side; ... but the phenomena that emerge when the two interact.

Furthermore, Hanseth and Aanestad (2004) highlight the superiority of ANT over Structuration theory in their analysis of technology. They stated as follows:

“The Structuration theory approach has been picked up by a vast number of scholars and a wide range of studies have been carried out. These have given us many valuable insights into the social processes related to adoption and use of information systems. There is one aspect of these studies that is of crucial importance here. That relates to the role of technology in these studies as well as the theories they are based on. These go equally well (or more precisely, badly) for both Structuration theory and institutionalism. The studies of information systems based on these theories do not address the role of technology in a proper way. This fact is largely a consequence of the fact these theories totally ignore technology. This makes ANT different. And in this respect ANT offers some unique and very important contributions to information systems.”

Hanseth and Aanestad (2004) present five exemplar research article which were based on applications of ANT to different technologies and situations. Marres (2004) used ANT as a theoretical and methodological tool for the advancement of research practice. Adams and Berg (2004) used ANT to demonstrate how the concept of “*reliability*” of health information can be subjected to negotiation. Allen (2004) conducted a study on the notion of inclusion in several technological frames through a socio-technical approach, and Mahring et al. (2004) undertook a study on the relative use of ANT and escalation theory to perform an analysis of dysfunctional IT projects. Of a particular interest to this study is a Faraj et al. (2004) study which used ANT as a foundation for studying the evolution and complex processes for the adoption of World Wide Web technology.

In this research study, we employed the use of ANT in an interpretive ontological constituency to provide a better understanding of the relational dimension between technology and people. This means that our focus is on the emergent properties of the relationship which is then followed by the evolving dynamic rather than on the mere effect of either over technology. Our approach in this research study is to use the argument of Antonio and Maha (2006), which implies that the ontology of ANT is that reality transpires through the interplay of various actors (i.e. both technology and people). This means that reality becomes real when actors interact. This is the tenet of adopting the use of ANT in this research study. Nevertheless, like Structuration theory, ANT is not free from criticisms either.

3.3.3 Critiques and Limitation of Actor-Network Theory

Walsham (1997) identifies four main areas of limitations and criticism directed at ANT in the literature. These include ANT's limited analysis of social structures; its indifference on moral and political analysis; its treatment of humans and non-humans symmetrically; and its description of power instead of explaining it, together with the problem of managing huge amounts of detail.

ANT has been criticised for overlooking the macro social structures while concentrating on local exigencies, that is, ways to map the local and global. However, advocates of ANT claim that macro levels can be examined with the same procedural tools as the micro-level, due to the fact that the macro-structure of society is made of the same stuff as the micro-structure (Latour, 1991). ANT enables movement between analysis levels. Latour (1991) refutes the difference between macro structures and micro interactions. According to Latour (1991), the variances between actor and network “*are two faces of the same phenomenon*”. Walsham (1997) argues that based on the structuration theory by Giddens (1984), the levels of analysis are connected from the individual to the global and provides models of structure and social action at multiple levels to overcome this impediments. However, Latour (1999) suggests that the social enjoys the inexplicable characteristic of not being made up of structure and agency, but it is a “*circulating entity*”. Based on the perspective of Latour (1999), the social is always circulating between actor and network. This treatment of society is the same in many ways to the treatment of agency and structure by Giddens (i.e. as a duality). Furthermore, Callon and Latour (1981) claim that it is appropriate to use the same framework of analysis to address both a micro-actor and a macro-actor and to make sure that the idea of an actor-network is scalable, meaning that one element of an actor-network may be extended into a new complete actor network, and vice versa and a complete actor network may be warped into one element of another actor network (Monteiro, 2000). The effects of this on the macro or on the micro level can therefore be analysed to expose their impact on either of these levels. In this way, it can be argued that Structuration theory is much like ANT. Giddens (1984) further dismisses the differences between micro and macro social studies as “*misleading*”. Also, Giddens (1984) claims that there will be no question of one level having priority over the other. Therefore, the position of Walsham (1997) on synthesising ANT with the work of Giddens have been dismissed by some researchers based on the reasons stated above.

The unprincipled stance of ANT and its related lack of awareness regarding the political viewpoints have also been criticised by Walsham (1997). Walsham (1997) suggests that more ethical and political theories are needed in order gain an understanding of case findings. For instance, the reason for the m-government implementation not in majority of the developing countries cannot be understood only by investigating the unavailability of appropriate mobile device in developing countries. Walsham (1997) further suggests that the practical outcomes of an ANT study should also be debated in terms of the political and moral issues.

Another important criticism of ANT comes from its assumption of giving symmetry between the technological and the social in the actor-network (Walsham, 1997). The focal critique is that human beings have been placed in the same level as technologies and things. Also, various critics claim that treating all actors as equivalent is problematic as all actors are not equal; some of the actors have stronger influences than others. Qualities such as emotions possessed by humans, which play an important role in the activities of humans, appear to be lost (Mutch, 2002). Furthermore, the idea of inscription makes technology to have been settled with some deterministic characteristic. However, ANT does not claim that humans and machines are the same. What ANT does is simply state that the influential elements that actually determine action should be discovered first, irrespective of whether it is technical or non-technical (Monteiro, 2000). Hanseth and Aanestad (2004) refute this criticism. They claim that although it is true that ANT acceptance of everything to be an actor-network, including both humans and technologies, all networks are nevertheless unavoidably different. This means that technological artefacts and humans play different roles in social life. For instance, to discover the influential factors that affect the way we implement m-government systems, we need to understand the capability of the mobile phones to be targeted (technical) as well as the people who drive the strategy to implement the system (nontechnical). Instead of differentiating technical and non-technical *a priori*, ANT claims that it is possible for them to have more in common than not. To observe the term “*inscription*” as an action that is inscribed and permanently connected to an artefact is a misconception (Monteiro, 2000). It is simply used to designate how real expectations and limitations of use patterns are involved in the design, development and use of technology. The case is not that the object determines its use, or that the

object is extremely flexible when its user conducts its interpretation and appropriation. This case is simply an interaction between both extremes. However, Collins and Yearley (1992) argue that ANT acknowledges a lot to technical accounts and realist. Equally, Grint and Woolgar (1997) indict ANT of technicism (i.e. over reliance and over confidence on technology as a benefactor of the society) in its quest to explain the technical capabilities of technology. Also, Brey (1997) argues that ANT is slightly similar to the approaches of social-shaping, and proposes that the idea of inscriptions can be viewed as a metaphor for the “politics of artefacts”.

ANT has also been criticised by Knights and Murray (1994) based on the way in which it gives little or no attention to the wider powers and disparities that serve as the condition and result of network formations. Latour (1999) refutes this argument by claiming that critical theorists rely too much on the inequalities of the social.

“Critical theory is unable to explain why artefacts enter the stream of our relations, why we so incessantly recruit and socialize non-humans. It is not to mirror, congeal, crystallize, or hide social relations, but to remake these very relations through fresh and unexpected sources of action. Society is not stable enough to inscribe itself in anything. On the contrary, most of the features of what we mean by social order – scale, asymmetry, durability, power, hierarchy, and the distribution of roles – are impossible even to define without recruiting non-humans. Yes, society is constructed, but not socially constructed. Humans, for millions of years, have extended their social relations to other actors with which, with whom, they have swapped many properties, and with which, with whom, they form collectives.”

This means that it is true that there are inequalities; however, the inequalities should not be seen as *a priori*, which divides the technological and social. Reductionism is not acceptable to ANT; that is, relationships in neither non-human nor human are determinate. There is no justification to assume, *a priori*, that either people or objects have the power to determine or regulate the character of social stability or change. In specific cases, machines may be shaped by social relations, or machine relations may shape their social counterparts. When understood as outcomes or effects, the technical and social might be considered separate, but they are not as given in the order of things (Law, 1999). However, both can have an effect on the resulting inequalities between

actors, through the concept of inscriptions. Therefore, the conclusion as stated by Walsham (1997) is that “*Moral and political issues should be debated from a solid empirical base, and actor-network theory offers a contribution to the latter if not directly to the former*”.

3.3.4 Conclusion of Actor Network Theory

ANT offers an approach to analyse the case study. It provides a tool of analysis that gives us to new ways of thinking. The contradiction between the technical and the social is resolved through understanding that both are entwined. Furthermore, ANT does not reduce *a priori* implementation in information system factors that are simplistic, but it has the ability to analyse all its complexity. ANT moves across political, economic, strategic, technical and social issues related to implementation of Information Systems and enables researchers to makes sense of the implementation process as its unfolds (Monteiro, 2000). ANT is beginning to display signs of future potential in information system research. It is based on that that Tatnall and Gilding (1999a) have the following to say about ANT:

“We contend that actor-network theory can be useful in studies of information systems where interactions of the social, technological and political are regarded as particularly important. We suggest that actor network theory, and the theory on innovation translation, can be particularly useful for studies in areas such as the business use of the technology”

3.4 Mixed Theory: Structuration Theory and Actor-Network Theory

The reason for applying Structuration theory and Actor-Network theory in this research study has been clearly indicated. It is, however, important to also indicate that there is no conflict or contradiction in using these two theories together in this research. The aim of this research study is not to compare and contrast Structuration theory and Actor-Network theory, but to highlight the importance and complementary usefulness they both provide for this research.

ANT does not differentiate between human and non-human agents and it also discards differences between the technical and the non-technical. Its focus can be on the micro or macro level of the establishment of heterogeneous networks of aligned interests, and its use in this study helped to provide an understanding of how actor-grows, changes and stabilizes during the development, evaluation and implementation of the artefact

and as each case study were analysed on the basis of the four moments of translation discussed earlier.

Structuration theory on the other hand re-conceptualizes the dualism between subjects and social objects. Giddens (1984), explains that "*Structuration theory is neither the experience of the individual actor, nor the existence of any form of societal totality, but social practices ordered across space and time. Human social activities, like some self-reproducing items in nature, are recursive. That is to say, they are not brought into being by social actors but are continually recreated by them via the very means whereby they express themselves as actors.*" Therefore, Structuration theory reorganizes the categories of structure and agency as a duality in a dialectical framework. The contribution of Structuration theory is that it provides methods of understanding how social institutions are produced and re-produced over time. Giddens (1984), therefore, defines social systems as visibly patterned interdependent networks of actions, where change in one part translates into change in the other. Structuration theory proposes that human actions simultaneously condition and are conditioned by organizational properties in social contexts.

Structuration theory and Actor-Network theory highlight different social contexts and enable different types of explanations. The limitation of Structuration theory is that it is a theory of social organisation that elucidates changes in a social system over time (Jones, 1997). Due to this limitation, Structuration theory does not authorize the examination of relationships between people and technology, nor how power and values are embedded in the use of technology. Monteiro and Hanseth (1996b) explain that Structuration theory basically does not make provision for the analysis of the interaction between individuals and technology.

An examination of the relationship between individuals and technology, which is the limitation of Structuration Theory, can therefore be supplemented by Actor-Network Theory. The tenet of ANT lies within the interactions between technology and individuals. It contains various concepts for understanding the relationship between technology and individuals. Therefore, without doubt, the combination and complementary use of Structuration theory and Actor-Network theory in this study

allow a more complete analysis of how IT artefact and strategy development and implementation are affected by organizational decision.

3.5 Chapter Summary

In this chapter, we begin with a discussion of structuration theory as a starting point from which the case studies can be analysed. The reason for chosen Structuration theory was because of its wide acceptance of by researchers who are interested in technology and its social context. Also, structuration theory was chosen due to its compatibility with the research questions posed in this study. However, after reviewing the limitations of structuration theory, actor-network theory was also chosen as part of the case studies analysis. In Chapter 6, we will begin with the analysis of structuration theory based on the interpretation of Giddens to demonstrate how and where it can be supportive in understanding the social context of m-government system implementation to enhance the quality of government service delivery. We will continue with the analysis of the same case studies using ANT to investigate how potential problematic explanations from structuration theory can be understood differently, especially from the technological point of view. It is predicted that these two separate theoretical lenses will assist to offer a better understanding of the social context of m-government implementation. The next chapter discusses the research philosophy, methodology and methods.

CHAPTER FOUR

RESEARCH PHILOSOPHY METHODOLOGY AND METHODS

4.1 Introduction

Various research methods are used in Information Systems research, depending on contexts, research questions and research objectives (Avison et al., 1999). The choice of a research methodology depends on how appropriate the method is for a specific research problem and research question.

The objective of this research is to investigate and explore how government can incorporate mobile cellular technologies to improve the provision and reach of government services.

This chapter presents argumentation to support interpretivism as a philosophical approach underpinning the study of the framework to enhance the quality of government service delivery through mobile technologies (otherwise known as m-government) in the context of a developing country. By acknowledging the social character of the research and the phenomenon under study, the chapter further elaborates on the research framework and also provides a description of the research strategies. Furthermore, a qualitative research methodology has been adopted. The selection of and motivation for the proposed methodology is discussed in detail in this chapter.

4.2 Research Philosophy and Methodology

In Information Systems research, researchers can apply different research methodologies (Pather and Remenyi, 2005). These methodologies have different underpinning philosophies that can be applied by a researcher in the study of information systems (Oates, 2006). There are three major philosophical paradigms that are used in Information System research: positivism, interpretivist and critical realism (Oates 2006). Others are pragmatist, post-positivist, interpretivism, etc. Some research methods such as case study, action research, and design science can be positivist, interpretive or critical, though these can be contentious in some cases. (Walsham, 1995b).

Myers (1997) analyses these philosophical perspectives as follows. Firstly, positivist research is a philosophical perspective that is based on the assumption that a researcher tests available theories.

Positivist research is based on measurable variables that characterize the phenomenon and reality can be described by measurable properties which are independent of the observer(s) and the instruments used by the observer(s) (Myers, 1997). This means that the researcher is independent of the research phenomenon and the propositions (Orlikowski, 1991).

Interpretive research, on the other hand, is a philosophical perspective that is based on the assumption that there are no predefined variables and that the researcher has to understand the phenomenon in its context, based on the sense that people make of the phenomenon. This research phenomenon is aimed at producing an understanding of the context of the information system, and the process that the Information System influences and is influenced by the context (Myers, 1997).

Critical realism research is a philosophical perspective that is based on the notion that liberation can only be achieved by improving the historical, cultural, socio-economic, or political causes of social inequalities and injustices that are produced or reproduced by people (Myers, 1997). Critical realism research is seen as being one of social critique where the restrictive and alienating conditions of the status quo are brought into question (Klein and Myers, 1999). Most of the research in critical realism has been conducted from an Interpretivist philosophical perspective.

An interpretive philosophical perspective has been adopted in this research study for the following reasons:

- The aim of this study was to understand a social phenomenon (i.e. the challenges of scalability and sustainability of mobile phone-based application of government services delivery) in the context of a developing country.
- There is no need to prove or disprove any hypothesis (Oates, 2006).

- There are no factors that need to be associated with the achievement of scalability and sustainability of a mobile phone-based application for government services delivery to the citizens.
- Multiple views of different stakeholders.

Therefore, the interpretive method has been adopted as the most appropriate method in this context. This is because an interpretive research methodology and data collection strategy will allow the gathering and analysis of empirical material that are critical to investigating the research question earlier asked at the beginning of this research study.

4.3 Interpretivism Research Approach in this Study

As stated earlier, this research investigates and explores how government can incorporate mobile cellular technologies to improve the provision and reach of government services. In this context, an interpretive research approach (Walsham, 1995b; Walsham, 1995a; Walsham and Sahay, 2006) is an appropriate approach to be adopted in order to understand its influences on the development and implementation of mobile ICT strategy within the social context of the society. In addition, qualitative research is more suitable for this study. This is because it allows respondents to the questions from the researcher to provide clarification, while the researcher, through close communication with interviewees, has the ability to develop a profound understanding of the situation under study. Boucaut (2001) argues that qualitative research is a very useful research method for complex situations.

In this study, the interpretive approach was adopted. This has proved very useful in the following ways:

- To study participants in their natural settings. This study involves interacting with the participants physically as well as gathering of material. This is necessary because if the participants are investigated out of their natural settings, it leads to artificial findings that are out of context.
- To highlight the role played by the researcher as an active learner who can relate the story told from the participants' points of view, rather than as an "expert" who already understands the participants' perspectives.

- To capture, observe, and explain the behaviour of participants.
- To allow an in-depth analysis of the case studies to be presented. This is necessary due to the nature of the topic.

The social reality which is created through social interaction that transcends individual motives and actions as a result of deliberate and undeliberate actions, is obtained through the assistance of interpretive approach (Burrell and Morgan, 1980). The purpose of using interpretive approaches in information systems research is mainly to formulate an understanding of social reality, the framework, and the development whereby information systems inspire and are inspired by the framework (Walsham, 1993). Various research study that have applied interpretive research include but not limited to Orlikowski (1991), (Walsham, 1993; Walsham, 1995b) and (Myers, 1994; Myers, 1998).

The research questions which were formulated in Chapter One are revisited in the next section. Following this, the research approach to this study as well as the research methodology are discussed in detail. These include the selection of the case study and issues related to the data collection.

4.4 Research Questions

The major focus of this research study is to understand how government can incorporate mobile cellular technologies to improve the provision and reach of government services. The research questions asked in this research study allowed the researcher to gather data within the scope of these questions. Roode (1993) described a process-based research framework which can be used in Information Systems. Roode (1993) argued that it is important for researchers to take into account the fundamental social nature of Information Systems when formulating researcher questions. This is due to the fact that Information Systems is a multidisciplinary field of academic inquiry, where a researcher undertakes a study of Information Systems as well as the integration with the organization in order to benefit the whole system which includes technology, people (i.e. those who use the technology), and the organization as well as the society that deploys the technology for use (Roode, 1993).

However, according to Roode (1993), the fundamental issue around Information Systems as a multi-disciplinary field of research is to stabilize the need to contribute (through Information Systems) to the attainment of the mission of the organization,

with the moral obligation to develop and implement Information Systems that are socially acceptable.

Therefore, the most appropriate research questions for this research study were generated based on the description of a process-based research framework for information systems by Roode (1993) through following the set of four generic research questions proposed by Roode (1993), according to Figure 4.1 below.

	What is?	
How does?	Research study problem statement Teaching situation Information System development	Why is?
	How should?	

**Figure 4.1: Process-based Research Framework for Information Systems Research:
Adapted from Roode (1993)**

However, there is one main research Question with six subsidiary questions:

How can the government incorporate the use of mobile cellular technologies to improve the provision and reach of government services?

- How can governments deliver services effectively through the use of mobile technologies such that people will use the technology they already have (i.e. mobile phones) to access government service(s) in a way that adds value to the lives of the citizens?
- What are the factors that are preventing the implementation of mobile government in Africa?
- What are the factors that affect or influence the sustainability and scalability of m-government implementation?
- What technical architectures can be put in place to support integrated m-government services?

Although, this study is mixed with little quantitative research methods, the fundamental research background of this study is qualitative, dual case study which involved two separate organizations, one in South Africa and another in Nigeria. The study uses the

perspective of social constructivism to investigate the relationship between the technical elements and non-technical elements in the development and implementation of m-government system for service delivery as highlighted in section 2.5.4. The research problem also highlights the intricacy of the interface between IT strategy that leads to m-government implementation and societal development in the context of the organisation that implements it. The purpose of this thesis is, therefore, to create a better understanding of how government can incorporate the use of mobile phone technologies to improve the provision and reach of government services to the citizens.

To this end, the research questions are analysed using two interconnected (macro and micro) levels. The macro level is used to address how IT strategy that leads to technology (such as e-government, m-government) deployment for service delivery is developed and implemented within the organization that deploys it, while micro level is used to analyse the implementation of the IT strategy from the viewpoint of the institutionalization.

4.5 Research Approach

The table below provides a short list of identified research that is classified according to the aim of this study. This table only presents what can be termed as a microscopic view of some methods that have been used and/or described in various literature in Information System, and that are classified according to the aim of this research study.

Table 4.1: Typical common Information Systems Research Methods

Types of Research	Typical characteristics
Qualitative	Interpretation of research phenomenon in its context
Design Science Research	Development of new Information System artefacts.
Action Research	Achieving social change through research.

- A Qualitative Research method is very common in Information System and is used when the researcher needs an interpretation of the research outcome within a socio-cultural context and/or within an environment that will validate the research outcome. As explained by Nandhakumar and Jones (1997), from an interpretivist perspective, it is imperative to note that understanding the social phenomena always involves inter-subjective interpretation.

Denzin and Lincoln (1994) argue that the qualitative research method is multi-directional in its application to research study. This involves an interpretive and a naturalistic approach to the subject under study. This shows that qualitative researchers have the ability to study participants within their natural settings, by trying to make sense of the phenomena in relation to the meanings participants give to them. Qualitative research involves the studied collection and use of diverse experimental materials such as introspective reflections, life story interviews, observation of events, personal experiences, etc.

- Design science research is used when the aim is to develop a new Information System artefact, prototype or theory. Unlike behavioural science research which seeks to develop and verify theories that explain or predict human and organizational behaviour, design science research seeks to extend the boundaries of human and organization capabilities by creating new and/or innovative artefacts (Hevner et al., 2004). According to Hevner et al. (2004), design science research can be categorized into five different groups: observational method such as case studies and field studies, analytical methods such as static analysis and architecture analysis, experimental methods such as simulations, testing methods such as functional testing and structural testing, and descriptive methods such as informed argument and scenarios.

- Action research is used when the aim of the researcher is to bring social change through research (Avison et al., 1999). This research method involves an iterative process consisting of problem diagnosis. Action taking and reflective learning is followed in action research.

From the perspective of the discussions given above, this research study was classified as design science while action research was incorporated (Sein et al., 2011). Also, qualitative research methodology was adopted, mixed with a little quantitative analysis from the study conducted on the potential users of m-government system implementation. The adoption and mixture of these approaches enabled the development of a good understanding of issues relating to sustainability of mobile government project implementation in the socio-cultural and contextual settings of developing countries.

Furthermore, action research methods provide a probable avenue to improve the practical relevance of IS research. It also aims to solve current practical problems while expanding on scientific knowledge (Baskerville & Michael, 2004). Unlike other research methods, action research is concerned with creating social change and simultaneously studies the process (Babüroglu & Ravn, 1992).

Design science was chosen in this research study because it aims to extend the boundaries of human capabilities by developing an artefact (Simon, 1996; Hevner et al., 2004). However, the creation of such an artefact relies on existing theories, examined and extended by researchers (Markus et al., 2002).

The importance of design science research is well recognized in Information Systems literature. Benbasat and Zmud (1999) argue that information system research must be relevant by being directly related to design applicability. However, designing useful IT artefacts is intricate, due to the necessity of creative advances in specific domain areas in which theories are most often inadequate, where we do not have an established body of knowledge (Markus et al., 2002).

These domain areas, including government domains, provide better opportunities for IS researchers to make a significant contribution. This was achieved by designing new

IT artefacts of relevance and then studying their acceptance, use and continuance (Green et al., 2004). Furthermore, Benbasat and Zmud (2003) explain that the focus of information systems research should be on how to best design IT artefacts while looking for elements of compatibility, acceptability and ease of use.

When considering the outcome of design science research, there is a need to stress the importance of constructive research methods in the development of the artefacts required to established scientific rigor (Livari, 2007). Information system design science research must also be distinguished from the normal practice of developing IT artefacts (Sein et al., 2011). This is because design science should be based on a paradigmatic framework, which includes a strong ontology, epistemology and methodology (i.e. research methodology) (Livari, 2007).

South Africa and Nigeria were chosen as the contexts of this research study. The choice of these countries provides an illustration of collaboration between various stakeholders (that is, the citizens, the government and government agencies) via both internet and mobile phones with the option of mobile phones appearing to be the most viable solution, due to the reasons mentioned earlier in this thesis.

Furthermore, the rising expectation of citizens, businesses and public administration for better government service delivery in these countries has led to a serious policy debate on the possibilities of alternative channels in order to increase the governments' ability to meet the rapidly changing needs of the population (Maumbe et al., 2007).

Like many other implementations in information systems, the widespread adoption of the technology by users was not guaranteed. Therefore, this research had to confront numerous challenges and this helped to further reveal the complexity of the adoption and diffusion processes. The decision to adopt the combination of action research and design science research was taken because it offers the researcher access to a wide range of participants ranging from the executives and staff in the selected government agencies to the citizens that adopt the use of the mobile government implementation (Sein et al., 2011).

4.6 Research Methodology

This study was conducted according to a research process that uses a case study and combines interview and artefact development to investigate the research questions and to attain the research objectives. In this research study, case study was selection of a setting, where the study will be conducted. Figure 4.2 below (adapted from Oates 2006 and Sein et al., 2011) illustrates how the research techniques and/or methodologies were used in this study.

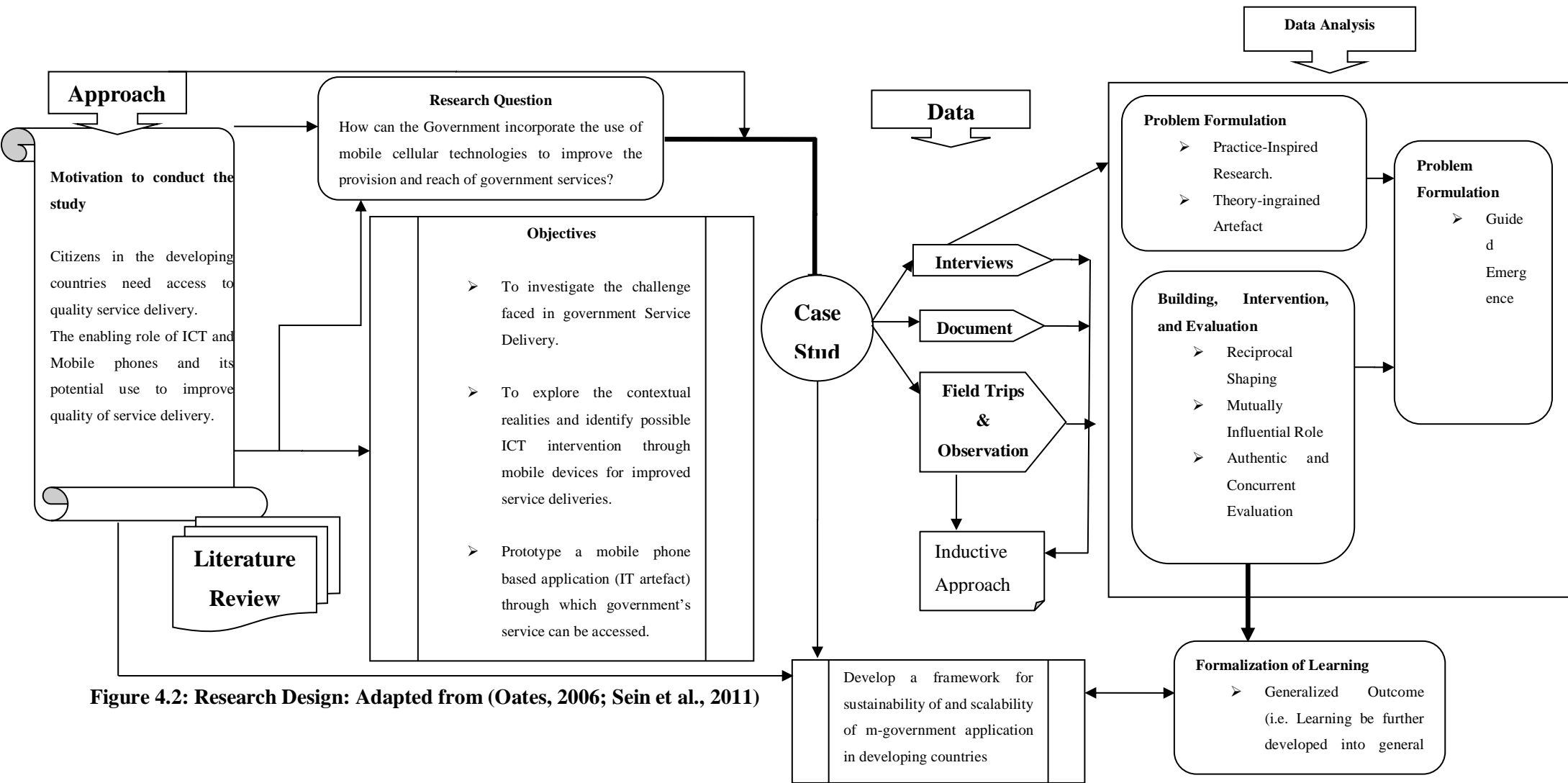


Figure 4.2: Research Design: Adapted from (Oates, 2006; Sein et al., 2011)

4.6.1 Research Strategy: Case Study

The use of case studies is an accepted research strategy in the field of information systems (Fitzgerald, 1999; Yin, 1994). Walsham (1993) argues that the case study research strategy is particularly useful because it provides the leading vehicle for research conducted in the interpretive custom. Furthermore, Lee (1989) and Galliers (1991) explain that case study strategy is suitable for problems that are practice-based whereby the understanding, knowledge and experience of the actors is significant and the context of action is critical.

A case study is an empirical inquiry that is used to investigate a contemporary phenomenon within its real-life context in order to define boundaries between phenomenon and context (Yin, 1994). Yin (1994) further explains that case study allows a researcher to conduct an investigation to retain holistic and meaningful characteristics of real-life events, for instance interaction between citizens and government agencies in this case.

This means that using a case study in Information System research is useful in a situation where contextual conditions and events that are under study are critical and also where the researcher has no control over events as they unfold. Therefore, using case study will involve specific techniques for the collection and analysis of data which should be collected from different sources while its integrity should be ensured.

Given the interpretive research paradigm that is adopted in this study as well as the nature of the research questions asked, which pursue an understanding of how government can incorporate the use of mobile cellular technologies to improve the quality of government service delivery, it is believed that the case study approach is the appropriate research strategy for this study. Furthermore, the case study method was adopted because of its advantages in creating novel and profound insights and its focus on examining the rich social and cultural influences of local adaptation (Fitzgerald, 1999) which, in this case, is due to the scalability and sustainability of m-government implementation in the context of developing country.

4.6.2 The Selection of Case Study Site:

A case study approach has been identified as the suitable research strategy to describe m-government implementation at the Department of Social Development in South Africa and Board of Internal Revenue (BIR), Cross River State in Nigeria. Two case studies were conducted. The first was at the South Africa Department of Social Development through its agency called the South Africa Social Security Agency (SASSA) which is in the process of adopting (implementing) an m-government system. The second case study was concerned with the implementation of an m-government initiative in Cross River State, Nigeria in the area of Tax revenue collection. The same process was followed throughout the research process that was conducted in the two case studies sites.

The selection of these cases was based on the following criteria. These are government organizations that are committed to service delivery in South Africa and Nigeria using various technologies and, recently, were in the process of implementing an ICT/IS-based m-government initiatives. These are also the agencies of government that provide essential services that majority of the citizens require most from the government. Their services are essential given the myriad challenges faced by the citizens of these countries. Another reason for the selection of these agencies for the case studies was a matter of access.

Research access was not easy to obtain. There are difficulties in obtaining access to both private and public organisations when investigating organisational and internal issues as this could undermine “the interests of the powerful” (Flower, 1996). For instance, in the process of conducting the initial study, more than ten organisations were approached, but only the above-mentioned responded positively.

4.6.3 Data Collection

It is recommended to have several methods of data collection in a qualitative study (Baskerville, 1999). It is also the responsibility of the researcher to choose the most suitable methods for the given research phenomenon, context cases, and research questions (Marshall and Rossman, 2006). Therefore, in this research study, data collection was done through both primary and secondary sources. The primary data

sources included key informants for each case study: South Africa’s Department of Social Development, and the Nigeria’s Board of Internal Revenue Collection Service. The following qualitative methods were used to collect data that were analysed for this research: interviews and interview questionnaires, document analysis, field trips, and observations. A description of these data collection methods and how they were used in this research study follows.

4.5.3.1 Interviews

Interviewing of subjects is one of the most common methods of data collection in qualitative research techniques of all kinds (Myers and Newman, 2006). The general questions that arise in the process leading to interviews concern who to interview and how many interviews should be conducted. However Pare (2004) recommends that the + of unit of analysis and the overall tenacity of the case study should direct the decisions made with regard to sampling. A number of sampling strategies have been suggested in the literature to guide interviewee selection. Table 4.2, sourced from Patton (2002), provides some common sampling strategies that are used in case study research. This was the primary source of data collection in this study. According to Myers and Newman (2006), there are three types of qualitative interviews. These are structured interviews, unstructured interviews and group interview. In a structured interview, there is an entire script which the researcher has prepared in advance (Myers and Newman, 2006). In unstructured or semi-structured interview, the script is not a complete script but the researcher may have prepared some questions in advance of the interview schedule (Myers and Newman, 2006).

Table 4.2: Sampling Strategies for Case Study Research Source: Patton (2002)

Information Sampling Strategy	Purpose
Maximum variations	Documents diverse variations and identifies important common patterns
Homogenous	Focuses, reduces, simplifies; facilitates group interviews
Chain or Snowball	Identifies cases of interest from people who know people who know what cases are information-rich
Purposeful	Select information-rich cases strategically and purposefully; selected type and number of cases selected depends on study purpose and resources
Emergent or Opportunistic	Following new leads during fieldwork; taking advantage of the unexpected flexibility.

Group interviews, on the other hand, consist of a situation where two or more people are interviewed at once; this type of interview can be structured or unstructured (Myers and Newman, 2006). This study employed the use of semi-structured interviews to access the state of the adoption of mobile among the citizens and also to gain their awareness of the challenges faced in accessing government service and the rate of m-government adoption. This is because semi-structured interviews contain the features of both structured and unstructured interviews. However, it is important to be consistent with all the participants while using this interview method. In order to do this, a set of pre-planned core questions for guidance was prepared, such that the same areas are covered with each participant and, as the participants' progress, opportunities were given to elaborate or provide more relevant information as the need may occur.

All the participants interviewed in this research study were selected due to their expression of willingness to participate in the study and their propinquity to assist in data gathering efforts and minimize costs. An introductory letter which was obtained from the faculty authority was first sent to seek approval, to identify as well as to secure participants' participation. Following this, a combination of phone calls and e-mails were used as a follow-up method to arrange an interview. A total of 30 people were interviewed from the first organization (i.e. SASSA) and a total of 42 people were interviewed from the second organization (i.e. BIR).

4.5.3.2 The Interview Process

Most the interviews in this study were conducted in person while a few of the interviews were conducted via Skype due to the location and time of the interview. The length of the interview ranged from 45 minutes to 1 hour 30 minutes. Prior to the commencement of each interview, the researcher asked the interviewees for his/her permission to tape-record the interview. 8 of the interviewees declined this request, the reason being the security of their job, although written and verbal assurance regarding the protection of their identities were provided. In the case of the eight interviews, notes were taken during the process. In the case of taped interviews, some of the respondents advised that the tape recorder should be turned off when they considered their responses to be politically sensitive. This happened on several occasions when they were discussing the role of the political leaders of their country in the process leading to adoption and implementation of m-government.

4.5.3.3 The Interview Instruments

The instruments that were used during the interviews were prepared on the basis of the theoretical underpinnings that were described in Chapter 3. These comprised open-ended questions to solicit the opinions of the participants about the study objectives. Before the interviews, the instruments were e-mailed to the participants through their representative from the organization in order to afford them the opportunity to be prepared. The instruments were presented, again, during the interviews, so that they could be reminded to cover all the factors. As stated earlier, interviews followed a semi-structured fashion. This is due to the various perspectives of the participants. It is important to note that the contents of the interviews were altered and changed slightly as the researcher discovered various factors. This is because of the intersection of the data analysis and data collection when utilizing the semi-structured interview. The original interview instrument that acted as a guide is provided in Appendix C.

4.5.3.4 Field Trips and Observations

Field trips and observations contribute towards obtaining direct interaction with the context and the research phenomenon. Oates (2006), argues that observation is an important key to data collection methodology in qualitative research. She argues further that observation is particularly important in collecting data in a situation where a researcher is using other senses to understand a phenomenon provided rather than just reliable information about the phenomenon. In this research study, field trips and observation were used for the assessment of mobile phone and m-government applications. These were used to evaluate the assessment of mobile phone and mobile phone applications usage in the context of developing countries. The ease of use of m-government applications and the effectiveness of their use were also assessed through observation.

During the field trips and observations, the researcher observed how the citizens in Nigeria and South Africa use their mobile phones. This was done by observing the “bottom of the pyramid” citizens in the remote areas where there is internet connection; the process took seven days to complete. Questions were also asked on their perception of mobile phone and mobile government implementation. This was done using a questionnaire which helps in conducting an evaluation of the developing country

context and in assessing mobile phone and mobile phone applications use. Also, this contributes towards getting hands-on experience and direct interactions with the developing country context as well as with the research phenomena (Oates, 2006). The ease of use of mobile phone and mobile applications, the effectiveness of the training and usage process of the prototyped artefact (more information about this will be provided in Chapter Six) were also accessed through observation conducted in this research study. The sites where this took place were Umgungundlovu district in KwaZulu-Natal Province, Cofimvaba and Queenstown in Eastern Cape Province, Soshanguve in Gauteng Province, all in South Africa, as well as in Calabar in Cross River State in Nigeria. The above described data collection strategies were used to gather information that was critical in answering the research question earlier asked in this dissertation.

4.7 Action Design Research as a Choice - Motivation

Sein et al. (2011) argue that in a social and organizational setting, the core of the Information Systems discipline is the IT artefact. To this end, one of the focuses of this research study was on artefacts as ensemble artefacts. Ensemble artefacts can be defined as the material and organizational features that are socially recognized as bundles of hardware and/or software (Orlikowski and Lacono, 2001). Sein et al. (2011) argue further that this definition signals a “technology as structure” view of the ensemble artefact where structure of the organization is inscribed into the artefact during its development and use (Orlikowski and Lacono, 2001).

Design research seeks to develop prescriptive design knowledge through the development and evaluation of innovative IT artefacts that are intended to solve an identified class of problems (Hevner et al., 2004; Sein et al., 2011; March and Smith, 1995). The result of design science research includes innovation and knowledge about creating other instances of artefacts that belong to the same class (Sein et al., 2011).

Existing design research methods (Nunamaker et al., 1991; Peffers et al., 2008; Walls et al., 1992) suggest the phase-gate process (Cooper et al., 2002) that necessitates progressing from problems to goals to conceptualizations to design and to evaluation of the innovative artefacts to assesses whether the outcomes serve its purpose.

This process separates building from evaluating and does not meet the needs of a research method that has built-in relevant research relevance and rigor cycles for designing innovative ensemble artefacts (Sein et al., 2011). However, in order to expand and enhance this approach, another research approach that has organization intervention at its very heart, namely Action Research, is needed (Sein et al., 2011). Action research combines theory generation with researcher intervention to solve immediate organizational problem. Therefore, action research aims to link theory with practice, and thinking with doing, together with an iterative process that is based on working hypothesis refined over cycles of inquiry (Susman, 1983; Sein et al., 2011).

Given these characteristics, (Sein et al., 2007; Sein et al., 2011) argue that the idea of cross-fertilization between action research and design research is imperative and Iivari (2007) proposes a two-step process: first, by designing an IT artefact through design research and then evaluating the artefact by implementing it in an organization through an action research project. This process recognizes that artefacts emerge from interaction with the organizational context even when the initial design is guided by the researchers' intent and it is known as Action Design Research (ADR) (Sein et al., 2011). Although the implementation through design science was carried out in the societal context, this research was conducted in an organizational context, such that it sought to answer the research question on how the government as an organization can improve the quality of service delivery through the use of mobile technologies. However, this can only be done with the aim that the society (i.e. the citizens) will be the end-user of the m-government implementation.

4.7.1 Action Design Research Process in this Study

According to Sein et al (2011:40) “*action design research is a research method for generating prescriptive design knowledge through building and evaluating ensemble IT artefacts in an organizational setting*”. It also deals with two different challenges: (1) finding solutions to a problem situation faced by a specific organizational setting (SASSA and FIR as earlier mentioned and others such as the Department of Home Affairs) by intervening and evaluating; and (2) developing and evaluating an IT artefact that solves the class of problems typified by the encountered situation (The m-government system implementation in the context of this research study and the evaluation were conducted in the KZN, Eastern Cape, Western Cape and Gauteng as

well as Cross River communities). The responses demanded by these challenges result in a method that focuses on the building, intervention, and evaluation of an artefact that reflects not only the theoretical precursors and intent of the researchers but also the influence of users and ongoing use in context.

Furthermore, the focus of action design research is to assemble artefacts, and due to this, it deals with certain important issues. First is that evaluation efforts cannot follow building in a sequence as suggested in prior, phase-gate models of design research. Second, controlled evaluation efforts are difficult to design and conduct. Finally, innovation must be defined for the class of systems typified by the ensemble artefact (Sein et al., 2011).

Sein et al. (2011), argue that there are four stages in the action design research method. These stages are followed as part of the research methodologies that were used in this study. These are (1) Problem formulation (2) Building, Intervention and Evaluation (3) Reflection and Learning (4) Formalization of learning. Brief explanations of these stages are given below:

The problem formulation stage is perceived by the researcher and provides the impetus for formulating the research effort. The input for this formulation come from practitioners, end-users, the researchers, existing technologies and/or review of previous research coupled with some empirical investigation of the problem. This stage includes determining the initial scope and formulating the initial research question. It also draws on two principles which are practice-inspired research and the theory of ingrained artefact. The former emphasizes viewing problem as knowledge-creation opportunities at the intersection of organizational and technological domain while the latter emphasizes that ensemble artefacts are informed by theories (Sein et al., 2011). This stage was achieved in this study through the case study that was earlier discussed (refer to the case study in section 4.5.1).

The Building, Intervention and Evaluation stage uses the problem framing and theoretical premises adopted in stage one. This stage provided a platform for generating the initial artefact in this research study, which is shaped further by organizational use.

This stage was carried out as an iterative process in a target environment (Sein et al., 2011). Please note that evaluation will be discussed in full in Chapter Six.

The Reflection and Learning stage moved conceptually from building a solution to apply that learning to a broader class of problems. This stage draws on the principle of guided emergence which emphasizes that the ensemble artefact will reflect not only on the preliminary design created by the researcher but also on the ongoing shaping by the organizational use (Sein et al., 2011). This was a continuous stage and parallels of the first two stages.

The Formalization of learning, on the other hand, is to formalize in a way that will help the researcher to outline the accomplishment realized in the IT artefact and describes the organizational outcome.

4.8 Framework Development: Methodology

As stated previously, this research study collected data through semi-structured interviews in two separate organizations i.e. from the government agency and among the citizens. The data that were collected were relevant to the design of the framework for the implementation of mobile government project for service delivery.

This study however, draws on two underpinning theories, namely Structuration (or Institutional Theory) theory and Actor-Network theory which have helped this research study to gain an understanding of the socio-technical factors that influence the implementation of mobile government for service delivery. This means that this study uses the concept of duality of structure and moments of translation from Structuration theory and Actor-Network Theory respectively to analyse the data that were collected.

The results from the interaction and actions of the government agencies and the citizens were captured as the factors of organizations impacting the implementation of mobile government. Furthermore, this was considered as a process that can lead to the imbalance in the implementation. The results of each case study were captured. This helped in the design of the framework for illustrating and understanding factors influencing mobile government as a vehicle of for the delivery of government services to the citizens.

Finally, the case studies were used to develop a generalized framework that can be used to understand and assist in addressing the issues of sustainability and scalability of m-government based projects and implementation for improved service delivery in the context of developing countries.

4.9 Chapter Summary

This chapter has discussed and presented the qualitative interpretive research followed in this research study. The rationale for applying these were also discussed. The research design methods that were used in addressing data collection and analysis were presented and discussed. Furthermore, the strategies that were adopted to ensure that the research was conducted ethically, as defined by the University of Cape Town, were also presented and discussed.

The case studies presentation and description are presented and discussed next in Chapter Five.

CHAPTER FIVE

CASE STUDY: PRESENTATION AND DESCRIPTION

5.1 Introduction

The purpose of this chapter is to present the two case studies that are concerned with the research. The same process was followed in these case studies; however, they were treated as separate cases. Also, both case studies are concerned with government service delivery to the citizens. The two organisations used in the case studies are the South Africa Social Security Agency (SASSA) in South Africa and the Board of Internal Revenue in Cross River State in Nigeria. The reason for using these two organizations as the case studies is because they were willing to take part in the research study and that they both have large IT departments.

The two case studies investigated the development and implementation, as well as the influencing factors, of mobile IT strategy. In particular, the focus is on how government can incorporate the use of mobile technology to enhance government service delivery as well as the impact of mobile IT strategy on government service delivery to the citizens.

The two case studies examine the opinions and understandings of different participants on mobile IT strategy and m-government implementation. Furthermore, the study investigates who are the actors involved in the development and implementation of the mobile IT strategy; what are the critical success factors that affect the initiatives of the strategy; what are the challenges encountered during implementation of mobile IT strategy; what are the change management processes followed during the implementation of mobile IT strategy that leads to m-government implementation, what are the resources available for proper functioning of the mobile IT implementation; what support is available from the senior management of the organization; what are the performance monitoring put in place and how has it worked; and what are the organization cultures towards the implementation of m-government system and the perceptions the employees within the computing unit have of mobile IT strategy and m-government implementation.

This chapter is structured into four main sections. The first section covers the field study as it applies to both case studies. In the second section, the two case study organisations are described, including their structures and their IT departments. The third section describes each of the case studies.

5.2 The Field Study and Field Work

The case study approach adopted in this research study is based on the case study research methodology earlier described in Chapter Four. The discussion in this section is centered on the research sites and the process of data gathering for this research study in each of the case studies. The data was gathered in the IT environment of the two organisations.

During the field study, data gathering for the two case studies took place within the organisations' sites from August 2014 to April 2015. In the first case study, which is SASSA, the fieldwork was conducted in the four strategic and operational areas in the computing unit, at the head office, where the IT department is situated. The data gathering commenced in August 2014 and lasted four months.

In the second case study, which is the BIR, the data gathering was also conducted at the head office of the organisation. The IT department is located at the head office of the organisation in Cross River, Nigeria. The data gathering started in December 2014, while it took four months to complete.

During the data gathering, questionnaires were administered and individual semi-structured interviews were conducted. This involved group discussions as well as secondary sources, like documentation. In this case study, parts of the interviews were conducted with a group of eight participants. In both case studies, the interviews were pre-organised and conducted at the chosen time and location of the interviewees. These locations were usually the offices of the participants. The researcher consistently adhered to specific interview guidelines for each of the case studies.

At SASSA, the Chief Information Officer (CIO) introduced the researcher to one of the functional managers. The functional manager then introduced the researcher to the general staff members and requested them to cooperate with the researcher and they

did. At FIR, the senior IT managers performed the introduction of the researcher to the staff. He also arranged all the appointments that took place with all the staff that were identified.

The initial interviews were conducted with the team lead, which were followed by subsequent interviews with staff that were directly responsible for the different functions in each of the department within the IT unit. The interviewees comprised of managers and other staff members. The interview sessions normal began with the introduction of the objectives, aims and scope of the scope of the research study. The interview was conducted in English and there were no language barriers. Following this was the explanation by the researcher regarding the non-disclosure of the interviewee's personal credentials. The researcher made this clear at the commencement of each interview so that the interviewee would be relaxed and freely express him/herself. The details of both organisational and personal observations, views regarding challenges and solutions regarding the use of mobile technologies within the organization were given by the interviewees.

The explanation about the functions of each department including individual staff, challenges being faced by the organization and how these can be addressed in the development and implementation of Mobile IT strategy within the IT environment of the organisations was provided by the interviewees. These were mapped to the challenges faced by the organization with regards to the use of mobile technologies to deliver service to the citizens.

The researcher recorded and transcribed the interviews. After the interviews were transcribed, they were sent to the interviewees by the researcher. The purpose of sending the transcribed interviews to the interviewees was so that the interviewees can confirm the authentication and correctness of the information provided during the interview. This is also for the purpose of rectifying any mistakes and make suggestions where possible. The interviewees provided confirmation to the researcher that all transcribed interviews were true productions of the interviews that were granted. However, more information was added to the interview by two of the interviewees at FIR. They requested permission to do this and the permission was granted.

Furthermore, this research study also used other research materials as secondary sources. Documents about mobile ICT strategic alignment, IT strategy and organisational structure therefore, form part of the case studies. The purpose of using these secondary materials was to gather strong background information on the human and non-human side of the research site. This assisted in constructing the historical background of each ICT environment.

The field study at SASSA commenced in August 2014 and was completed within four months. Interviews were conducted with the key people that were identified in the organization's IT department. Also, analysis of secondary documents was conducted and this gave the researcher an opportunity to identify the organisation's approach to IT strategic alignment with the organization's missions and objectives, and to discover several influencing factors.

Interviewees were fully open about expressing their views and opinions on how IT strategy is developed and implemented within the organization. Most of the interviews that were scheduled to last for one hour each ultimately lasted for about two and half hours each. Only one interview meeting was cancelled and this was rescheduled. Generally, interviewees were excited and expressed willingness to be interviewed.

Staff members from different units of SASSA's IT department were interviewed. The interviewees were of different levels of seniority. In total, twenty-one (21) individuals were interviewed and five meetings were held. The employees interviewed hold titles which include:

- i. Chief Information Officer
- ii. IT Architects
- iii. Technical Support Specialists
- iv. IT Senior Managers
- v. Project Managers

The research source used as secondary materials included:

- i. Strategic documentation (e.g., IT strategy 2012).
- ii. Technical reports and documentation (e.g., IT report on infrastructure).

- iii. Internal memos and documents (e.g., Memo about Infrastructure usage).

Immediately after the field study at SASSA was completed, the second case study at the BIR IT department started.

The field study at BIR started in December 2014 and was completed in April 2015. The aim of the research study was to understand the technical and non-technical issues in the development and implementation (including the influencing factors) of IT strategy in the organisation.

The organization has an IT strategy, which has both short-term (annual) and long-term (three to five year) goals and objectives. At the end of each year, the IT strategy is formulated for the next year and then reviewed for the longer-term.

The interviews of the staff identified took place at FIR head office, where the IT department is situated. In total, twenty-four (24) interviews were conducted with twenty-six (26) people. Similar to the SASSA's case study, the interviewees were also on various levels of seniority and race group was also not taken into consideration for the same reason that was earlier stated. Each interview lasted an average of two hours.

The employees interviewed hold titles which include:

- i. IT Senior Managers
- ii. Software Developers
- iii. Business Analysts
- iv. Software Testers
- v. Technical Support Specialists
- vi. Project Managers

For the FIR's case, the secondary source materials that were used included:

- i. Documentation and reports (e.g., organizational financial report)
- ii. Strategic documentation (e.g., IT strategy roadmap).
- iii. Internal documents and memos (e.g., memos from IT management to staff members)

At least one person was interviewed from each section of the IT department with FIR. Notes were taken down during the interviews. These notes formed the initial confirmation of the data gathered during the interviews.

Through the interviews, the researcher was able to gain a comprehensive understanding of the role of the IT department within the organisation as well as the role the organization played within the society in terms of service delivery through its IT department. Furthermore, the interviews assisted the researcher to gain an understanding of the roles of each individual in developing and implementing mobile IT strategy within the organisation that will assist in delivering service to the citizens.

As with SASSA, the participants of the interviews embraced the opportunity to share their opinions and views on how IT strategy is developed and implemented. This was manifested when a staff member who was not on the original list of the interviewees expressed willingness to participate in the interview. The person was included in one of the interviews that was conducted as a group interview. Unlike the case of SASSA, no interview meeting was cancelled or rescheduled. Table 5.1 below provides summaries of the above details.

Table 5.1: Summary of data gathering procedure in the case studies

	SASSA	FIR
Location of the case study	Organization head, Pretoria South Africa	Organization Head, Cross River State, Nigeria
Duration of the study	August 2014 – December 2014	December 2014 – April 2015
Source of Data collection	<p>Primary Sources:</p> <ul style="list-style-type: none"> i. Questionnaire (40) ii. Individual Interviews (21) iii. Meetings (5) <p>Secondary Sources:</p> <ul style="list-style-type: none"> i. Organizational structure chat ii. Technical documents iii. Organization website iv. Annual reports v. Technical documents vi. Strategic documents 	<p>Primary Sources:</p> <ul style="list-style-type: none"> i. Questionnaire (42) ii. Individual Interviews (26) iii. Meetings (7) <p>Secondary Sources:</p> <ul style="list-style-type: none"> Annual report Organization website Technical document
Communication Language	<ul style="list-style-type: none"> i. English was the language of communication for all interviews ii. All documentation were in English 	<ul style="list-style-type: none"> i. English was the language of communication for all interviews ii. All documentation were in English

The description of each case study, starting with SASSA is provided in the next sections. Limited documentation was shared with the researcher by participants from both case studies. The reason for this was that participants considered some documentation to be too confidential for the study.

5.3 Description of the Organizational Case Studies

The background information about the two case studies is provided in this section. Specific emphasis on the respective IT sections within the organizations.

5.3.1 SASSA Case Study

The main aim of this study was to explore ways that the government can use mobile technologies to improve the provision of government services. The research question enabled the researcher to gather data within this scope and also focussed on the following important areas: project management, project scope, project resources, pre-project planning, project scope, mobile IT strategy development, definition, and implementation.

SASSA is a South African state owned agency, established in April 2005 through the South African Social Security Agency Act no. 9 of 2004. SASSA operates with its head office in Pretoria and operating offices across the nine (9) provinces of South Africa. Figure 5.1 below provides the national organizational structure of SASSA, which illustrates that the head office is the central point. The main purpose of SASSA is the management, administration and payment of social security grants and services. Due to this, the responsibility for the management, administration and payment of social assistance grants was transferred to SASSA.

5.3.2 Challenges in the Current Social Assistance Management System

Despite all the ground gained in terms of making social assistance available to more and more citizens in South Africa, fundamental challenges still exist in the system and in the way payments are disbursed. There are delays in terms of capturing, validation and approval of applications. These are caused by a number of factors such as the lack of sufficient human resources due to a high vacancy rate. However, during one of the interviews, it was mentioned that sourcing third party partners is a useful step that has been taken on many occasions, and, most importantly, that there is a lack of technological resources which has caused a large number of backlogs. This has caused delays in payment processing.

Due to this, a great deal of effort has been made by SASSA to put in place an Information Technology department in order to assist in alleviating the challenges of

approving applications and of payment disbursements. However, SASSA has yet to take the full advantage provided by mobile technology by implementing mobile government system.



Figure 5.1: SASSA National Organizational Structure

5.3.3 SASSA IT Department

The Information Technology (IT) department is centralised at the organisation’s head office. The IT department has quite a number of employees, consisting mostly permanent staff. The IT department provides IT services to all business functions of the organization. The IT department also provides IT services to the citizens.

SASSA IT computing unit is structured into three different units as represented in Figure 5.2 on the next page

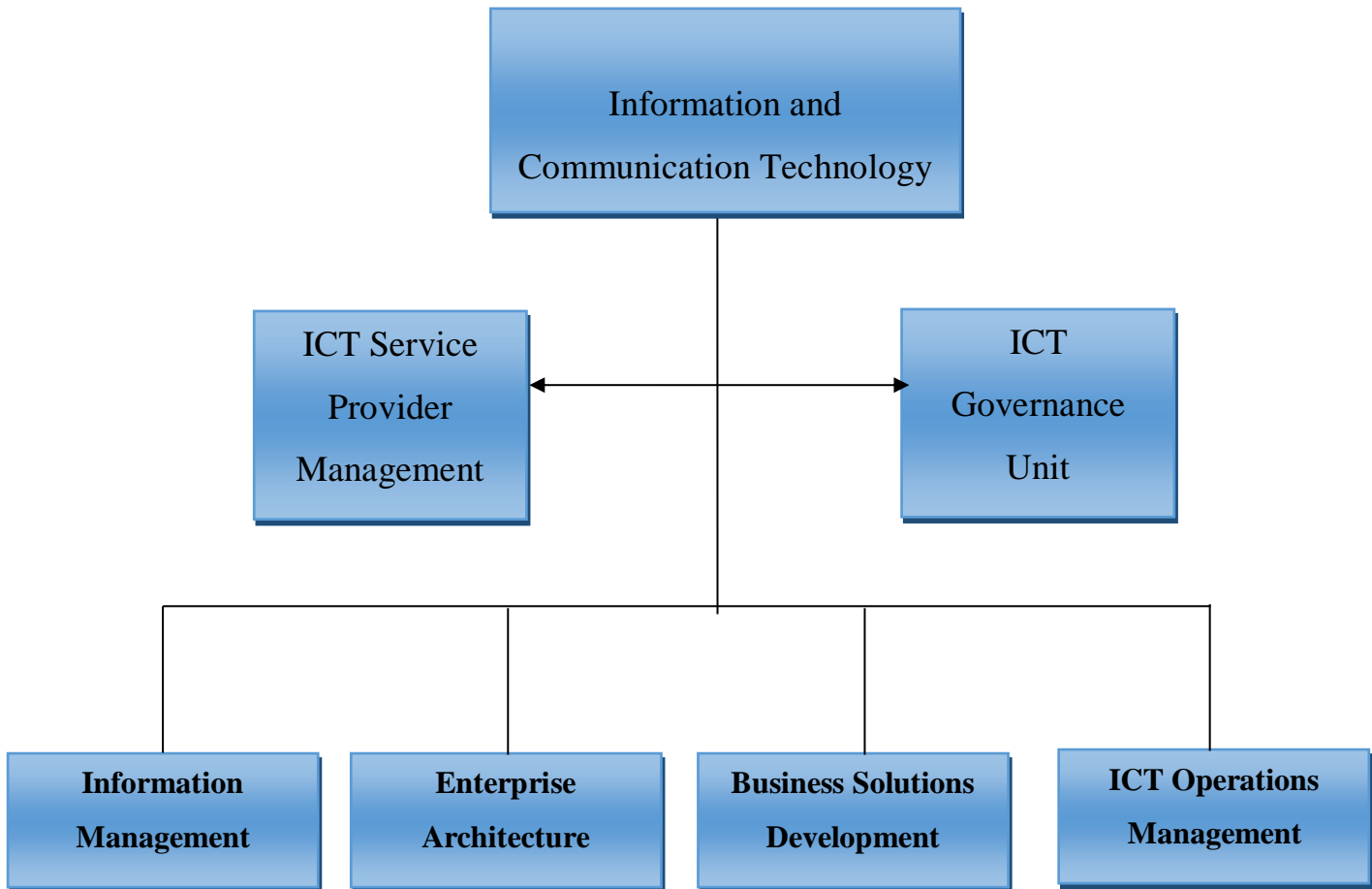


Figure 5.2: SASSA IT Organizational Structure

The role of various IT Units is described below:

5.3.3.1 The Information and Communication Technology

The ICT Unit serves as the unit that oversees all ICT related functions of the organization.

- It provides information on communication technology services. The ICT also manages information for planning.
- Develops business systems to support the organization’s operations in line with the organization’s development standards and principles.
- Manages the ICT operations of the organization pertaining to user support, systems maintenance, performance of vendor service level agreement.
- Lead the development and maintenance of ICT governance model and ICT policies and process.
- Manages service providers in accordance with service level agreement.

5.3.3.2 The ICT Service Provider Management

The ICT service provider management manages vendors in accordance with the service level agreements. The unit provides supplier management services.

5.3.3.3 The ICT Governance Unit

The ICT governance unit implements and monitors ICT governance model. It manages quality assurance and certification of compliance. The unit establishes and maintains structured testing methodologies. It develops and monitors policies and processes. It develops test plans and monitors functions of the organization in relating to the use of ICT.

The representatives of the different units within SASSA's IT environment constitute the governing body of the IT environment within SASSA. This is headed by the Chief Information Officer. The governing body is referred to as the IT Exco (IT Executive Committee). This committee reports directly to the executive committee of the organization.

5.3.4 THE BIR Case Study

5.3.4.1 Organizational Background

BIR was founded based on section 85A (1) of the Personal Income Tax Act No 104 of 1993. The basic function of the organization is spelt out in Section 85B of the same Act which is to ensure the effective and optimum collection of all taxes and penalties and other revenue due to the government under the relevant laws.

The organization focuses on corporate, commercial and personal tax collection. It has client contact centres in Calabar, Odukpani, Obubra and seventeen more centres across the state. The organization's services are aimed at utilizing world-class facilities and resources to generate revenue in an effective, efficient, honest and transparent manner in the interest of the citizens of the state.

The company relies on employees and citizens to manage its tax collection affairs. Most the organization's business transactions come from the citizens and businesses within the state.

Among other technology enabling tools, BIR currently uses the internet to allow its tax payers to electronically access the organization's tax payment support systems.

5.3.4.2 IT Unit

The computing unit at the BIR is called or referred to as IT unit. This name was adopted by the researcher in the case study.

The BIR IT unit has been given the responsibility and accountability to direct and coordinate information technology planning, including all phases of systems design, development, installation and operations. It reviews and evaluates project feasibility studies based on management's requirements and priorities, and implements the installation and operation of information systems and technology equipment. Over the years, the organisation has relied on IT for support and services of its processes and activities.

The Head of Unit (HOU) heads the IT division of the organisation. The HOU formerly known as Chief Information Officer (CIO) was a member of the executive committee of the organisation. However, the incumbent at the time of this research study was not. The HOU reports to the chairman of the organization who is the head of the Executive Committee.

As at the time of this study, about seventy-five people including the managers were employed in the IT unit of BIR. Many the employees are in the application and system development sub-unit and these include developers as well as business and systems analysts.

There are various technologies within the computing unit ranging from the Microsoft Windows operating system to a Linux platform. The computing unit hosts many business applications, which include personal income tax collections, company tax collections, and Human Resources applications. These technologies are hosted in central data centre.

The IT Unit is structured into six different units, namely, Systems Development, IT Finance, Architecture, Systems Management, IT Resources, and Infrastructure and

Network. Figure 5.3 illustrates the structure including components of each unit of the IT Unit

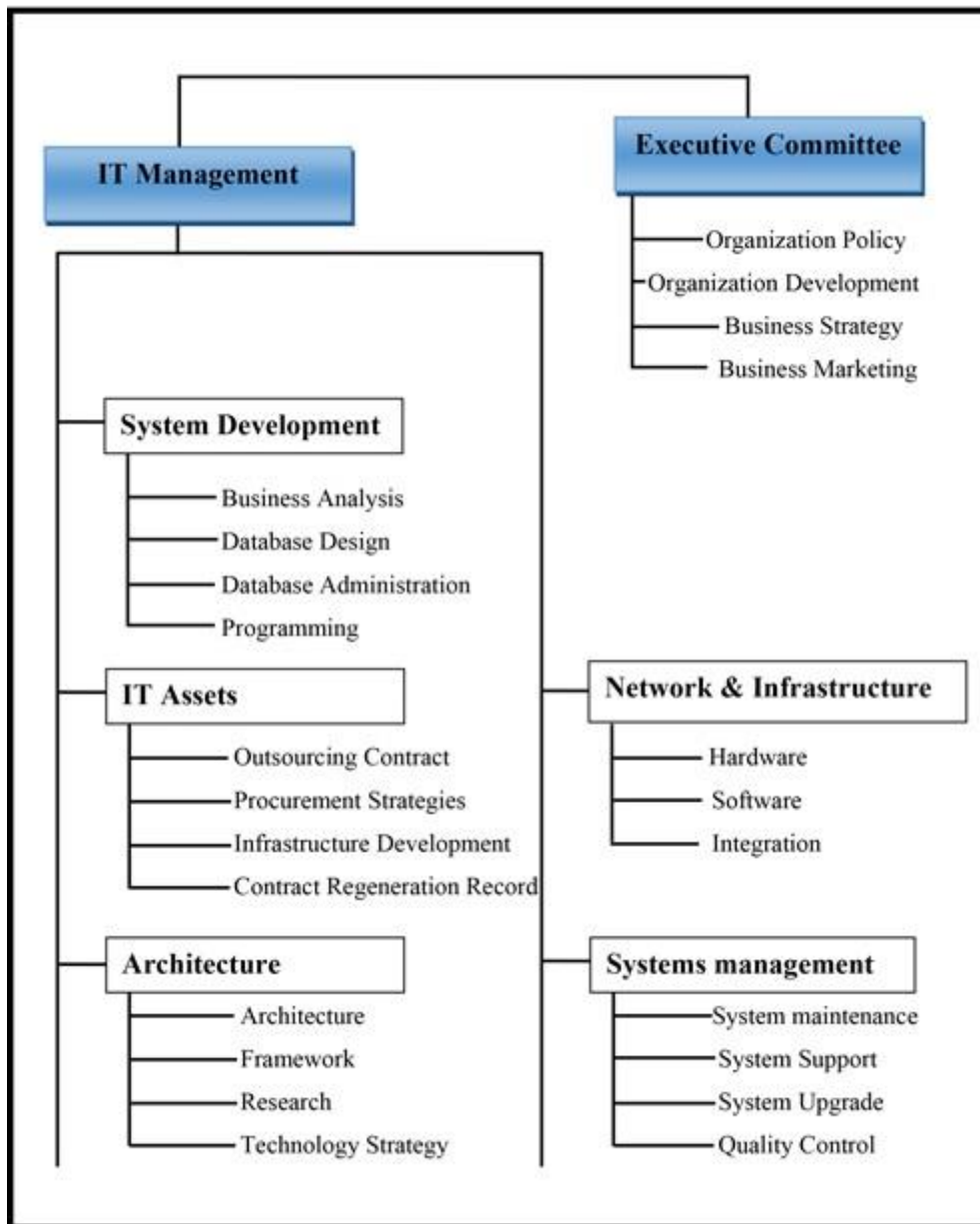


Figure 5.3: Structure of BIR IT Unit

Details about all the components of the structure are given below:

5.3.4.2.1. Executive Committee

The Executive Committee (Exco) of the BIR is the highest body that makes decisions regarding how the organisation is managed. This is headed by a chairman. The main objective of the Exco is to consider important issues raised at a business level within the organization. Every head of every unit within the organisation is automatically a member of the committee. Other responsibilities include the following:

- i. Formulate the aims and objectives of the organization.
- ii. Formulate and manage the strategy of the organization.
- iii. Provides accountability and responsible for the organizations activities.

5.3.4.2.2. IT Management

The IT Management of the BIR meets on a weekly basis to discuss, provide solution and make informed decision on IT-related infrastructure issues that influence business processes within the organisation. The head of IT Unit is represented in the Committee.

The tasks of the IT management include strategic IT development, planning and making sure that IT plans in the long-term are aligned to the success of the unit objectives which includes the following:

- i. To be recognised as the IT backbone providing professional IT services to the BIR.
- ii. Ensure IT strategic alignment with the business strategy of the organization
- iii. Develop strong and open relationships with the BIR clients at all levels of transaction
- iv. Cultivate a habit of excellence within the organization
- v. Encourage research and knowledge sharing philosophy in order to exploit latest trends in technology development.

5.3.4.2.3. System Development

This department is responsible for the design, development, implementation and maintenance of the software systems within the organization. The following are also part of the tasks of the software development sub-unit:

- Ensure that the systems problems are clearly defined. In addition to this, it ensures that the solutions to these problems are delivered in accordance with the business strategy of the organization.
- Ensure that there is a strategy in place for a quick response to technology trends as well as the needs of the clients.
- Ensure that all the systems developed meet quality system as first time, through putting in place organizational standards and systems development life cycle.

5.3.4.2.4. IT Assets

This is the sub-unit that is tasked with the responsibility of managing the relationship between the IT procedures and actions within the organisation. This responsibility includes problem solving, raising awareness, decision-making and others such as:

- i. Igniting human capital
- ii. Develop IT leadership skills
- iii. Develop information capital
- iv. Optimise sourcing capacity

5.3.4.2.5. Architecture

The responsibility of the architecture sub-unit is concerned with all the issues related to technologies such as design, deployment, selection, principles and policies and standards within the organization. Others responsibilities of this sub-unit include the following:

- i. Augment activities within the IT Unit to provide adequate support for the organizational strategy
- ii. Provide solutions that are aligned to BIR's strategic business requirements
- iii. Present innovative technology that generates value for the BIR's business
- iv. Develop framework for alignment and contract
- v. Develop strategy to align IT and information architecture to the organization's strategy
- vi. Conduct research and development related to IT for the benefit of organization business benefit
- vii. Recommend new technologies for the organisation's business.

5.3.4.2.6. Network and Infrastructure

The Network and Infrastructure sub-unit is responsible for the management of IT infrastructure and is also responsible for the development of cost effective and robust shared infrastructure through the introduction and implementation of technology solutions to:

- i. Make sure that there is efficiency of system in production
- ii. Improve support of the systems that are in production for the purpose of the business
- iii. Ensure that the systems used for the day to day operation of BIR's business is available every time

5.3.4.2.7. Systems Management

The Systems Management sub-unit provides the required technical support for the organization which includes maintaining the systems that are deployed in the computing unit within the organisation. In addition to this, the sub-unit is tasked with the following:

- i. Constant improvement in terms of maintenance and upgrade (where applicable) of the systems in production
- ii. Technical Optimisation

According to the IT manager in the unit, each of the above sub-units is autonomous in what they do. The manager explained further that communication collaboration exists between the sub-units.

5.4 Chapter Summary

The discussion in this chapter presented the two cases studies both in South Africa and Nigeria respectively. The focus of these case studies was on the IT and computing units. In the research process of these case studies, many similarities were noted by the researcher.

The next chapter presents the analysis of the case studies which informs the findings and results.

CHAPTER SIX

ANALYSIS OF THE CASE STUDIES: FINDINGS AND RESULTS

6.1 Introduction

Based on the data collection from the case studies presented in Chapter Five, this chapter discusses the analysis of the two case studies described in Chapter Five. This analysis is done on two levels. These are based on the Giddens' Structuration Theory and Actor-Network Theory perspectives, respectively, and are described through examining the relationship between the dynamics of the development and implementation of m-government project in the contexts of the two case studies. As stated earlier, IT strategy development (formulation) and implementation (translating the strategy to a working system) is key in m-government system implementation for enhancing the quality of government service delivery. Therefore, the development and implementation of ICT strategy is studied through the duality of structure and moments of translation concepts from Structuration theory and ANT, respectively. Furthermore, this chapter presents an overview of some additional study findings in the two case studies in both Nigeria and South Africa.

The chapter is divided into five sections. The first section discusses the concepts applied in the analysis. The second section presents the analysis of the case studies from the perspectives of Giddens' Structuration Theory and Actor-Network Theory. The third section discusses the analysis from the different case studies for the research study (i.e. analysis of SASSA and BIR) while the fourth section discusses analysis of the results from the Critical Success Factors (CSFs). The fifth section discussed the observation and lessons learnt from the study of factors affecting the scalability and sustainability of M-government Project Implementation and the last section draws conclusions from the analysis of the case studies.

6.2 Analysis of the Case Studies

This section discusses the components of Structuration theory and Actor-Network theory with respect to their application in the analysis of the case studies.

This research study focuses on exploring ways government can enhance service delivery using mobile technologies. Therefore, in both case studies, the study of some Critical Success Factors (CSFs) that can assist in implementing m-government system was conducted. ICT strategy development was conducted behind closed doors. It was gathered that the majority of the employees of the organizations do not completely understand the development of this CSF in their organization. As a result, they found it somewhat difficult to make meaningful contributions about the development of CSF during the interviews.

6.2.1 Perspective from Structuration Theory

Section 3.2 presented an overview of Structuration Theory (ST). This section revisits some aspects of the theory and focuses more on the exact purpose of applying Structuration theory in the case studies. The purpose of the first level of analysis is to gain an understanding of the social context in which the CSFs are developed and implemented in the process of executing m-government project. This analysis makes use of Structuration theory, and focuses on the development of regularities of the situation through the application of Giddens' measurement of duality of structure (See Figure 3.1).

The upper level of analysis of these case studies takes into consideration the environment in which the CSFs are established and applied. Internal and external factors and the demands of the larger organisational and human (social) circumstances influenced the settings of the case studies in the SASSA and BIR mobile computing units. The analysis is based on the concept of Giddens' duality of structure, which was discussed in Chapter Three.

An understanding of the development and implementation of m-government system within an organisation shows that it makes sense to engage in mobile technology initiatives in the human and non-human (technological) contexts. The case studies at SASSA and BIR focused on factors such as organisational politics, which influence the technology and organisation, groups of individuals and their organisational activities and tasks, their philosophical viewpoints on work as well as the infrastructure and ICT strategy.

Therefore, using Structuration Theory, the analysis of the two case studies focused on two main areas:

1. The mobile ICT strategy: analysis of the interaction or social practice involving the development and implementation of m-government system implementation.
2. Influencing factors i.e. the Critical Success Factors (CSFs): analysis of how this social practice is influenced by certain CSFs.

This analysis using Structuration Theory was followed by the Actor-Network analysis

6.2.2 Perspective from Actor-Network Theory

The overview of Actor-Network Theory (ANT) was discussed and presented in section 3.3. This section provides a revision of some aspects of ANT and emphasis is placed on the particular purpose of applying ANT in the case studies.

The purpose of the second level of analysis was to have an understanding of the level of the factors affecting the development and implementation of m-government system in developing countries. Furthermore, ANT was applied in order to acquire an understanding of the scope of influence of actors in the development and implementation of m-government system. In terms of ANT, this occurs through processes of translation. Actors can be defined as all objects that have the capability to connect humans, texts, money, etc., in order to form a domain that is filled with other entities while creating their own identity, history, and relations (Callon, 1991). In this context, actors are seen as objects that have the ability to influence, constrain or facilitate action.

The case study analysis that was conducted from the perspective of ANT references the sociology of translation. The emphasis, however, is on how the actor-network matures, changes and steadies during development and implementation of ICT strategy which eventually leads to the development and implementation of m-government systems, which is precisely observed in the context of the computing unit of each of the case studies. Due to this, each case study is analysed based on the four moments of translation. In brief, the moments of translation (i.e. problematization, interessement, enrolment and mobilisation) discussed in Chapter 3 (see Section 3.3.1.1) can be summarized as follows: (See Section 3.3.1.1).

Problematization: a principal actor analyses the situation, defines and explains the problem and recommends a solution as a Mandatory Point of Passage (MPP; sometimes referred to as the Obligatory Point of Passage/OPP) This means that resolution to the problem can only be discussed through the MPP.

Interessement: at this stage, other actors develop an interest in the recommended solution. Their affiliation is changed to a certain group in favour of the actor that was recently inducted.

Enrolment: at this stage, the solution will be accepted and a new network of allied interests starts as soon as the actors accept the roles defined for them.

Mobilisation: the new network begins operation in a target-focused way in order to implement the recommended solution, and develops as actors are mobilised to act as “secondary principal actors”.

6.3 Case Study Analysis: SASSA

In this section, the SASSA case study is analysed. Section 6.3.1 presents the case study analysis through the perspective of Structuration Theory while section 6.3.2 presents the case study analysis through the perspective of Actor-Network Theory.

6.3.1 SASSA Case Study Analysis through Structuration Theory

The computing unit at SASSA is organized as a hierarchical system. All the activities take place in the hierarchical system and are managed by individuals and groups (i.e. units) of employees. Responsibilities are bestowed based on the rules and regulations of the organisation. Within the IT department of SASSA, there are guiding processes and procedures as well as rules and regulations, which are required to be adhered to by all employees within the organisational structures. The IT executive committee develops these guidelines, which are enforced and all employees including the managers are expected to observe and obey them.

6.3.1.1 Agents

Agents are closely linked together with guidelines and available resources. Within these guidelines, the resources available are used. In the computing unit at SASSA, the

employees involved in the development of the IT (which also includes ICT) strategy included the CIO, IT Architects and IT managers. As explained by the CIO:

“The employees as well as the offices that are responsible for defining the IT strategy include the Chief Information officer (CIO), Chief Technology Officer the Architects, and the IT managers”.

However, it was discovered that the employees that are responsible for the development of the IT strategy are not automatically responsible for the implementation of the same strategy within the organisation. The employees who implement the IT strategy include IT technical staff, IT users (employees), IT managers, and IT architects.

The IT managers make the final decisions (regarding the implementation of particular IT/ICT systems. This also includes the m-government system) within their various units in the computing unit of SASSA. For instance, the CTO makes the final decision on issues related to the m-government project. The organization has realized that the m-government system implementation project is one of the technology projects that is dictated by the ICT strategy. However, due to the lack of proper direction of this agent, the organization has not kick-started this project and, due to the importance of this project, many agents have been brought together to participate in its development and implementation. In explaining who is part of the m-government implementation process and how it gets started, one of the interviewees explained that:

“All the IT managers are brought together in a meeting and we start the process and then after two days another meeting is conveyed. This time, all of the IT employees are involved in the meeting. We basically need to understand the importance of the project at the business level, as well as within the IT environment in which the system will be implemented. We then debate various areas related to the implementation”.

The SASSA’s CIO is entrusted with the mandate to make a final decision on any issues that are not clear in the development and implementation of any IT or ICT strategy. However, the CIO also has the prerogative of delegating responsibilities for the various constituents of the strategy to the IT managers who report to him directly. The responsibilities include exploitation of resources and execution of policies.

These agents do not act in an empty space but they act within a particular structure (i.e. rules and resources). According to Giddens (1984), agency and structure are a duality that cannot be considered in isolation of each other.

6.3.1.2 Structure

The term Structure in Structuration Theory describes rules and resources that are instantiated in persistent social practice (Giddens, 1984).

Together with the resources available, SASSA has rules and regulations that serves as guidelines that assist with the development and implementation of IT (as well as ICT) strategy. The development of this strategy is done every two years and it takes place at the end of financial year. Furthermore, this is done against the requirements of the organisational for the following year. To realize this, deadlines are set and information required by employees and individuals is provided. At the end of each financial year, the CIO and some of the IT managers (those who directly report to him) meet, usually for a number of days, which is set accordingly. Some heads of other business units are invited. The following explanation was given by one of the IT managers:

“With the development of IT or ICT strategy, those who develop the strategy are employees who are saddled with the tasks and they take input from the CIO. The CIO himself takes input from the heads of all other units and this happens in line with the overall strategy (I mean the business strategy). Basically, the CIO has some people that assist him to make decision as well as those that assist him to define strategy. The mandate of the CIO comes from the SASSA as an organisation. He is then at liberty to choose whom he will like to participate in the development of the ICT strategy. What I am saying is that the CIO owns IT strategy and in line with this, [he] and those who report to him create the strategy”.

Furthermore, the available resources that are utilized in developing and implementing the IT strategy within SASSA comprise both technical and non-technical factors, for instance the technology and the people. The organisation has rules and regulations that guides the development and implementation. One of the IT managers explain as follows:

“Our process here is very organized but that does not mean it is not flexible. What we normally do is that we start the process by reviewing our business objectives against the present state of IT within SASSA. What we then do next is to define the future state of the IT. But all other units within SASSA provide inputs on this. However, the CIO office as well as the Architecture unit make the larger decision regarding IT strategy within SASSA”.

In accordance with his mandate from the organization, the CIO defines the rules within which the ICT strategy is developed and allocates tasks to the different IT managers. The practices of the development of the ICT strategy are documented by the IT managers, and there are operational practices that are followed when there is a need for change to be made. One of the IT managers that was interviewed explained as follows:

“Developing IT (and ICT) strategy within SASSA is a process that is dependent on the CIO. He is the one that perform the assessment of the ICT needs within the whole of SASSA business units and then makes the decision on the IT (ICT) strategy that will be developed and implemented to realize those needs”.

Another manager explains as follows:

“Only the CIO is mandated by SASSA to perform such function. And he has different people who perform the operational stuff; he has the power, money and he also has some leadership skills to do this”.

Furthermore, the IT (ICT) strategy that leads to the implementation of m-government system needs the approval of the CIO. However, there is a gap between those employees who develop the IT (ICT) strategy and those employees who implement IT (ICT) strategy within the organisation. The reason for this is simply due to several employees who are given the assignment of implementing the strategy are not part of those who are members of the teams in the development. Furthermore, no required structures are provided within the computing unit that can assist with successful implementation of the IT (ICT) strategy. This means that there are defined guidelines in terms of rules and regulations that can be used to aid the implementation of the IT (ICT) strategy. The team responsible for implementation only works around the

information that is painstakingly supplied by their individual managers, instead of adhering to the needs and requirements. As a result, no operational practices are in place. One of the managers explained as follows:

“Implementation is a challenging concept to understand by some employees, specifically for those who are not part of the development team

Also, appropriate technical personnel are available within the organization, but some of the units do not have enough of them. The IT managers are not experienced enough in managing implementation of IT (ICT) strategy. Another issue is that there is no awareness of technical and/or non-technical opportunities in the implementation of the IT (ICT) strategy, especially when it comes to mobile system implementation.

The CIO explains as follows:

“I do not have at my disposal a team of experienced employees that are supporting me. So, in the past I had to basically do all the facilitation and describing of the strategy. However, I have managed to create a virtual team to help me to achieve that now. I have at my disposal an Application Architect, as well as three other IT Architects. So, there are about four staffs in the virtual team who are now helping me to describe and facilitate this process”.

While development of the IT strategy within SASSA is done by the CIO and the IT managers directly reporting to him, part of the strategy to be implemented is allocated to each of the IT managers. The CIO gave instructions to the IT managers in order to impose performance contracts that can aid the implementation of the IT (ICT) strategy.

Based on the rules and regulations that serve as guidelines for developing and implementing IT strategy at SASSA, the CIO reserves the authority to allocate the available resources for the development and implementation of the IT (ICT) strategy. However, the rules allow the IT managers to make some decisions regarding some resources.

The next section discusses the shared dependency of agency and structure, as well as the link through mode of operation that exists within SASSA's computing unit.

6.3.1.3 Measurement of Duality of Structure

Due to the main purpose of analysis, human interactions and social structures in the development as well as in the implementation of IT strategy that leads to m-government systems implementation are divided into three measurements areas and the recurrence of these measurements is shown by the linking modalities.

Both the structures and interactions that occur during the development of an IT strategy are not automatically the same during the implementation of the IT strategy. Tables 6.1 and 6.2 below are used to conduct the analyses of the Structuration theory of the computing unit at SASSA and are also summarised for development and implementation, respectively. Please note that the discussion, following the tables should be digested alongside the tables in order acquire full understanding of the duality of structure during IT strategy development and implementation that leads to m-government systems development for government service delivery.

IT Strategy Development

Table 6.1: SASSA's Duality of Structure during IT (ICT) Strategy Development

Implication	Authority	Legitimization
IT (ICT) strategy is important just as the business strategy in the organisation. Therefore, the senior managers (or employees) are always placed in charge of its development. This includes the CIO, executive committees and the Architects.	The CIO and the IT managers that are reporting to him are given autonomy, notwithstanding the hierarchical structure within the IT Unit of SASSA. Therefore, ordinary employees are not permitted to make decisions on issues around the development of IT strategy.	The CIO is saddle with the responsible and accountability of the IT (ICT) strategy of SASSA.
Interpretive Structure	Capability	Standards
Through IT strategy, the goals are set and the resources that will be used to fulfil the business needs are acquired. In line with this, IT (including ICT) and business (through which the government conducts its daily transaction with the citizens) strategies must be aligned with each other. The CIO has been saddled with the responsibility to make sure that this becomes a reality.	The power to assign resources to the development of the IT strategy lies with the CIO.	Required and compulsory guidelines of SASSA (i.e. the rules and regulations).
Communication	Influence	Approval
There is a communication gap that exists between the CIO and his team of IT managers who report to him directly and are responsible for the development of IT strategy.	The CIO uses his authority to put together a team that will develop the IT strategy.	The developed IT strategy is approved by the CIO and IT Executives. This is then sent to all other employees.

IT Strategy Implementation

Table 6.2: SASSA's Duality of Structure During IT (ICT) Strategy Implementation

Implication	Authority	Legitimization
Priority is given to the Technical features in accordance with the interests of subordinate decision makers. This is not due to the fact that they meet the criteria of a particular aspect of the IT strategy.	Implementation is dictated more by what can be done, than by what should be done.	The implementation is done by the lower level employees who are not part of the IT strategy development team.
Interpretive Structure	Capability	Standards
Employees put their trust on their technical skills and knowledge when constructing an understanding of the implementation in order to carry out their routine tasks.	There is a preference over the use of skills and capacities that are available rather than recruiting required skills.	Individual performance contract is the basis for the Implementation of the IT (ICT) strategy
Communication	Influence	Approval
The CIO and his IT managers communicate with other employees. The purpose of the communication is to instruct them to migrate from development to implementation. This communication is one-way. Also there is also a one-way communication which is done on a technical level during implementation. This communication arises from the employees to the IT managers and also from the IT managers to the CIO.	Individuals, including both the IT managers and the employees use their specialist power as well as information available to them to protect their interests.	All employees accept the tasks assigned to them in order to implement IT strategy. This is done even without proper understanding of the strategy that has been developed. In this case the workload is affected by the power of rivalries. This then develops into a situation where there is no real collaboration on the work at hand.

Next section presents the discussion of the information in Tables 6.1 and 6.2

6.3.1.3.1 Duality of Structure: Implication and Communication

Communication is sent to all employees after work has been completed on an ICT strategy. This is done by the employees' managers. The CIO also makes presentations to all the employees of the IT and computing unit within SASSA. The reason for the communication of the ICT strategy is to enable employees to ruminate about the implementation of the strategy. This is explained by one of the IT managers as follows:

We communicate with all the employees (I cannot remember their numbers). This then goes to the IT leaders and all those who are in the IT leadership space. This includes the technical staffs. The session is always an open session and this depends on the availability of the employees. The final presentation is conducted by the CIO. This then goes external. This is we communicate which is part of management process within SASSA.

Another employee explained as follows:

The management always publish this on our website and inform us about it. Then we can do our work based on that.

For implementation and creating cognizance for the employees, the IT managers also make presentations to employees during the implementation of the system. This is done through presenting the architectural and business applications strategy to the technical employees. One of the managers explained below:

“What we do is that the managers will communicate with their technical staff at all levels. And performance contracts are drawn for the technical employees. These are done in a way the employees deliver in line with the strategy that has been developed”.

Implementing IT (ICT) strategy in the organisation is critical in order for objectives to be achieved, especially in the implementation of m-government system. However, there are challenges. The implementation of IT (ICT) strategy depends solely on the employees, who have broadly different interests and technical skills. Some are interested in and contented to perform (implement) the task allocated to them, while

some don't see any value in such a project and believe that it will complicate activities within the IT unit. Hence, many of the tasks are not completed even in the face of deadlines.

IT (ICT) strategy plays a significant role in any organisation. It helps by enabling and supporting the business activities as well as the business processes of the organization. The common view is that IT (ICT) strategy is imperative and therefore must be aligned with the business strategy. Some of the comments made by the employees in this regard are compliments to each other:

“Using IT gives a lot of life to business processes of the organization and the IT strategy is another method of empowering the business hence the IT strategy basically should be developed and make sure that it is aligned with the overall strategy of the organization”.

At SASSA, decisions are made by the executive committees during IT (ICT) strategy development. And due to the rules and regulations that guide the organisation, employees do not have the opportunity to make contributions to the decisions. Also, not all the employees are permitted to be part of the IT (ICT) strategy development, and those end users that will be the users of the system after implementation are not carried along. One of the IT employees explained as follows:

“One of the challenges we have in SASSA is that, IT (ICT) strategy is developed only by those who are placed to do it. This means that it happens behind closed doors because only few players in the IT unit carry out the development. This is basically due to the current structure of the organisation. Even this strategy does not even sought input from the people who will end up using the IT implementation”.

Furthermore, it emerged that more priority is given to the technical element of IT (ICT) strategy than the non-technical elements during both the development and implementation. However, the development and the implementation of IT (ICT) strategy will obviously have principal technical deeds. In the computing unit, non-technical factors are regarded as secondary issues. What is also clear is that the non-technical elements decide the guidelines of development and implementation of IT

(ICT) strategy and makes it efficient or in efficient. One of the IT employees explains as follows:

“Over the years, we focus more on the technical stuffs in our IT strategy development and implementation. The truth is that we have those people who make the decisions and they are at the lower level, and who at the operational level will make technology choices and the choices they make are made because of the technology and not because those choices are in line our strategy”.

Also, the technical employees have the feeling of being neglected during strategy development and this creates a lack of interest in gaining an understanding of the IT (ICT) strategy. This creates difficulty in communication, which in turn makes the implementation of m-government system difficult to achieve. This became evident from the discussions held with the interviewees:

“The feeling of the employees is that they are neglected and as such they are not making [any] contribution to the process. Therefore, they have a negative view of the strategy development. Technology people are very different people. They have the belief [that] they know and understand everything, they like to be communicated to as soon as possible in such a way that they feel they are carried along. And if they are not involved they have the tendency to making life difficult during the implementation of the system”.

6.3.1.3.2 Duality of Structure: Legitimization and Approval

The importance of IT strategy in the business process of any organization cannot be overemphasized. Because of this, the accountability by the highest authority for IT strategy, both at the development and implementation levels, is required. This highest level of authority, however, is within the capacity of the CIO in the computing unit. The CIO therefore uses the authority given to him by the organisation to make sure that those employees under his watch follow the guidelines within which IT strategy is developed. This is explained by one of the interviewees as follows:

“The senior management are always the on the business side of SASSA. The ownership of the business initiatives as to whether to implement m-government system is taken by them. This is done so that they ensued that it is a project that gets completed. But on

the IT side, the CIO takes responsible for the IT (ICT) strategy, the IT managers are responsible for the implementation in conjunction with the CIO but the CIO is ultimately responsible for the larger part of the IT strategy development and implementation”.

Even though there are clear guidelines regarding IT (ICT) strategy development and implementation in the computing unit within SASSA, it is also imperative to obtain the employees buy-in as well as that of the citizens who will end up using the system. Having the guidelines alone without the buy-in from both the employees and the citizens is like the adage that says “*you can lead a horse to water but you can’t make it drink*”. This is explained by one of the interviewees as follows:

“The IT strategy is done by the CIO’s office. It just tells us where we need to go as an organization in terms of using Information Technology which now mobile technology is part of. The process is facilitated by the CIO together with the IT managers. It is important to get a buy-in from both the employees within SASSA as well as the citizen that will use the implementation. Without this I strongly feel it’s a waste of time which is what has been happening over the years”.

It was established that it has been difficult to implement m-government systems for government service delivery through the IT (ICT) strategy. This is because some of the managers within the IT unit seem not to understand where the challenges are. Further interview and analysis showed that there is a disparity between people and technology, because too much overemphasis have been placed on technology. However, some of the employees understand what the challenges are which is based on their level of involvement in the challenges. But they stay aloof and decide not to interfere for the fact that they felt ignored in the process of development and even implementation of the IT (ICT) strategy. One of the interviewee explained as follows:

“The impact of the people is enormous. Only those people involved can regulate his/her action. Also, the managers have control on it to some degree. And the impact will be negative is the person puts in his/her frustration. Frustration can be due to unhappiness among many others”.

6.3.1.3.3 Duality of Structure: Authority and Influence

The rules and regulation with SASSA are binding on the IT unit. The CIO oversees and manages the IT unit. The CIO and the IT executives manage the general strategic decision-making of IT (ICT) strategy. However, the final decision on all other issues relating to the IT (ICT) strategy lies with the CIO. Furthermore, the IT managers possess little to no authority as with the CIO that they can invoke to resolve various demands of the employees. Maximum authority lies with the CIO to make demands on the employees regarding the deliverables for the development and implementation of IT strategy within SASSA. This is explained by the interviewee as follows:

“The real and true owner of the IT strategy who also takes the total responsibility for it within SASSA is the CIO. The CIO”.

“Those who are responsible for the development and implementation of the IT Strategy are the people who have senior positions within SASSA. This is because they are the only ones who possess the power to make decisions in that regard”

6.3.2 SASSA Case Study through Actor-Network Theory

In this section, the analysis of the case study is presented from an Actor-Network Theory point of view. This is done by depicting the sociology of translation as discussed in Chapter Three. The section concentrates more on how the actor-network develops, changes and steadies during development and implementation of IT (ICT) strategy within the computing unit of SASSA. The case study is analysed taking into consideration the four moments of translation, namely, problematization, interessement, enrolment and mobilisation (see Section 3.3.1.1).

The main objective of an IT strategy is to ensure that it is aligned with the business and operational strategy of the organization. To realize this, certain requirements will be gathered. These requirements are then problematized by the CIO for the employees. From this, an IT (ICT) strategy will be developed and implemented in the form of a solution (hence the m-government system implementation) for these requirements.

The actors who are significantly involved in the actor-network, as well as their interests, are described first. This is then followed by the analysis, using the four moments of translation.

Chief Information Officer (CIO): the CIO is responsible for the overall IT strategy. This includes IT related matters within SASSA. The CIO is the bridge between the IT unit and the rest of the unit within SASSA. The following explanation was given by the interviewee:

“IT strategy development is based on the authority of the CIO. He evaluates the needs of SASSA business activities and processes and from there make decision on what IT strategy needs to be develop to achieve the business needs”.

Chief Technology Officer (CTO): The CTO is an affiliate of the IT Executive committees. He reports to the CIO directly. The CTO is also accountable for the architectural element of IT strategy development, including technology management within the computing unit. One interviewee explains as follows:

“He is very significant to this place. He has the business view of SASSA with a strong view of how IT can be used to deliver service to the citizens. He also assists the CIO by making input to him during the strategy. He is also expected to know everything about everything that is IT”.

Business Development Managers: The Business Development Managers are responsible for the development of the business strategy on behalf of SASSA, as they make sure that the business strategy of SASSA aligns with the IT strategy. Through the office of the CIO, the business development manager communicates the goals and objectives of SASSA with employees within the computing unit of SASSA. One interviewee explains as follows:

“The IT strategy is developed with some input from the business development manager, based on the processes the business has and that it will be using to achieve service delivery objectives. This is then translated into technology requirements which in turn moves to become the IT (ICT) strategy”.

IT Managers: the IT managers report directly to the CIO. They assist the CIO the development of the strategy in the organization. One interviewee explains as follows:

“The IT managers assist the CIO in the development and implementation of the IT Strategy by providing input. They also report to the CIO.”

IT Architect: the IT architects work in conjunction with the CTO to develop the architectural element of IT (ICT) strategy. They are also accountable for IT governance which depends on the guidelines set by them within the directive of IT (ICT) strategy. One interviewee explained as follows:

“The IT Architects define the course of technology and implementation of the IT projects”.

The Citizens: the citizens are the end-users of the m-government system implementation. One interviewee explains it as follows:

“The citizens are the people that end up using the implementation of our IT (ICT) strategy. In this case the m-government system implementation”.

The Technology: this is the hardware and software, which are selected during the development and implementation of IT (ICT) strategy. One of the employees explains as follows:

“The IT strategy enables SASSA to look at cost and from there allows us to set a viable direction for both hardware and software that are mostly used mostly during the implementation of the strategy”.

IT Employees: the IT employees do not include the managers. They are principally the ones in charge of implementation. They apply the standards as stated by IT (ICT) strategy of SASSA. One of the employees explains as follows:

“In SASSA, it’s the employees, which are very hands on (i.e. they implement the strategy into a system that is usable by the users i.e. the citizens). Our major task is really to

identify the needs, and these needs will be collated by the middle manager and finally it will be finalized by the IT managers, Architectural Managers and the CIO”.

Performance Contract of IT Employees: During the implementation of the IT strategy (and even during the development), employees are allocated tasks. This task allocation process is done through the system of performance contract. Through this contract, individual activities are managed and evaluated. One of the employees explained as follows:

“Our IT Strategy are implemented through various group in the computing unit. This is done through performance contract which is managed and evaluated by their managers at the end of every financial year”.

6.3.2.1 ANT Translation: Problematization

The function of the business development manager(s) is that of scout who scouts the problem of the organization and then present this to the CIO in the form of SASSA’s strategy. His presentation must be aligned with the IT strategy by suggesting how IT can assist in solving the problem. The CIO then presents the business strategy to the IT executive committee. The IT executive committee members include the following: Service Delivery Manager, Application Development Manager, some IT managers and Chief Technology Officer. The IT executive committee members are then tasked to develop the appropriate IT strategy that will suit the business as presented to the organisation and make sure that the IT strategy is aligned with the business strategy the organization is pursuing. During one of the interviews conducted, an interviewee explained the introduction of IT strategy within the organisation as follows:

“The vision of where the IT will assist the organization (i.e. SASSA) is presented to us by the CIO. He is the one capable of doing this because he matches the business strategy with the IT strategy and his is accountable for that. He is the only one that looks at what needed to be done with the elements of the strategy in detail. He also evaluates the environment”.

To aid development, the IT executive committee separates IT strategy into various areas such as Infrastructure, Application and Architecture. These areas are then assigned to

suitable and applicable authority that are defined by the IT executive committee. The manager of each unit takes responsibility over the various areas that are assigned to his or her unit. One of the interviewees explains as follows:

“The IT Executives makes the decision on what element of the strategy is accessible and on the other hand, what is not accessible”.

Every solution within SASSA that is IT-based is controlled by the IT strategy in place within SASSA. Every matter arising from the IT strategy is resolved through suitable units such as Application, Design and Architecture defined by the IT executive committee. Also, the manager of each unit is authorized to approve/disapprove any decision regarding with what each unit faces in terms of the strategy. The final decision within the computing unit of SASSA lies with the CIO. One of the interviewees explains as follows:

“All the strategic components are articulated within the IT strategy and those who are responsible for managing them are attached to them. So, no one will police anyone. This is then delivered per standard performance management that has been put in place. Therefore, by default, what this means is that if a unit does not perform or that unit does not deliver, the units gets reprimanded. For instance, is, if the Application manager does not deliver on the IT strategy components attached to them, he and his team will be penalised for not delivering on the target”.

During the implementation of IT (ICT) strategy within SASSA, tasks are assigned to employees in each team per the capacity, skills and specialization of the unit. For instance, all works relating to the application within SASSA are allocated to the Application development team for implementation and approval. An interviewee explains this as follows:

“It is a process. I mean the implementation of the IT strategy. It is done by assigning responsibilities including assigning human resources. And from the architectural point of view, we always take into consideration what technologies will be the approved for the implementation”.

To ensure the performance of each SASSA employee within the computing unit, the performance contract is involved during the implementation of the IT strategy. These performance contracts are managed by the managers of individual employees while the performance of each of the managers is managed by the CIO.

The goal and objective of IT strategy, is to ensure that it is aligned with the business strategy of the SASSA. The CIO uses this to articulate the requirements that relates and talks to service delivery using mobile technologies. The CIO then problematized these requirements and under his leadership, the implementation of IT strategy is presented as a solution to the problematized issue just as it was done during the development of the strategy. The processes of implementing the IT (ICT) strategy i.e. m-government system that can enhance the quality of service delivery are defined as Mandatory Passage Points (MPP). This is done through the implementation of individual performance contracts which is established based on the tasks associated with the implementation of the IT (ICT) strategy are allocated to all the employees.

6.3.2.2 ANT Translation: Interessement

IT strategy at SASSA is currently developed, and it is revised bi-annually. On many occasions, the implementation is not accomplished within a year and it is carried over to the next year and, sometimes, the next two years. However, this is guided by the established performance contract. The established performance contract is used to carry out tasks during the implementation stage (i.e. during the implementation of m-government system). Annual salary increase and performance bonuses are determined by the outcome of individual performance. Thus, performances of some employees are enhanced while this becomes challenging in managing some employees who would not want to give their best in the implementation stage of the IT strategy based on this. One of the employees interviewed explains as follows:

“By default, the resolutions of IT strategy are based on a short-term one, although it is supposed to be a longer-term. This is because bonuses are on an annual basis which is based on the performances of employees. These performances are evaluated based on a short term. The motivations in the form of incentives and actions also depend on short-term. This sometimes serves as a motivation for employees to perform but on many occasions, it becomes more challenging to manage the employees based on this”.

There is always a performance contract for every employee regarding the implementation of the IT (ICT) strategy, and although employees are allowed to negotiate, it is highly limited. This hampers the skills set of the employee in terms of performance. One of the employees interviewed explains as follows:

“There is a consultation between employees and their managers consult. Our inputs are put together as a joint view and the managers presented them to the CIO as well as the IT executive committee. What normally happens in the end, is that we all agree on what needs to be done in that regard”.

6.3.2.3 ANT Translation: Enrolment

Employees’ involvement in the implementation of IT (ICT) strategy (i.e. the m-government system implementation) is crucial in realizing the goals of the organization. The performance contract is utilized by the CIO and the respective managers as a scheme which affords them the opportunity to persuade and influence the employees at all levels to participate in the implementation of IT (ICT) strategy (i.e. the m-government system implementation) within SASSA. One of the interviewee explains as follows:

“The moment the strategy (i.e. IT (ICT) has been developed and assigned I have never been monitoring the implementation of the strategy against the developed strategy. This is because this has already been integrated into the organization Key Result Areas (KRA) and hence into the individual performance contracts. For instance, the team responsible for application development understands the IT strategy from the viewpoint of applications layer of the system”.

Furthermore, the implementation of IT (ICT) strategy within SASSA is done through assigning tasks to employees which are managed by the respective managers. The assignment of task is managed in line with teams’ and individuals’ roles and within the computing unit. This is based on performance contracts as outlined by the guidelines as defined by the performance contract. However, this is not always the case and it’s a challenge. One of the interviewees explains as follows:

“Performance contracts are managed such that they are implemented across various teams. There is a consistent standard when it comes to performance. Although there are tools in place to monitor the performance contract to make sure implementation takes place in the right way and boosts the value of our business from the perspective of risk and policy. But employees do not always follow this which on many occasions poses challenge to the implementation within the organization”.

Managers of the different teams in the computing unit within SASSA report both the progress and activities of the teams to the CIO and the IT Executive Committee members. These reports include the assigned tasks in the implementation of the strategy. The purpose of this is to evaluate issues such as risks and cracks within the implementation, which include the contribution of employees in the implementation of the IT (ICT) strategy within SASSA.

However, some employees do not show commitment to the development and some of those that show commitment do so reluctantly. Some reasons given for employees' lack of participation and commitment in the implementation of the IT (ICT) strategy is lack of opportunity to participate in the development of the strategy, lack of opportunity to increase their knowledge, inadequate infrastructure to fully implement the strategy, and lack of adequate human resources, among many others. Employees on the senior level acknowledged that there are other circumstances that discourage individuals from participating in IT strategy implementation: One of the interviewees explains as follows:

“There is no adequate infrastructure during the implementation of the system (I mean during the development and testing). On many occasions during implementation, employees are required to share implementation resources together thereby forcing them to work together and some employees don't appreciate working with other employees. Even I am one of the typical examples”.

In addition, there are some occasions where the stakeholders who are part of different tasks during the implementation of IT (ICT) strategy could not agree on some decisions. In cases like these, the decisions of the employee and/or managers responsible for such

a unit or team becomes a matter of choice made by an individual. One of the interviewees explains as follows:

“Some of the IT managers already have made up their mind and have their own view of what technology and framework will be adopted to achieve the goals of the implementation of the system. Their choice may not fall into IT (ICT) strategy around m-government and they will still go for their own way. This has on many occasions been a process that is common in SASSA”.

Finally, most of lower level employees have little understanding of how IT (ICT) strategy is developed, which leads to requirement gathering of how the implementation will be handled. And they are enrolled as part of the team responsible for the implementation. The enrolment and participation of these employees are per the performance contract, which makes sure that every employee enrolls accordingly and completes the tasks assigned during the implementation of the system and this causes a low level of commitment. This low-level commitment causes further disunion and the quest for the interests of individual employees.

6.3.2.4 ANT Translation: Mobilization

The recognition of the performance bonus motivates many employees to be committed to the implementation of the IT (ICT) strategy within SASSA and has been found to also assist in attracting adequate talent that can contribute immensely to proper implementation of the strategy. Also, IT managers in the various sub-units are advised to find ways of bringing out the best from their employees such that they are committed to the proper implementation of IT (ICT) strategy. Since the tasks assigned to every employee are associated with the performance contract and, as a result of the impact of the performance contract, the IT managers show positive attitude regarding the policies of the organization and the IT unit with regards to the need of the government to deliver service to the citizens as well as the goals of IT strategy within SASSA. One of the interviewees explained as follows:

“The agreement and decision is first made by the stakeholders, business development managers, and the CIO. Then the IT managers are instructed communicate it down to their various staffs in the different levels. They are always advised to make sure that

they motivate the employees to perform. This is because it has been realized that employees show little commitment towards the implementation of the IT strategy which is affecting the organization”.

The understanding of both the development and implementation of IT (ICT) strategy by employees of SASSA are on different levels. While some of the employees believe the process is too complex and as a result may not meet the objectives, others, who are more experienced, are of the opinions that the process is fair and in order. This delays the implementation of m-government system within the organization.

“The IT (ICT) strategy to some employees is at a very complex level and they do not understand the details needed to implement the system while for other employees what it has been is what IT (ICT) strategy needs to be. This is because they understand the context of IT (ICT) strategy and they are also being part of the development process”.

One of the reasons attributed to different levels of understanding is that employees are not always encouraged to participate in IT strategy development prior to implementation. This does not encourage the employees in terms of commitment to the implementation of the m-government system which leads to decrease in employee participation performance. One of the interviewees explains as follows:

“Our IT managers do not take input from us during the IT strategy development. Yet they speak on our behalf. This makes things difficult for us to understand and it serves as a demoralising factor in terms of performance. This sometimes delay or output”.

The guidelines within SASSA, which are enforced through the performance contract, allows the managers to mobilize every employee during the implementation of the IT strategy. Employees are also afforded the opportunity to mobilize themselves based on their understanding around the implementation. However, the mobilization is more about the accomplishment of the outcome of the performance contract, rather than accomplishment of the outcome implementation of the IT strategy, in this case the m-government system implementation. This means that the actor-network mobilizes around loosely joined individuals and/or group/team targets more than around the

solution proposed during problematization that will enhance the quality of government service delivery.

Furthermore, as stated earlier that the provision of services for citizens through mobile technologies is more about providing better social infrastructure through mobile applications and services to the citizens, who are the major stakeholders (i.e. those who are the end-users of the system) This means that the citizens are supposed to be mobilized around the proposed solution during the problematization in order to gain an understanding of how best the citizens will communicate with the government. This is considered important because understanding the social, economic, and cultural conditions in which every technology adapted from the developed world that will be deployed in developing countries should increase its adoption and effectiveness This, however, has not been the case. One of the interviewees explains as follows:

“What we normally do is to implement the system and then employ the service of third party to assist us with the testing of the system. We did the same with our electronic website and in the end, we realized that there is no much traffic to the website as we had expected”.

Also, it could be argued that the solution and the Mandatory Point of Passage (MPP) proposed during the problematization stage have an element of a disjointed mobilization inside of it. What this means is that there may be a complete IT strategy that is well communicated to all levels, but it was not put forward as the solution that needs to be achieved. More specifically, the processes of implementation (the MPP) became the solution to the problematized subject of finding support to the business strategy. This means that individual interests are aiding a fragmented mobilization of the network. One of the interviewees had this to say:

“When it comes to IT strategy within SASSA, there is politics involved. This is gone to a level of who owns the roles and it is affecting those employees who are innocent in the sense that it is on many occasion becoming limiting factor, making our projects to go beyond deadlines”.

6.3.3 Finding from the Analysis

From the analysis of the case study presented above, using Structuration theory and Actor-Network theory, some findings are presented in this section.

○ Human Interaction as a Significant Factor

The analysis showed that interaction between humans is very significant in both the development and implementation of IT (ICT) strategy within any government organisation where service delivery is key. This is because it was gathered that through the process of interactions, every actor involved will gain an understanding of what is needed to be done, assigned tasks will be communicated, information will be shared among all the actors involved in the development and implementation including the citizens. Furthermore, poor interaction between the CIO, IT managers and employees who are at the forefront of the implementation indicates that there is little or no understanding from the part of the employees in terms of the developed IT strategy, which will affect the implementation of the IT strategy. Also, poor interaction with the citizens will mean that there is no proper communication with the citizens from the government organization or agency responsible for the implementation of the IT (ICT) strategy, in this case the m-government system.

○ The Negative Effect of Independence

The guidelines in place within SASSA permit autonomy in every working area within the computing unit. Therefore, the various managers were seen to be independent in their actions when implementing of the IT strategy. The effect of this autonomy is that IT managers have the overriding capacity in the allocation of tasks. Due to the independence accorded the managers, on many occasions they ignored tasks that did not have their personal interest and relegated or allocated them to their employees. This hampers the sustainability of m-government system implementation.

○ Guidelines and Hierarchy within an Organization

Based on the guidelines put in place at SASSA, all employees were working within the hierarchy of SASSA and due to this, regardless of the interests of individual employees everyone is within the structures of the hierarchy. The determinant for the allocation of various roles is based on the hierarchy within the organization. Therefore, greater parts

of tasks were assigned per roles and responsibilities of the actors involved in the development and implementation of IT strategy.

The actions or inactions of the employees, which are enabled by the hierarchy within SASSA, have some impact on the IT (ICT) strategy. For example, in the absence of the CIO, some decisions cannot be made unless they have already been delegated by the CIO. All employees follow this structure and it sometimes causes delays in meeting deadlines of projects which causes the quality of service delivery to be limited.

- **Alignment of Various Interests**

It was discovered during the analysis that there were employees who have different interests during the implementation. These interests were confirmed in the assignment and implementation of the tasks during the implementation of IT strategy. Various interest may be the choice of technology to adopt and the choice of who purchases the infrastructure, among many others.

The actions of the employees within the organization are established as a practice which depicts the structures that are empowering and coercing the implementation of IT strategy within SASSA. Unavoidably, individual employees reacted differently to the system. For instance, due to the power of autonomy bestowed on the IT managers, they have the power to place personal interest ahead of the goals of the organisation. This will hamper the implementation of m-government system and, hence, sustainability will not be achieved

- **Implication of Networks of People**

During the analysis, diverse networks of people were recognized. These networks were from different levels of hierarchy within the computing units and the various citizens who are the end-users of the system. Through these networks, different interactive groups formed through their right of association.

The guidelines of SASSA facilitated the associations between the employees and how they interacted during the development and implementation of IT strategy. The interaction went along these lines of networks in the organisation. For example, this allowed the IT manager to override on many occasions. Communications were not

directed at the citizens, i.e. citizens were not involved as part of the implementation process.

6.4 Case Study: Board of Internal Revenue (BIR)

As discussed in Chapter Five, BIR and, specifically its computing unit, was one of the two case studies that were analysed. The two levels of analysis embraced in this study were applied to the BIR case study. In this section, the analysis will start with Structuration Theory and will be followed by Actor-Network Theory.

6.4.1 The BIR Case Study Analysis through Structuration Theory

The requirements are presented by the Head of Unit (HOU) who makes requests to all employees to ensure that development and implementation of IT (ICT) strategy are realized within BIR. The requirements are accepted by the employees and they approve the importance of IT (ICT) strategy in accomplishing the BIR's business processes.

In this analysis, the focus of Structuration theory is on employees' activities and on the guidelines put in place within the BIR, as well as on the resources associated with the development and implementation of IT strategy in the organisation.

Like SASSA, the computing unit of BIR is structured hierarchically. In the implementation of IT (ICT) strategy, activities are performed by individual employees as well as by teams (units) of employees which also include the IT managers. Roles and responsibilities are given within the hierarchy based on the guidelines of BIR.

6.4.1.1 Agents

Similar to SASSA, agents are closely connected with rules and resources. The agents who are responsible for the development of IT (ICT) strategy are different from the agents who are responsible in the implementation of IT (ICT) strategy in the computing unit of BIR. The responsible employees for both the development and implementation of IT strategy possess different managerial and technical experiences and skills.

The IT unit through the Head of Unit (HOU) is responsible for all the IT processes and activities. This mandate is given by the BIR Executive Committee. Through the mandate the HOU tasks the IT Executive Committee with the obligation of developing the IT strategy within the BIR. One of the interviewees explains as follows:

“The executive committee are responsible for the organisational strategy and the IT executive committee is responsible for the IT strategy”.

Also, the head of the IT unit, the IT manager, IT technical staff, the rest of the employees as well as the IT Executive Committee are part of the team responsible for either the development or implementation of IT (ICT) strategy within BIR. However, the IT managers take responsibility in being part of team responsible for both the IT strategy development and implementation. One of the interviewees stated that:

“Actually, everyone within the computing unit at all levels are involved in IT strategy. It is normally conducted as an open forum; the IT management forms different groups/teams, and these are led by group/team leaders. The members of those teams are represented from all various levels and this is opened to everyone in the unit.

The roles and responsibility are spread across to every member of the team during implementation of the IT (ICT) strategy. As echoed by one of the interviewees (quoted above), it emerged that all employees participate in IT (ICT) strategy in different ways. The IT Executive Committee team assigns tasks to the managers regarding the development and implementation of IT (ICT) strategy. Power is exerted mainly by the manipulation of guidelines and resources in the development and implementation of IT strategy within BIR.

6.4.1.2 Structure

Within BIR, there are guidelines around the development and implementation of IT (ICT) strategy. The HOU is tasked with the responsibility to ensure the development and implementation of IT strategy based on the guidelines and the available resources. However, the strategy needs to align with the business strategy so that the business processes and activities are enabled and supported by the IT (ICT) strategy.

The HOU manages the resources (such as technologies available human resources) within the computing unit of BIR. This is achieved through the guidelines of BIR. Additional responsibilities are assigned to the IT executive members in order of hierarchy. Also, additional responsibilities are assigned to the IT managers for the

implementation of IT (ICT) strategy within BIR. One of the interviewees explained as follows:

“We have the head of IT unit, we have systems manager, business systems manager and we have got a development team who are technical. All these positions constitute the IT executive committee and they report to the HOU. The head of IT reports to the BIR executive”.

Every employee is assigned to a team within the computing unit and this assignment is based on the skills possessed by the individual employee. Also, the budget (financial) is assigned per the needs of the units. Assigning both employees and budget is principally done by the HOU. The activities are carried out with the presiding guidelines. These guidelines are used to evaluate activities of the development and implementation of IT (ICT) strategy with BIR. One of the interviewees explained as follows:

“There is a way we evaluate the planning of the IT (ICT) strategy and this assists us in maintaining standards and consistency”.

The responsibilities and management of the implementation of IT (ICT) strategy emanate from the HOU, which is based on the guidelines. These are further extended to all levels of employees within the computing unit of BIR. The guidelines assist both the IT managers and the employees in carrying out their tasks.

The available resources with the computing unit are utilized by all employees to carry out their tasks in the implementation of the IT (ICT) strategy. Also, the guidelines and resources available are equally important because they depend on each other to implement the IT (ICT) strategy. Due to the issue of dependencies, the way the guidelines are interpreted by the employee is precarious and this leads to the usage of measurement of duality of structure in BIR case study. This is discussed in the next section.

6.4.1.3 Measurement of Duality of Structure

For analysis purposes, the structure and interaction between humans in BIR's computing unit are divided into three dimensions as in the case of SASSA. The recurrence property of these dimensions is explained by linking modalities.

As in the case of SASSA, the structure which includes interactions that takes place in the development of the IT (ICT) strategy is not essentially the same as the interactions that takes place during the implementation of the IT (ICT) strategy. The computing unit with the BIR's computing unit analyses of the Structuration theory through the concept of measurement of duality of structure is conducted for the development and implementation of IT (ICT) strategy using Table 6.3 and Table 6.4 below:

IT Strategy Development

Table 6.3: BIR's Duality of Structure During IT (ICT) Strategy Development

Implication	Authority	Legitimization
Development and Implementation of IT (ICT) strategy is handled by the HOU and the IT executive committee due to the significance of IT strategy within BIR	The HOU and the IT manager possess the sole authority to make decisions regarding the development and implementation of IT (ICT) strategy.	The HOU is the only one responsible for IT Strategy. He also possesses the authority to delegate power
Interpretive Structure	Capability	Standards
The direction in which the computing unit will take with regards to the IT implementation in terms of m-government system is set by the IT (ICT) strategy	The HOU has the authority to assign resources to the development and implementation of IT (ICT) strategy	Required guidelines of the BIR
Communication	Influence	Approval
There is little or no communication exist during both the development and implementation of the IT (ICT) strategy between the HOU and the It executive team and other employees.	The HOU wields his authority in developing the IT (ICT) strategy in conjunction with the IT executive members.	The HOD and the IT executive committee develops and approve the IT strategy and then presented this to the employees at a meeting for implementation.

IT Strategy Implementation

Table 6.4: BIR's Duality of Structure During IT (ICT) Strategy Implementation

Implication	Authority	Legitimization
Priorities are given to the Technical features in accordance with the interests of subordinate decision makers. This is not so, since they meet the criteria of a particular aspect of the IT strategy.	Implementation is dictated by the understanding of the organization and the technical capabilities	The implementation is done by the lower level employees who are not part of the IT strategy development team.
Interpretive Structure	Capability	Standards
Employees put their trust on their technical skills and knowledge when constructing an understanding of the implementation to carry out their routine tasks.	IT managers have the capability to force an employee to perform an implementation of IT strategy by making the assigned feature an employee's only task.	Assigning tasks to individual and teams for implementation and it is enforced through the performance evaluation methods
Communication	Influence	Approval
The HOU and the IT executive committee communicate with other employees in a one-way manner.	Individuals, including both the IT managers and the employees use their specialist power as well as information available to them to protect their interests. The managers use their authority while the employees use their technical ability to protect their interest.	All Employees accept the tasks assigned to them to implement IT strategy. This is done even without proper understanding of the strategy that has been developed. In this case, lack of mistrust infuses the employees and these hampers the implementation

The next section presents the discussions on the information in table 6.3 and 6.4

6.4.1.3.1: Duality of Structure: Implication and Communication

The HOU and the IT Executive Committee are given the responsibilities of developing and implementing the IT (ICT) strategy by the BIR's Executive Committee, which is the highest decision making rank within BIR. This is in accordance with relevance of IT strategy within the BIR, hence there is a requirement to make sure that there is a

wide variety of input and audience within the computing unit of BIR. The IT Executive Committee manages the input. One of the interviewee explains as follows:

“What is important is to have some drivers that genuinely drive IT strategy. The executive committee of the organization has identified IT and mobile technology as one of the key driving areas that can greatly assist the business processes and activities of the organization grow. In one of the circular they send to us, they said and I quote we have identified IT and in particular ICT as the key drivers that will ensure that we meet the BIR’s business objectives”.

Another employee explained as follows:

“The executive committee of BIR in conjunction with the IT executive committee define the IT strategy and we are also given the opportunity from the low level to make contribution. However, more authorities are given to the IT HOU and the IT executive committee in terms of the development and implementation of IT (ICT) strategy”

Upon approval of the strategy by the BIR Executive Committee, the initiative is then communicated to the IT managers by the HOU and the IT Executive Committee communicate. The initiatives include the objective of the strategy. The IT managers consequently make the same communication to every employee through different media such BIR intranet, team meetings and email etc.

However, some of the employees are not pleased with the way that awareness regarding implementation has been handled by the IT Executive Committee. The opinion of these employees is that more needs to be done by the IT Executive Committee to create awareness about how the strategy within BIR should be implemented. On the other hand, some employees feel that there is access to resources that are needed to implement the IT (ICT) strategy. One of the interviewees explained as follows:

“When it comes to implementing the IT (ICT) strategy, one should be informed about how we would and should go about implementing the strategy. This is lacking now. In all, no adequate resources (both technology and human) have been provided in a bid to implement the IT (ICT) strategy”.

6.4.1.3.2 Duality of Structure: Legitimization and Approval

The HOU is tasked with the responsibility for the IT (ICT) strategy and, due to this, he makes sure that it is accepted within BIR by first convincing the executive committee for approval before it can be implemented for the m-government system that can enhance service delivery. One of the interviewees explained as follows:

“The HOU presents the IT (ICT) strategy to the executive in which he convinces them about what the IT (ICT) strategy is and how it will assist with the business process. Thereafter the executive committee approves or rejects it”.

Although employees are motivated to work by offering incentives, some employees are hesitant and others, for various reasons, do not participate in the implementation of the IT (ICT) strategy. For instance, some employees feel that the communication about the implementation is not enough, while others feel that adequate resources in terms of skills, appropriate technology and human are not available to implement the strategy. Due to this, the relationship that exists between the IT Executive Committee and the employees is a tense one and both parties know about this. On some occasions, the employees only reluctantly agree to the task given to them to perform regarding the implementation of the IT (ICT) strategy. One of the employees explains as follows:

“Due to some of the excuses that have been highlighted before, we are sometimes reluctant to accept our tasks at the implementation of the IT (ICT) strategy. This sometimes causes delay in the implementation”

6.4.1.3.3 Duality of Structure: Authority and Influence

The BIR Executive Committee has vested the authority to develop and implement IT (ICT) strategy on the HOU and the IT Executive Committee. All IT managers are then instructed by the HOU to communicate the initiatives with the employees and also to apply performance evaluation methods which gives them the opportunity to use their authority to force employees to participate at their full strength in the implementation of the IT (ICT) strategy by assigning tasks and resources to them. One of the employees explained as follows:

“There is a target which is based on performance evaluation on solution delivery. For instance, employees are required to deliver on a certain time frame and allocated budget and any part of the implementation delivered per time and budget gets high score”.

Some of the employees, particularly those who have been a long time with BIR, are more knowledgeable and understand what needs to be done more than other employees. This wealth of knowledge gives the employee the sense of superiority towards their fellow employees during the implementation of the IT (ICT) strategy. One of the interviewees explained as follows:

“The thing is the senior employees are more knowledgeable and the junior employees are still growing. However, the senior employees are giving a sense of being superior than the junior employees. I think this serves as a demotivation for the junior developers that we have here. This can cause bad implementation and even delay in meeting our deadlines”.

For implementation of IT (ICT) strategy to be successful, there is a need for the employee to accept the developed IT (ICT) strategy. This is because the basis for the actions of individual employees are determined by the level of acceptance of the developed IT (MICT) strategy. However, when the level of acceptance is low, various issues will come up, such as mistrust, and implementation will suffer. Through the performance evaluation method, the HOU directs the IT managers to assign tasks and resources to employees that are responsible for the implementation of IT (ICT) strategy. Employees will have little or no choice but to accept the tasks assigned to them.

Using the duality of structure from the Structuration theory, the researcher was able to analyse the repetitive relationship between the structure and human actions during the development and particularly the implementation of IT (ICT) strategy as in the case of SASSA.

During development of the IT strategy, the HOU and the IT Executive Committee are authorized by the BIR Executive Committee to take control. At this point, there is a restricted communication between the HOU and the IT Executive Committee. The rest

of the employees are excluded from the communication. These actions replicate the signification structures which states that developing the IT (ICT) strategy can only be assumed by the HOU and the IT Executive Committee members. Through the authority influence given to the HOU by the BIR Executive Committee, he assumes responsibility and accountability regarding the development of the IT (ICT) strategy together with the IT Executive Committee. These actions yield and replicate the structures of domination which assumes that all choices concerning the development of the IT (ICT) strategy rest with the HOU and the executive committee. And, when the developed strategy has been approved, the HOU and the IT Executive Committee make presentation about it to the employees at an organized meeting. These actions reproduce the structure of legitimation which identifies the HOU as the one solely responsible for the IT (ICT) strategy.

The next phase is to mobilize employees by their respective managers to implement the IT (ICT) strategy by allocating tasks to them. Communication is one-way, from the managers to the employees, and this issue of communication often affects the understanding of employees. These actions replicate structures of significance, which assumes that employees can only see solutions through technical lenses, irrespective of their definition of what constitutes the developed IT strategy. Employees then utilize their technical skills to safeguard their interests, and managers utilize their authority to defend their positions. These actions replicate the structures of domination, Finally, employees accept their tasks, per performance evaluations schemes, and endure their work with little understanding of the developed IT strategy. Issues of mistrust towards the employees' managers come in at this stage and it affects their work. The significance of this is that there is a replication of structure of legitimation which assumes that employees at lower levels, who have little to no understanding of the developed It (ICT) strategy, will be able to implement the strategy.

The next section provides analysis of the BIR using the Actor-Network Theory (ANT).

6.4.2 BIR Case Study through Actor-Network Theory (ANT)

In this section, the analyses of the case study are presented from the perspective of Actor-Network Theory (ANT). Again, the section concentrates more on how the “actor-network” develops, changes and steadies during development and implementation of IT (ICT) strategy within the computing unit of BIR. The case study is analysed taking

into consideration the four moments of translation, namely, problematization, interessement, enrolment and mobilisation. This is done by drawing upon the sociology of translation as described in Chapter Three (see section 3.3.1.1).

The principal objective of an IT (ICT) strategy is that it must align with the business strategy and processes within the organization that formulates it. To realize this, a set of requirements is articulated and stated. These requirements are then problematized for the employees by the HOU. The IT (ICT) strategy is then implemented as a solution to these requirements.

The important actors involved in the actor-network as well as their interests are first discussed in this section. This is followed by the analysis using the four moments of translation as described in the sociology of translation.

The Executive Committee: This is the uppermost body in the levels of decision within the BIR. It is chaired by the Chief Executive Officer (CEO).

The Head of Unit (HOU): The HOU is the overall manager of the IT unit with the BIR. The HOU is saddled with the responsibility of developing and implementing the IT (ICT) strategy. He is also responsible for managing related issues such as people and processes. One of the interviewees explained as follows:

“The Head of Unit (HOU) is responsible for all issues relating to both technology and people in the computing unit of BIR”

IT Executive Committee: This is the uppermost level of decision making in the computing unit of BIR which is chaired by the HOU. The IT Executive Committee is responsible for all issues related to IT (ICT) strategy within BIR. It consists of senior employees within the computing unit of BIR. Every member of the committee is a head of a sub-unit within the computing unit. One of the interviewees explains as follows:

“We have within the computing unit IT executive committee. This is a set of people who are managers of different sub-units within the unit. They come together and formulate the IT (ICT) strategy which they give feedback to CEO on the outcome”.

IT Managers: Every IT manager manages one or more teams. The IT managers are responsible for development and, mainly, implementation of the components of the IT (ICT) strategy within BIR.

IT Employees: These are the rest of the employees with the computing unit of BIR. They have various responsibilities. However, not all of them participate in the implementation of the IT (ICT) strategy within BIR.

IT Technology: This refers to the various technologies that are significant in enabling the implementation of the IT (ICT) strategy. One of the interviewee had this to say:

“The form of the IT (ICT) strategy determines particular technology that will be adopted for its implementation. For instance, we are using Android and the Google Cloud engine for our current mobile system implementation for the tax claim submission”.

Skill-set: Employees with BIR have various technical skills and it is understood that some of the employees are more technically skilled than others.

Citizens: These are the clients of BIR who will be the end-user of the IT (ICT) strategy implemented solution.

All the above in the computing unit contribute to and influence the development and implementation of IT (ICT) strategy within BIR, directly or indirectly. Their roles are distinct and it is analysed further below.

6.4.2.1 ANT Translation: Problematization

The Board of Internal Revenue (BIR) provides the HOU in the computing unit with the business strategy. This is done through its executive committee. The HOU is then mandated to develop an IT (ICT) strategy that will align with the business strategy. The HOU problematizes the requirement in a way that will provide support to the business strategy of BIR. This is then presented in the form of a solution, in conjunction with the IT Executive Committee. One of the interviewee explains as follows:

“The IT (ICT) strategy is dependent on our organization’s (i.e. BIR) business strategy. For IT (ICT) strategy to change, it has to first change at the executive level (i.e. at the top level)”.

The guidelines of BIR do not allow anyone within the computing unit to lobby for or contract any solutions regarding the Information Technology of the organization from external sources. This means that all IT related solutions provided are done so through the computing unit of BIR, and this is made possible through the IT strategy. All the elements of the IT strategy must be approved by the HOU; however, the HOU has the power to delegate the approval of IT-related matters on his behalf. One of the interviewees explains as follows:

“Because one’s role is small within the company; your influence is insignificant. You honestly do not have much say in things like that so you have to abide by the decision and choices of your manager, even if you don’t agree with it or it’s not the correct way of doing things. You have no power and you can’t do anything”.

After the IT (ICT) strategy has been developed, the HOU in conjunction with the IT executive committee members present it to all other employees. One of the interviewees explained as follow:

“The CEO presents the business strategy to the HOU and his IT executive committee. The HOU and the IT executive committee in addition with the IT managers organize workshop of discussion meeting to discuss the business strategy. What is however, germane at the discussion is how IT (ICT) strategy can be aligned to the business strategy in realizing the business objectives of BIR”.

6.4.2.2 ANT Translation: Interessement

At this stage, the developed IT (ICT) strategy will be submitted to the executive committee of BIR for approval. After this, the implementation begins. The key stakeholders in the implementation of the IT (ICT) strategy are the HOU and the IT Executive Committee. This is, however, done without other employees participating actively at this stage and, on many occasions, all efforts are wasted. This is explained by one of the interviewees as follows:

“I agree that it is possible for the HOU and the IT executive committee to make decisions on IT (ICT) strategy development and its implementation. But if what we will do does at the implementation does not support the decision made on the IT (ICT) strategy then it will never be implemented; it will only be words on paper for many times. Therefore, it is important that what we do is aligned with implementation of the IT (ICT) strategy. What is more important is that people must believe that the IT (ICT) strategy is the right direction in terms of its feasibility of implementation”.

Furthermore, the IT managers can gather interest from the other employees by presenting the IT strategy to them through organizing a workshop. The IT Executive Committee uses the opportunity to explain the services that will be available to the citizens (in terms of m-government system implementation). The managers are then selected to manage the implementation of the IT (ICT) strategy based on their experience and skills-set. The managers then make sure that individual employees show their commitment to the implementation.

It is, however, not guaranteed that this effort will yield positive results. This is made known by the comments of one of the interviewees below:

“As an employee, you find yourself in a situation where you do not have a complete understanding of what the IT (ICT) strategy is or what it is not. And this is what you are expected to implement. It is very clear that there is confusion regarding IT (ICT) strategy we want to implement. One is therefore compelled to work under pressure which sometimes does not bring the best out in us”.

The HOU and the IT Executive Committee are aware of this situation but it emerged that this is not effective beyond acknowledging the situation.

Therefore, while the HOU and the IT executive committee made several determinations to build interest around the solution proposed to the problematized issue, the building of interest among employees cannot be viewed as an achievement. Due to this, employees' enrolment to the processes of implementation, presented as the MPP of the actor-network, was also partly accomplished, because employees accept the tasks

assigned to them hesitantly and their roles in the implementation of the IT strategy are hampered.

6.4.2.3 ANT Translation: Enrolment

Various meetings were organized to inform the employees about the IT (ICT) strategy that has been developed. These were followed up with team meetings. The team meetings serve as the vehicle through which discussions can be held regarding the purpose of the IT (ICT) strategy and assign task to employees. One of the interviewees explained as follows:

“Our first step is organizing a seminar and this is facilitated by the management with the executive member explaining the IT (ICT) strategy and we also use the occasion to discuss our score card”.

Although enrolment at the highest echelon has never been a challenge, with the IT managers supporting the IT Executive Committee in both the IT (ICT) strategy development and the (ICT) strategy implementation, it emerged that the individual employees are not united regarding the enrolment. This is because some of the employees lend their support to the process and enrol in the implementation while others show little or no support and as such their enrolment in the implementation is done hesitantly. One of the interviewees explained as follows:

“There are different employees that are on different levels that are actually participating in implementing the IT (ICT) strategy; but the truth is there are some that are just there for the sake of being there and their participation is done reluctantly”.

The IT managers use the power bestowed on them to enrol employees into the process of implementation by allocating tasks and resources to them. This action is in conjunction with the BIR required performance evaluation system.

Therefore, as expected from a moderately ineffective phase of building interest for implementation among employees, enrolment was similarly only partially accomplished. The enrolment that was conducted was more of the result of employees being forced into accommodating the tasks assigned to them due to the fact that this

came with their performance evaluation scheme, than that it was based on their interest having been effectively translated to concur with the interests of the focal actors.

6.4.2.4 ANT Translation: Mobilization

Mobilization is the last phase and during this stage, new initiators will be formulated by using some actors to achieve this. These actors become the spokesperson for the focal actor which helps to solidify and steady the network. The actor-network then starts to operate in a target-oriented method to implement the solution proposed. This will determine the level of success of the mobilisation.

The IT Executive Committee as well as the IT managers are then mobilized successfully by the HOU who are in turn expected to enrol their various individual employees in the IT strategy development.

Clearly, such circumstances have a dire negative effect on mobilisation. Mobilisation begins positively at a high level, but fades out through the ranks and leaves most of the employees sceptical and unresponsive contributors to the implementation of the IT strategy.

6.4.3 Finding from the Analysis

From the analysis of the case study presented above, using both Structuration Theory and ANT, some findings can be extracted. These findings are briefly discussed below.

- **Resources Control**

Resource control was dominant in the computing unit. This was based on how important the resources were in the implementation of IT strategy.

The tasks in the implementation of IT strategy within BIR were defined and determined by the structures within the computing unit at the BIR. Employees' tasks were assigned to the different IT managers, who in turn assigned the tasks within the specified times to their individual employees. Through the performance evaluation scheme, the IT managers dominated their individual employees during implementation of IT (ICT) strategy. This practice was considered rational and, as such, authorized by most of the employees, particularly at the lower levels.

- **Human Interference**

It was clear that some actions were strong indications that there were manifestations of organisational politics. These actions included differences between the employees in the lower levels and the employees in the senior levels. Due to this, there was division, which led to a serious lack of cooperation between the different employees in the computing unit.

- **Guidelines of BIR**

The guidelines of BIR can be applied to different activities and processes in both the development and implementation stages of IT (ICT) strategy. For instance, not all the employees who participated in the development of IT (ICT) are necessarily required to participate in the implementation of IT (ICT) strategy within BIR. However, the employees believed such a system was not reasonable and, as a result, they found it difficult to sanction the development and this clearly affected the implementation of IT strategy. This effectively means the implementation of m-government system to enhance the quality of government service delivery was negatively affected.

IT managers were not and cannot be questioned by lower level employees. This allowed some IT managers to apply BIR guidelines as they deemed fit.

- **Employees lower on Technical Ability**

The higher numbers of juniors among the employees in the computing unit who do not have adequate technical abilities had a significant contribution on how the tasks for the implementation of the IT (ICT) strategy will be assigned within BIR. Because of this, getting the employee with exceptional technical abilities that can have a huge impact on the implementation of IT (ICT) strategy was a challenge. Therefore, junior employees did not or only hesitantly enrol in the implementation.

6.5 Analysis of the Results from the Critical Success Factors

The challenges of scalability and sustainability of an m-government project was explored in the case study. The analysis of the interview transcripts was conducted systematically using qualitative data analysis software packages Atlas.Ti 7 and NVivo 11. Although the two software programs were developed by separate organizations, they are used for the same purpose and the reason for using the two together was simply

because the researcher wanted to validate the quality of the result from the analysis. There was no difference in the result of the analysis and the researcher was satisfied with the output. This section presents the analysis of the interview.

6.5.1 Result Categories from the Concept of Scalability and Sustainability

Following the coding of the interviews, the challenges facing scaling and sustaining m-government project implementation for effective service delivery were identified and explored. More than 10 concepts were identified from the data that were gathered. The researcher then regrouped these concepts into three different concepts. These are (1) the concept of contextual realities of developing countries, (2) the concept of anticipated users (the citizens and staff members of the agency and/or departments) and (3) the concept of evaluation of m-government system implementation for service delivery. In this section, these concepts are described from the above-mentioned concepts.

From the concept of contextual realities of developing countries, it has been gathered that there are main contextual and physical factors in developing countries that are affecting the use of Information and Communications Technologies (ICT) in general and mobile technologies in particular. These factors are considered to have direct effect on the process of scaling and sustaining m-government projects implementation in majority of developing countries. The following are some of the realities that were observed from the analysis of the data.

○ Deficit in ICT Infrastructure

Many governments in developing countries have intensified their efforts to invest in ICT infrastructure in terms of service delivery to the citizens. However, it has been observed that the lack of appropriate ICT infrastructure has a direct effect on the implementation of m-government projects. The use of some components of mobile phone applications (for example mobile applications that need access to the network or web based applications in an environment where there is no support for internet technologies) has not been sustainable due to a lack of appropriate ICT infrastructure that can be used to support the system. It was also gathered that this has a direct impact on scaling the implemented m-government system. For example, one of the functional managers interviewed at BIR explained as follows:

“One of the challenges that we face is that we do not possess quality server computer within the agency that can be used to support the implementation of the m-government system. Majority of our customers are in the rural areas and while it is understood that some of them have access to smartphones that have access to internet, but the truth is that the level of internet connectivity among them is very low. It is also understood that the network operators have the infrastructure and we have on many occasions express our interest in partnering with them and use their infrastructure, however the cost of doing this is too high and it is not sustainable from our side and we have to stop the process of going that route.

Furthermore, the infrastructure that we have within our capacity are not strong enough to cater for many thousands of customers, not to talk of millions of customers. We have had a pilot project which is an SMS (Short Messaging System) integration and it reached a certain point when the system had to crash. We lost all the data and this is due to over subscribing to the system”.

The above response speaks directly to factors that affect scalability and sustainability.

- **Socio-economic conditions**

Unemployment, poverty and problems related to literacy are also observed to be factors that have an impact on the scalability and sustainability of m-government project implementation. It was gathered from the interviews that this has a general impact on the feasibility and practicality of the project (i.e. self-sustaining). Furthermore, these have been observed to have impact in terms of the contributions made financially from already poor individuals. For instance, it emerged from the follow-up interview where one of the interviewees said:

“We also find ourselves in a situation where we have customers (i.e. citizens who do not want to pay for using their mobile phone to access government services, which we have been considered effective. We however do not blame majority of them because we realize that some of these people do not have the money. But the truth is that, government having to pay the total cost of the service is simply not sustainable and this is one of the reasons some government agencies/department do not budget for the implementation of m-government project”

- **Lack of Government Support and Buy-In**

Another factor observed that affects scalability and sustainability of m-government project implementation is a lack of support from the government. This is seen to have influence on its short term and long term objectives, particularly when the project is not an initiative by the government itself. From the interview, it was gathered 100% of the respondents agreed that it is vital for government representatives to be supportive of the m-government project and, therefore, provide the necessary resources to carry it out. However, 90% of the respondents agreed that the reason for the lack of support from the government is due to lack of ICT knowledge, which leads to a lack of understanding of the value mobile technology brings a lack of familiarity and lack ICT background among the top government representatives who make final decision on the approval or non-approval of m-government project implementation which eventually leads to non-sustainability of m-government project.

- **Lack of Project Management Skills to Successfully Handle m-Government Projects**

The data gathered from the respondents and analysed revealed that many m-government projects have been carried out without any prior feasibility study and this is due to lack of project selection process with regards to m-government project implementation. One of the respondents' comments – *“there is lack of strategic approach to m-government project selection. Getting this right can assist in getting better results for our organizations in terms of sustainability of the m-government implementations that we have carried thereby reducing the risks in terms of failure and maximizing the potential success of the project”*.

- **Lack of Alignment between Users' Needs and Organization(s) that deploys M-Government Solutions**

Most of the respondents agreed that, in many cases, there is an absence of appropriate evaluation process and standard methodology as well as no business process reengineering. Thus, getting user involvement in the project becomes a difficulty and the development team fails to get the full involvement of the user, most especially during the user acceptance test. Because of this, users do not use the system after it is implemented due to the system not meeting users' requirement. Furthermore, the user complains that most of the m-government systems implemented fail to meet their expectations.

From the concept of anticipated users with regards to the citizens, the following were observed based on the interview conducted. The observations were made from the perspective of scalability and sustainability.

- **The Intended Users Are Not Ready To Make Financial Contribution**

From the concept of contextual realities of developing countries (discussed above), it has been gathered that financial viability of m-government project will contribute to its sustainability. However less than 36% of potential users were willing to commit financial contributions as observed from the data gathered.

- **Lack of Appropriate Use of Technology Infrastructures**

The choice and the use of inappropriate technology infrastructures have been identified to not always provide the best solution in terms of the infrastructure's ability to handle the user's request. For instance, access to mobile phones is high. More than 95 per cent of the respondents (intended users) have access to smartphones. It was further gathered that one of the mediums through which some governments in developing countries communicate with users is through Unstructured Supplementary Service Data (USSD). This is a Global System for Mobile (GSM) communication technology used to send ordinary text between a mobile phone and the corresponding application program within the network. More than 80 per cent of the respondents agreed that on many occasions they were unable to finish their transaction using the USSD system. This agrees with the discussion above, regarding the deficit in infrastructure. However, the respondents express their willingness in using potential native mobile phone applications for government service delivery, if implemented. More than 90 per cent believed that appropriate technologies implementation could assist in improving the quality of service delivery. This means that the perception of users regarding the importance of technology has considerable impact on scalability and sustainability of m-government project implementation. Table 6.5 below highlights these analyses.

Table 6.5: Findings on anticipated users of m-government system implementation.

Source: Survey Conducted

Potential for M-government Application usage	Percentage
Users with access to mobile phone	95.7%
Users with no access to mobile phone	4.3%
Lack of technology infrastructure and implementation	81.6%
Financial contribution for service use	35.4
Not willing to contribute financially for service use	64.6%
Believe m-government services can be improved through using appropriate mobile technology	90.3%
Do not believe m-government service can be improved through using appropriate mobile technology	9.7%

6.6 Observation/Lessons Learned from the study of Factors Affecting the Scalability and Sustainability of M-government Project Implementation

From the study conducted, it emerged that the level of interest and investment in m-government projects implementation to the developing countries has risen steeply in recent years and an improved understanding of the key components of effective m-government project implementation remains subtle. However, it was observed that scalability and sustainability of m-government project implementation remain a persistent concern and this means many of these projects typically have a high failure rate. This experience in this research is a mixed one with various perspectives in terms of scalability and sustainability, such as technological, organizational, economic and social were taken into consideration.

From the scalability point of view, the researcher observed that simplicity of replicability and model for scalability, technologies customization to meet specific needs of the local users, commitment of the organization to ensure success are some of the attributes that are missing. These are viewed as some of the factors that can contribute to the scalability of m-government project implementation.

From the sustainability point of view, the researcher observed that governments tend to base some of the m-government project implementation on a charitable or free model.

Most of the government ICT project implementations do not identify and charge for the services they provide, hence the lack of sustainability. It was also observed that some of these projects cease to exist once the initial funding from external parties disappears. Furthermore, projects were not initiated through consultation at the grassroots level to maintain sustainability. This means that the government organizations/agencies have been adopting a top down approach and this has not been working as these results demonstrate that that users (in this case, the citizens) do not use or need the implementation of m-government project.

6.7 Chapter Summary

This focus of this chapter was on the Analysis of the case studies that leads to some findings and results in terms of the observations made by the researcher. The discussion in this chapter presented the concepts applied in the analysis as well as the analysis of the case studies from the perspectives of the theoretical framework (i.e. Giddens's Structuration Theory and Actor Network Theory respectively). By employing the duality of structure from the Structuration theory, this chapter concentrate on the repetitive relationship between structure and human actions during the development and implementation of IT (ICT) strategy which ultimately leads to implementation of the m-government system that can used to enhance government service delivery in both cases.

Analysing both case studies using ANT showed that a moderately stable network of aligned interests was unsuccessful in establishing itself. While the problematization phase in both cases is successful, the same cannot be said of the subsequent phases. There was no sufficient interest amongst the rest of the employees, beyond the top IT executive committee who were responsible for the development and implementation of the IT (ICT) strategy. This can be credited to the poor level of communication, in addition with subjects of mistrust as well as private technical interests which were not focused on the broader interest of the case studies. Furthermore, communication with the citizens who will end use being the final users and adopter of the implementation was not established. Enrolment in both cases depended on force, and is used with performance related motivations, and on many occasions, employees hesitantly accepted their tasks and responsibility during the implementation. Therefore, it was not astonishing that mobilisation was disjointed and could not be accomplished, with little or no signs. These are some of the factors that hinder successful implementation of m-

government system that can be used to enhance the quality of government service deliveries.

The next chapter presents an explanation of the design and development of the artefact. This is informed by the Action Design Science research process that was discussed in Chapter Four.

CHAPTER SEVEN

DESIGN AND DEVELOPMENT

7.1 Introduction

The theoretical background, and research methodologies to successfully conduct this research were presented in the chapter four. This chapter outlines the design and development of the framework that was developed as a proof of concept artefact that serves to investigate mobile government implementation at various levels of governance. The chapter also presents how design science theory was applied in designing and developing the prototypes.

At this stage, it is important to revisit the focus of this research study - to study and explore ways through which government can incorporate the use of mobile phone technologies to improve the provision and reach of government services to the citizens. This requires a prototype artefact that serves to investigate mobile government implementation at various levels of government. However, as part of the design science methodology a conceptual framework was developed in the process leading to the design and development of the application (See Figure 1.1).

7.2 The Development of the Framework

The context, intended use and goals of the framework under development are guided by the results of the findings from the preliminary interview of the citizens. This identified a gap in Information Systems when it comes to government service delivery through using ICT (particularly mobile technologies). The interviews also provided understandings of the research problem, for which an appropriately considered framework could prove useful. However, the role of design in the development of the framework is through the selection, composition and evaluation of academic theoretical concepts for practical ends. Therefore, the development of the framework (including its evaluation) is part of a design science research methodology. Furthermore, the development of an organization-specific application (as in the case of the proof of concept artefact) is a design science activity, in the sense that it involves the development of a system. The framework presented in table 7.1 was developed in response to the challenges of m-government scalability and sustainability which hinders quality service delivery through using mobile technology, caused by many reasons

including inadequate infrastructure, inadequate resources (including human resources), inadequate funding etc.

The proposed framework addresses the quality of government service delivery by aligning the strategic objectives between service delivery and m-government system implementation. The expectation of the researcher is that if the framework is properly implemented it will ease the current loophole in m-government scalability and sustainability and assist in enhancing the quality of government service delivery through mobile technology, hence enhancing confidence in the citizens, who are at the receiving end of the service

7.3 Developing the Framework to Address Challenges of Scalability and Sustainability of M-government System Implementation

Reviewing the literature on M-government scalability and sustainability, it can be determined that no integrated framework that can be used to ensure scalability and sustainability of M-government project implementation. Therefore, establishing a framework to address this subject would facilitate academic research as well as knowledge transfer that will address practical issues and also enable a more focused approach. The proposed framework in the table below outlines the factors that are essential to address the subject of sustainability of m-government implementation.

We propose five perspectives on m-government scalability and sustainability: Governance, Technology, Financial Management, Citizen and Resources. These five perspectives are based on the necessary sustainability measures in terms of m-government implementation. As m-government projects implementation progress through the various stages of maturity, these requirements must be addressed adequately and simultaneously. If there is no proper scalability or sustainability measure put in place, the probability of a failed m-government project implementation is high. The framework is proposed based on our adoption of Alijeban and Saghafi (2010) model through the course of our research study. Therefore, as m-government progresses through the six maturity stages this framework must be addressed adequately and simultaneously.

7.4 Purpose of the Framework

The fundamental idea of a framework is that it is principle-driven, which means that the business requirements are analysed and then establish a set theoretical architecture principles that will allow the framework for use in organization and technical selection based on the analysed requirements. Sadeh (2002) argues that a framework must guarantee consistency between the requirements and the principles such that the business objectives will be met through using a solution that concords with the principles, and that the applicable principles are grounded in the business objectives.

Therefore, the purpose of the framework is to ensure the veneration of the aims and objectives of m-government initiative in the area of government service delivery and the enhancement of the quality of the service delivered. Furthermore, it is important to explore the necessary requirements for m-government as a success factor in government service delivery effort through the use of mobile devices and technology. However, the focus of the proposed framework comes from a technology perspective. The horizontal axis of the framework outlines the consecutive stages of m-government implementation while the vertical axis applies the three different technology requirement perspectives. This results in five successive steps per technology requirement which build upon their respective predecessor indicated by their alignment within the framework.

Table 7.1: Framework for m-Government Project Implementation Scalability and Sustainability. Source: Adapted from (Alijeban and Saghafi, 2010)

Stages of M-Government							
Scalability and Sustainability		1 Presence	2 Interaction	3 Transaction	4 Integration	5 Personalization	6 Participation
	Governance	Policy on presence	Policy of Interaction	Policy on Transaction	Policy on information sharing	Policy of personalization	Policy on informational self-determination
	Technology	Appropriate mobile technology	Secure communication	Integrity of transaction and storage	Data access on time and right management	anytime accessibility	Citizen controlled
	Finance/Budget	Funds provision	Accountability	Minimal transaction charge	Consultation	Justification for budget	Citizen controlled
	Citizen	Citizen Awareness	Trust	Choice of Transaction	Consultation	Management right	Control
	Resources	Policy to address shortage in resources	Provide service support	System to address overwhelming needs	Retention mechanism of human resources	Capacity building	Institutional support

7.5 Framework Development Process

The development processes of the framework were guided by design science research as discussed in Chapter four (see section 4.4). The design science research phases that were followed were: Consciousness of the m-government scalability and sustainability challenge, proposition for initial design, developing the framework (i.e. the artefact), Evaluation of the proposed framework and finalizing the research results. To clearly describe how the framework was developed, the process adopted during the development phase is divided into five major steps as predicted by (Karokola et al., 2011).

- **Consciousness of the m-government Scalability and Sustainability Challenge**

A rigorous literature review and case-studies were conducted in two separate government organizations located in Nigeria and South Africa respectively. The findings from the studies showed that scalability and sustainability of m-government project implementation seem to be a key challenge. The study further reveal that one of

the major reasons for this challenge is m-government project systems are implemented in a manner that is scalable. Furthermore, it was gathered that m-government system implementation in these case studies environment is guided by the national government e-Strategy (which forms part of the IT(ICT) strategy). Please note that the researcher could only find literature on the strategy in the South African context (Mkhize, 2014) and no literature was found in the Nigerian context, apart from the organizational (i.e. BIR) IT (ICT) strategy. The strategy however recognizes the importance and use of IT (ICT). Furthermore, it was revealed that, some of the initial respondents from the case studies were of the view that if there is a model that could have built-in guidance on how m-government system should be implemented, it could enhance the quality of government service delivery, thereby improving the alignment between the strategic objectives of government business processes and government services delivery through the use of IT (ICT). This generates the necessity to conduct more study on existing e-government and m-government, looking at various existing maturity models. The results of the study showed that there is a need for a framework that can assist to ensure scalability and sustainability of m-government system implementation.

To generate consciousness of the identified challenges, the researcher communicated the findings to the case study organizations. Also, the results of the finding were reported in research papers published in peer-reviewed internationally recognized conferences and book chapter.

- **Proposition of Initial Design**

In the previous research studies, some of the identified challenges of scalability and sustainability of ICT projects in the practical setting that had affected e-government project in developing countries (and even m-government) systems were inadequate infrastructure, inadequate human resources capacity, inadequate or no funding, inappropriate policies and strategies to manage the sustainability challenge etc.

In addressing these identified challenges (see section 2.8.3), it was imperative to propose an initial design that would suitably integrate how sustainability and scalability of m-government system implementation could be achieved. Subsequently, various e-government and m-government maturity models, e-government and m-government implementation best practices and standards were reviewed as presented in Chapter

Two and the research paper that was published as a book chapter. The research results proposed five critical perspectives on m-government scalability and sustainability: Governance, Technology, Financial Management, Citizen and Resources. These five perspectives are based on the necessary sustainability measures in terms of m-government implementation.

- **Design and development of the Framework**

This stage included applying appropriate research methods and approaches. It also involved the application of appropriate theoretical foundation from the existing theories in information system as well as m-government standard discussed in Chapters Two, Three and Four. These includes Structuration theory (Giddens, 1984), Actor-Network theory (ANT) (Latour, 1987), review of e-government and m-government maturity models, best and practices standards, review and identification of critical success factors (CSFs). During the design, various m-government perspectives (as mention above) and requirements for scaling and sustaining m-government system were integrated.

- **Evaluation of the Proposed Framework**

This was seen as one of the most significant aspect of this research study. Through this stage, an important feedback was provided to the development process of the framework. The design process was performed repeatedly from the consciousness of the challenges, proposition of the initial design, design and development of the framework to evaluation of the proposed framework. The analysis of the evaluation provided the researcher with the choice of theoretical and qualitative evaluation methods.

- **Finalizing the Research Result**

The concluding result of this research study was a framework to ensure scalability and sustainability of m-government project implementation. The research findings that contributed to the development process of the framework were reported in five research papers. The research papers were published in the peer-reviewed internationally recognized conferences and book chapters. Furthermore, Chapter Nine serves as the concluding remarks for this research study.

7.6 Discussion of the Framework

7.6.1 Horizontal Dimension: Maturity Stages

The six maturity stages build upon each other, for example to get to a transactional capability (Stage 3), two-way intensive mobile-enabled communication (Stage 2) between government and citizen must be possible. The first four maturity stages describe a government's evolution in providing electronic services. The first stage, presence, recognizes government's initial ability to provide one-way information electronically to citizens. The latter stages progress through two-way communication, e.g. establishing communication via mobile devices and online forms through mobile devices, through to citizen centric, integrated electronic service delivery, i.e. Transaction, then across multiple government's agencies and departments, Integration. The sixth stage, participation was added to reflect government platforms allowing users to participate politically, e.g. by applying for government's services at citizen's convenient times. The last stage, electronic participation reflects government platforms allowing users to participate politically, e.g. by voting or posting comments.

7.6.2 Vertical Dimension: Scalability and Sustainability Framework

The proposed framework adopts a multi-perspective approach - Policy, Technology, Capital and Citizen for establishing scalability and sustainability of m-government project implementation. To address the implementation of this framework, four things need to be considered alongside each other for enhancing the scalability and sustainability of m-government: Policy Requirements, Technology Requirements, Financial Requirement and individual empowerment otherwise known as citizens' requirements and resources. These five perspective are selected for the proposed framework.

7.6.2.1 Policy

The policy perspective, in the *Policy* row, defines the development of scope and clarity of m-government system implementation. This begins with the existence of basic policies on M-government project implementation. These may restrict what types and amount of data is collected about citizens as well as stipulate the need to inform citizens about this. However, policy at this stage does not yet cover the need to address how the collected data is used. What type of transaction will be taking place via citizen's mobile devices in order to communicate with the government? Also, policies such as cost involved in applying for any of government services through mobile means needs to be

put in place. This comes into play in the second stage, with policy adding greater protection of citizens' privacy by specifying how data is used when two-way communication occurs. Government accountability comes into play in the third stage as protection of data becomes part of the government's mandate. This is broadened in the fourth stage where policy needs to define how citizen information is shared between government organizations, possibly reaching down to the level of the roles and responsibilities of the information handler. In the participation stage policies need to stipulate the complete informational self-determination of the citizen by addressing how a citizen can obtain full control over the data the government has collected about her/him and how the government uses this data.

7.6.2.2 Technology

The Technology perspective is the manifestation of the application of technology. The proposed framework expands this notion to the concept of regulating technology's ability to help collect information without the citizen's involvement, so that it occurs in an appropriate manner where both the government and the citizen will have mutual benefit and understanding. In the second stage, where two-way communication is relevant, technologies such as encryption and secured storage are needed to protect interactions between citizen and e-government system.

7.6.2.3 Financial

This perspective requires that in order to implement a sustainable M-government project, the government has to look at the financing requirements that are needed to meet the needs of the implementation. Government and various stakeholders involved in M-government project implementation need to understand the total cost of ownership before the decision to invest in such a project is made.

7.6.2.4 Citizen

The Citizen perspective is generalized to convey important citizen characteristics which support the advancement of technology usage in m-government project implementation (Belanger and Hiller, 2006). These characteristics must be established through the policy, and practice of government including the use of technology. Furthermore, the degree to which the citizens believe that their continued use of the m-government implementation will be effortless, the usefulness of the m-government system as well

as the alternative to m-government system implementation needs to be established by the government. Citizen awareness of privacy issues, and the government's policy towards it, structures the basis for the citizen's stake in m-government project Implementation. Once trust by citizens in the m-government project has been established, the choice of how to implementation m-government system needs to be addressed. The next action is therefore to consult citizens, educate them and empower them to decide on which data the government collects about them and how it is used at a high level of granularity while the last stage gives full control over this matter to the citizen.

7.6.2.5 Resources

The resources perspective is required with the notion that capacity building in m-government project implementation among public service practitioners is at the center without which it is possible to even reverse past achievements. Furthermore, it is obvious that human resources can play a more strategic role in the implementation of policies, practices as well as the systems that influences the attitudes and behaviours of the citizens in adopting and utilizing m-government project implementation as the sole medium of service delivery (Yambesi, 2012). However, the concern is on how the human resources should be developed and the importance of making sure that they are utilized to ensure the sustainability of m-government project implementation.

7.7 Design Decision of Artefact (Mobile Service Delivery Platform)

Understanding how and where to enhance government service through mobile technologies requires some investigation to understand how the government can achieve effective service delivery and what the citizens on the other side want from the government with regards to the delivery of quality service. To achieve the objectives of our research, we gathered input from the citizens during the early stage of our research work. As stated earlier, the citizens in this research were sampled from both Nigeria and South Africa. The purpose of this is so that the extent of the research study can be strengthened. Therefore, we conducted survey to comprehend how they evaluate their service delivery experience with the government. The survey included nine questions which were administered by means of interviews and questionnaires. This process started in July 2013 and it took nine months to complete. The researcher later followed this up by conducting observation of the users.

A literature study on how the questionnaire that could be usable for capturing user needs and requirement regarding government service delivery using mobile technology was conducted. However, none of this questionnaire covered the data required in this study. We therefore held series of consultation with various researchers in compiling the questionnaire and this led to comments and suggestions being given on how the questionnaire would be designed and administered. The constructive comments and suggestions received as well as the modifications proposed were taken into consideration and executed. This led to the capture of information about the following aspects:

- Biographic details: Name, gender, academic qualifications, and experience.
- Priorities in selecting and using a certain government service, used and the reason for this.
- What features subject would like to see in a mobile service delivery platform if there is any.

In total, 124 people responded to the questionnaire that was distributed. 70 of these were citizens from South Africa while the remaining 54 were those from Nigeria.

Due to the size of the data collected from the survey, a descriptive analysis was conducted and the following data was gathered from the survey: Ninety-four percent (94%) of the respondents have smartphones and majority of them have been using the smartphones for more than 5 years. Sixty-seven percent (67%) of the respondents were males and sixty-eight percent (68%) were aged between 26 and 35 and thirty-two percent (32%) were aged between 18 and 25.

Eighty-six percent (86%) of the respondents felt that mobile technology will support the way in which they communicate with the government in terms of service delivery. Most of the respondents believe that m-government would be useful and would help reduce the time spent on manual form of conduction transaction and communicating with the government. Eighty-nine (89%) percent of the respondents have the infrastructure (i.e. smartphones and access to the internet) to use m-government system while Eighty-three percent (83%) belief that m-government should be accessible at anytime and anywhere. However, after follow-up interview, it became very clear that

citizens expect more government services to be ported on mobile devices. It was gathered further that this is mainly because of the unnecessary time wasted through using the traditional ways of service rendered by the government.

Hence, the result of the survey shows that porting government services on the mobile platform in order to accommodate the citizen's yearnings for better services needs to be implemented. To this end, our research focuses on designing a proof of concept artefact. This was done through Android Mobile development platform. The reason behind the choice of Android Development platform was because more than 75% of the citizens of the two countries have access to Android mobile devices.

The artefact that was developed is called Mobile Service Delivery Platform (MSDP) and it is used to request for government services such as application for ID or passport (for example South Africa's Department of Home Affairs) and tax payment system (for example the Nigeria's Board of Internal Revenue (BIR)).

7.8 Chapter Summary

This chapter presents a framework that could be used to address the challenges of scalability and sustainability of m-government system implementation in developing countries. The target users of the framework are stakeholders within the government organizations and agencies who are engaged in a value-led mobile technology implementation for service deliveries to the citizens.

The framework is used and tested to evaluate the Mobile government implementation. The details of the evaluation are presented in Chapter 8.

CHAPTER EIGHT

EVALUATION OF THE FRAMEWORK

8.1 Introduction

In Chapter three, the theoretical backgrounds that formed the basis for this research study were presented and discussed while in Chapter four, we presented the methodologies that are applicable to carry out this research. In Chapter seven, the discussion around the design and the development of the framework for m-government scalability and sustainability was presented. However, one of the essential steps in the development of framework is evaluation. This is because it offers important feedback to the improvement of the framework development. The evaluation of the framework was carried out in the organizations of the case study. This chapter presents the details of the evaluation that was conducted during this period.

8.2 Design Science Research Evaluation

It is essential to establish a suitable set of definitions, guidelines or assessment standards when evaluating design science research. This is because it is used to guarantee that design science is the appropriate way to conceive of and evaluate the research effort. Furthermore, it acts as the basis of the evaluation.

Hevner et al. (2004), argues that artefacts that are built in design science research are rarely full-grown information systems that are used in practice. Rather, artefacts are innovations that define and describe the ideas, practices, products, and technical capabilities through which the analysis, design, implementation, and use of information systems can be efficiently and effectively communicated and accomplished. This means that when conducting design science research, it is not essential or required to produce a working IT system (or artefact).

This study is a research project, as opposed to a design project, thus the resulting artefact, that is the framework is satisfactorily generic and abstract such that it can be applied to a various organisational settings and situations. It also includes some amount of evaluative severity and consideration that go beyond what is traditionally required for a once-off design effort.

Therefore, the prime objective of the framework is to establish the possibility of the research process. In this case, the possibility of the research process is claimed for by the existence of the framework itself.

8.3 Method of Evaluation

As stated in the previous chapter, the design and development process was carried out repeatedly from the consciousness of the challenges facing m-government system implementation, proposition of the initial design, design and development of the framework to evaluation of the proposed framework. There are various methods that can be adopted in evaluating the proposed framework. These include analytical, descriptive, empirical, observational and testing methods (Zelkowitz and Wallace, 1998; Hevner et al., 2004; Gupta and Jane, 2003). These methods were reviewed and analysed.

The result of the review and analysis of these methods suggested that observational and descriptive evaluation methods are more suitable for theoretical evaluation approach. Similarly, testing, analytical and empirical evaluation methods are more suitable for practical evaluation approach. However, the practical evaluation approach requires the implementation of the framework in a real-life setting by applying the framework in an on-going m-government project. This process will demand lot of time, effort as well as resources.

A theoretical evaluation approach was chosen to evaluate the proposed framework. Further questionnaires that can assist and guide the evaluation process were developed (Hevner et al., 2004; Venkatesh V. and H., 2008). These questionnaires contain six criteria for the evaluation: effectiveness, relevance and capabilities, flexibility and dynamics, completeness and coverage, reliability, and simplicity. It is imperative to note that the purpose of the framework evaluation was to obtain feed-back for improvements, therefore, findings of the ratings for those who agreed and strongly agreed are presented here. Results of the ratings for those who were either not sure, disagreed or strongly disagreed are not presented here.

The next section presents analysis and discussion of the result of the evaluation.

8.4 Analysis and Discussion of the Evaluation Result

The evaluation was conducted among researchers (Professors, Doctors and PhD candidate) whose area of research and research interests fall within e-government and m-government. This evaluation was conducted at the 2014 International Conference on e-Learning, e-Business, Enterprise Information Systems, and e-Government in Las Vegas, where the researcher also presented a paper based on this research study. Also, the evaluation was conducted among government employees (i.e. those whose positions are managers upward). A total number of 69 subjects participated in the evaluation.

The result from the data processing and analysis were divided into three main evaluation categories: the first category (category 1) presents overall analysis acceptability ratings of the proposed framework regarding the seven evaluation criteria; the second category (category 2) looks at areas of framework improvements, which is based on the respondents' opinions.

8.4.1 Analysis of the Acceptability ratings of the Proposed Framework

The evaluation findings of the proposed framework in this category are grouped into the following: overall acceptability ratings, and acceptability ratings per organisation.

8.4.1.1 Overall Acceptability Ratings for the proposed Framework

Based on the six criteria that were defined, the findings from the case studies are discussed below. Figure 8.1 below presents the summary of the general evaluation findings:

- **Simplicity:** the general acceptability rating was 81% as shown in figure 8.1. What this means is that respondents perceived that the proposed framework is designed to be clear and easily understandable to m-government system implementers.
- **Completeness and Coverage:** The general acceptability rating of the framework under the completeness and coverage criterion saw an increase compared to the previous one. The rating was 87% as shown in figure 8.1. This means that the respondents observed that the framework can adequately address the technical, non-technical, theory and practical-related issues with m-government system implementation.

- **Flexibility and Dynamic:** This criterion saw a decline in the general acceptability rating. It stood at 75% compared to the previous criteria as shown in figure 8.1. However, the rating still stood at an acceptable level. This shows that the respondents were of the view that the framework is flexible and dynamic enough to handle any possible future risks and threats that may be encountered by m-government implementation.
- **Relevance and Capabilities:** The general acceptability rating for the relevance and capabilities criterion saw an increase to 79% compared to flexibility and dynamic criterion. This is shown in figure 8.1. What this means is that respondents believed that the framework to be more realistic when dealing with the challenges facing scalability and sustainability of m-government system implementation.
- **Effectiveness:** This criterion received an increase for the general acceptability rating. The rating was 92% as depicted in figure 8.1. This means that respondents believed the framework to be useful when addressing the challenges of scalability and sustainability of m-government system implementation.
- **Reliability:** This criterion saw a decrease for the general acceptability rating compared to the effectiveness criterion. There was a decrease of about 9%. The rating stood at 83% as shown in figure 8.1. This means that in general, the respondents believed that the framework is worth trusting for addressing the challenges facing scalability and sustainability of m-government system implementation.

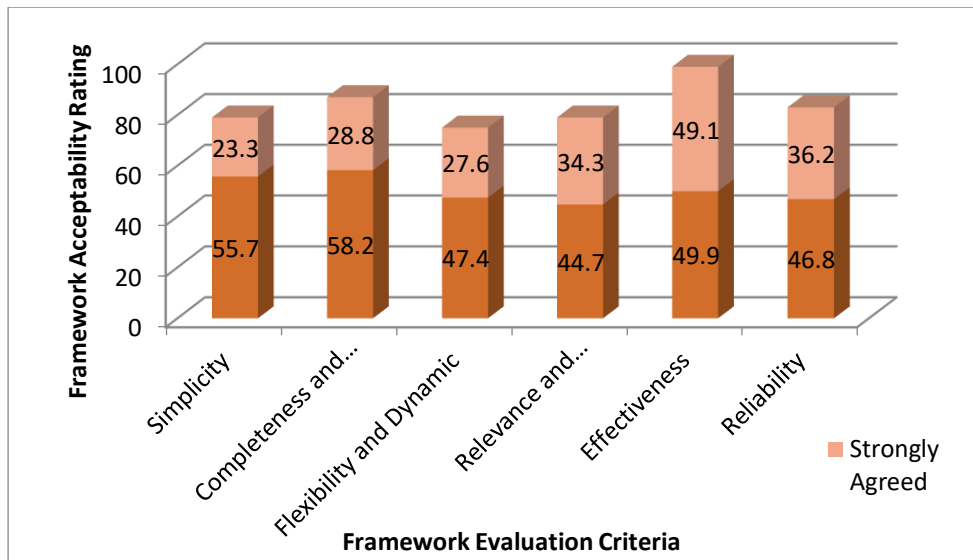


Figure 8.1: Overall acceptability ratings of the proposed framework using six different evaluation criteria for the two case studies

8.4.1.2 Overall Acceptability Ratings of the Proposed Framework according to Case Study Organizations

According to the six criteria that were defined, the findings from the two case study organizations are discussed below. Figure 8.2 below presents the summary of the organization evaluation findings:

- **Simplicity:** Acceptability ratings for the proposed framework among the two case study organizations revealed that BIR rated the framework highest with 94% rating while SASSA rated the framework at 90%. This shows that the design of the framework was believed to be more easily understood by the responded at BIR than the respondent at SASSA. Follow up study on revealed that the differences among the two case study organizations could be due to various reasons, including the level of exposure by the organizations, the level of skills and expertise regarding m-government related implementation issues. The result is summarized in figure 8.2.
- **Completeness and Coverage:** For this criterion, the acceptability rating for the proposed framework among the two case studies revealed that BIR rated the framework highest at 97%, while SASSA rated the framework at 92%. The result showed that respondent at BIR believed the framework will satisfactorily address the challenges of m-government scalability and sustainability.

- **Flexibility and Dynamic:** acceptability ratings between the two case studies on flexibility and dynamic criterion revealed that BIR rated it the highest at 96%, whilst SASSA rated it the lowest at 73%. This means that respondents at BIR perceived the framework to be flexible and dynamic enough to handle any possible future risks and threats that may be encountered by m-government implementation.
- **Relevance and Capability:** acceptability ratings between the two case studies revealed that BIR U rated the framework highest at 90%, while SASSA rated it the lowest at 79%. This means that respondents at BIR believed the framework to be more realistic when dealing with the challenges facing scalability and sustainability of m-government system implementation.
- **Effectiveness:** acceptability ratings among the two case studies revealed that BIR rated the usefulness of the framework highest at around 96%, while SASSA rated it lowest at 85%. These findings show suggests that respondents at BIR believed the framework to be more useful when addressing the challenges of scalability and sustainability of m-government system implementation.
- **Reliability:** acceptability ratings for the two case studies revealed that BIR rated the framework highest at 92%, while SASSA rated it the lowest at 79%. These results show that respondents at BIR perceived the framework to be more reliable in addressing the challenges facing scalability and sustainability of m-government system implementation.
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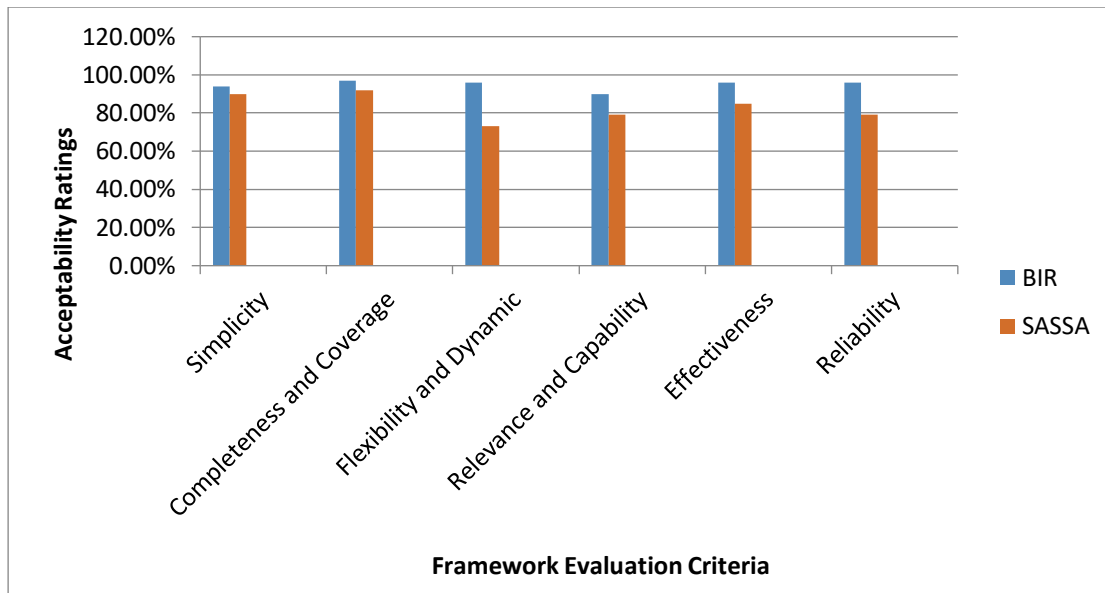


Figure 8.2: Comparison of acceptability ratings of the framework using six different evaluation criteria between the case studies organizations

8.5 Challenges of Evaluating the Quality of Framework

All the respondents at the two case studies agreed that the framework had the potential to be useful. However, the challenges of assessing the quality of the framework was repeated and discussed by the respondents when they were asked the question: in what ways, do they believe and think the framework can assist in improve the quality of government service delivery. For privacy purpose, the name of the respondents will not be revealed. The respondents will simply be referred to as respondent.

Response from respondent: *“I think your question presumes that we understand that we can measure the level of success of this framework for implementing m-government system so that it can assist government service delivery to the citizens, but I’m not sure if we can do that. The question is how we measure whether a framework is an effective one or not?”*

The point the respondent was making is explaining the challenges of evaluating the Framework’s quality, and hence the challenge of evaluating the framework developed. The use of the term ‘measure’ proposes that the researcher believes that evaluating the quality can only be done quantitatively, but as another respondent puts it, *“you don’t understand the fact”*, which means it would not be possible to associate the results of the framework with real data. When asked about the quality of the framework, another

respondent used the terms ‘*effective*’ and ‘*successful*’. This infers that their understanding of framework quality is to develop a framework which will assist government make the right decision regarding service delivery. This sentiment supports what the respondent of the previous analysis had earlier highlighted, that framework development was not an end in itself but a tool that assists in decision making. This then suggests that evaluating framework quality could be done alternatively by basically evaluating whether the right decision was made based on the framework; however, this may not also be possible considering the fact that there will not be a comparator. Although, participants did not propose a practical method for evaluating the framework quality, they however made some insinuations about how the framework could be of assistance.

8.6 Feedback and Analysis from EEE’2014 Meeting

The feedback from the EEE’2014 meeting was more positive when compared with the focus meeting that was held with the managers (functional managers, IT managers and project managers) within the case study. Those who attended the session were higher than the average number of participants (approximately 55 people). This shows that participants were interested in the topic. However, more than 75% of those who attended the session were from countries in Africa and other developing countries. The delegates at the session who introduced the framework termed it very *concisely and showed a clear grasp of the aim of the framework*. In his remarks during the introduction of the framework, he said that ‘*the article was very all-inclusive (and understandable) that it does not leave me much to say*’. The majority of the participants at the session gave positive and constructive feedback about the framework such as ‘*I think this is a great idea*’ and ‘*I have no doubt that this will assist a lot in service delivery. Thank you for coming up with this*’. The delegates emphasised that the researcher should have incorporated a description of the methods employed in developing the framework within the article and presentation made. Also, one of the delegates suggested that ‘*the framework could be applied to more areas within the government in terms of service delivery*’. Finally, there was another suggestion on how the framework could be published so that it can be used by other researchers.

8.7 Probable Weaknesses of the Framework

A significant possibly undesired effect of using the framework, identified by both the researcher's critical reflection and some of the participants at the case study and the delegates, is that while the researcher was spending time developing the framework, he was not completing other activities. Therefore, the time taken to develop the framework should be flexible. Furthermore, as with any guidance document, there is possibility of lack of proper application. Therefore, it is important to be clear about the objectives of the framework and how it should be applied, as highlighted by the delegates at the EEE'2014 symposium data.

8.8 How the Framework May Improve the Quality of Government Service Delivery

The group meeting participants agreed that the framework has the potential to improve the quality of government service delivery through mobile technology by helping to: (1) identify service delivery objectives, (2) guide service delivery model by identify strategic issues, which would also assist in introducing some level of consistency, (3) offer a means for communicating with stakeholders, the project team, customer (i.e. citizens), and also anyone who is interested or willing to develop a similar framework in the future, and finally (4) improve framework justification which may improve its validity, verification and credibility. There was general agreement that the framework could be applied in a range of contexts by researchers with different levels of experience.

8.9 Chapter Summary

This Chapter presented the evaluated study that was conducted for this research. The importance and the purpose of design science research evaluation was discussed. Furthermore, the method that was adopted in conducting the evaluation and the justification for the selected method were discussed. These methods included Theory-based evaluation. The chapter further presented analysis and feedback from the EEE' 2014 conference. Finally, the weakness of the proposed framework it can be applied to enhance the quality of government service delivery were presented. The next chapter discusses conclusion and recommendation of this thesis.

CHAPTER NINE

EVALUATION AND CONCLUSION

9.1 Introduction

This chapter concludes this research and presents an evaluation of what has been achieved.

The aim of the research study had been to study and explore how government can incorporate the use of mobile phone technologies to improve the provision and reach of government services. To this end, an interpretive stance was adopted by the research study. The study also adopts a two case study strategy. This was to gain a deeper understanding of how best to overcome the challenges of scalability and sustainability of m-government system implementation to enhance the quality of government service delivery via mobile technology. The rest of this chapter is divided into four sections. The first section presents the concluding remarks, while the second section discusses the research contribution of this study. The third section presents a discussion around the trustworthiness and quality of the research study and the fourth section discusses the limitations of the research study as well as suggestion on the future research directions.

9.2 Overview of the Research Study

The objective of implementing m-government system is to make sure service delivery is made possible to citizens always. However, this is not to be the case, due to lack of access to traditional internet connectivity. Many studies have been conducted on m-government systems implementation. Some of these studies have considered factors that are responsible for the acceptance and non-usability of m-government system. However, no study yet has been found to have considered the topics of scalability and sustainability of m-government project implementation. Also, no study was found that suggest that social context as well as the need for change should be considered when developing and implementing IT strategy which leads to the implementation of m-government systems.

Chapter One provided background to the research study. This covered the impact of ICT on the organizations that deploys it on one hand as well as the relevance of

framework for enhancing government service delivery on the one hand, which includes the importance of designing and developing of the framework that can guide in enhancing the quality of government service delivery. The relationship between people, technology and the structure of the organization that deploys the technology was covered on the other hand, which was key to this research study. In formulating IT strategy, the focus is on technical and non-technical issues. The structure of the thesis was presented at the end of Chapter One.

Through the lens of the literature review in **Chapter Two**, the dependency between technical and non-technical factors was revealed. It was uncovered that Technology, Process and People are the main components in the development and implementation of IT strategy in any organization. We argued that these components cannot be separated in the development and implementation of the IT strategy that will lead to m-government system implementation. Therefore, the understanding of these components (people, process and technology) is very essential, since they have transformative effects on each other.

The review revealed that the process component consists mainly of non-technical participations, which are predominantly actions of people. Some of these actions demonstrated themselves as organisational structure. This led the researcher to adopt a socio-technical approach throughout the research study and the researcher accorded equal importance to both the social (non-technical) issues and technical issues. To effect to the socio-technical nature this research study, the duality of structure from Structuration Theory and Moments of Translation from Actor-Network Theory were utilized intensively in the analysis of the data gathered from the case studies.

The literature reviews also revealed the transition from e-government to m-government, as well as the benefits and barriers (such as privacy, security accessibility etc.) of m-government systems. It continued with the topic of the challenges facing public governance in Africa. Also, the topic of maturity models from e-government to m-government was discussed in the literature review and finally the topic of m-government project scalability and sustainability was discussed. The challenges facing m-government project scalability and sustainability as well as how the challenges can be addressed were unpacked in **Chapter Two**.

In **Chapter Three**, a review of the underpinning theories, Structuration Theory and Actor-Network Theory (ANT) was conducted. The Chapter uncovered the relationship between Structuration Theory and Information Systems and between Actor-Network Theory and Information Systems. Also, the limitations that applied to both Structuration Theory as well as the relationship between the two theories (i.e. the possibility of applying both the theories in one study) were uncovered.

Chapter Four outlined the Philosophical assumptions underpinning this research study. These assumptions are in line with the ontological and epistemological assumptions of interpretive research study. As the aim of this research was to create a better understanding of how government can incorporate the use of mobile phone technologies to improve the provision and reach of government service, a case study strategy and Action Design Science were chosen in order to gain rich insight in to the study. Therefore, two case studies were conducted in two different organizations in two countries. This includes the computing environments of the case studies. The research design as well as data collection techniques that were employed in the fieldwork were presented in the chapter.

In **Chapter Five**, the computing environment of each of the organisations where the two case studies were carried out was described. The Chapter identified the actors involved in the development and implementation of IT strategy as well as the organisational structures. Also, described in Chapter Five was how the research study was conducted in each of the case studies. This included the time spent and the format used to gather the data.

In **Chapter Six**, the analysis of the data from the case studies was conducted. The researcher adopted the idea of the duality of structure, arising from Structuration Theory and the moment of translation from Actor-Network Theory in conducting the analyses of the data collection in each case study. Structuration Theory was predominantly useful in recognizing and analysing the dialectic between organizational which includes the computing environment with the organization and technological structures, as well as the actions exhibit by human within the organization. Actor-Network Theory provided the research study a focus on the analysis of coalitions (i.e. alliance) of networks within the computing environment of the case studies.

The findings and analyses from the case studies were interpreted and this led to the identification of the factors responsible for the scalability and sustainability of m-government implementation. This results were used to develop the framework to address the challenges of scalability and sustainability of m-government system implementation in **Chapter Seven**. **Chapter Seven** also discussed the design as well as the purpose of the framework. Later in the chapter, an in-depth discussion of the framework was provided. Furthermore, the design of the artefact as well as the decision that led to the design were presented.

In **Chapter Eight**, an evaluation of the Framework was presented. A review of various evaluation methods (analytical, descriptive, empirical, observational and testing methods) was conducted and due to some factors, that was considered (such as time limitation), theoretical evaluation approach was chosen to evaluate the proposed framework. The feedback and analysis from the evaluation, the weakness of the proposed framework and how the framework may assist in improving and enhancing the quality of government system service delivery through m-government implementation was presented in the chapter.

9.3 Revisiting the Research Questions

In Chapter One of this thesis, the formulated research questions were presented. The researcher asked the questions to break down the general research focus on how the government can incorporate the use of mobile cellular technologies to improve the provision and reach of government services. The research questions are presented in the sections that follows.

- **How can the government incorporate the use of mobile cellular technologies to improve the provision and reach of government services?**

This serves as the main question in this study. The question was asked to understand how the government can utilize the proliferation of mobile and cellular technologies to provide government services to the citizen in Africa, considering the fact that mobile phone (particularly smart phones) has become the computer in the pocket of citizens of Africa. This question was also asked in order to clarify and respond to the challenges facing public governance in Africa. This question played a leading role throughout the

thesis and particularly in Chapter Five and Chapter Six. In these chapters, the data that were elicited in the two case studies were analysed and interpreted using Structuration Theory and Actor-Network Theory.

There has not been any formal documentation or research study on how government service delivery can be enhanced using mobile technologies. Also, this study could not find any formal research study on how m-government system implementation can be sustained and scaled using mobile technologies in developing countries and Africa in particular. What the researcher found interesting is that almost all the employees and government customers (i.e. the citizens) knew the importance of adopting mobile technology, particularly mobile phone as a tool to deliver service to the citizens.

- **How can governments deliver services effectively through the use of mobile technologies such that people will use the technology they already have (i.e. mobile phones) to access government service(s) in a way that adds value to the lives of the citizens?**

The Analysis of the case study data revealed that senior managers within government's organization and/or agency responsible for service delivery understand that the use of mobile technology (i.e. mobile phones) is imperative in order to achieve enhanced, effective and improved service delivery, which will assist to make a difference in the way government services are delivered at local/national level. Some are accepting the risk of the barriers of m-government system as well as the challenges of scalability and sustainability of m-government system implementation as highlighted in the literature review of this thesis. Based on the data from the case study along with the evaluation of the proposed framework, it was gathered that there is a need for government organizations at the forefront of service delivery to design and develop strategies around the implementations of ICT for Service Delivery (ICT4SD). This strategy however, needs to cater for the following among other things:

An establishment of a cross-functional team that will continuously evaluate technical, privacy and legal use of mobile technology for government service delivery.

There is a need to continuously develop requirements and recommendations that will facilitate the use of strong authentication and encryption in order to accelerate the use of mobile devices in a secure manner.

Therefore, in attempting to address the main research question and sub research question one (1) stated above; using the analysis that was conducted in Chapter Six, the researcher found that to incorporate the use of mobile cellular technology to improve the provision and reach of government services and deliver effective services through the use of mobile technologies require infrastructures that will be designed to replace instead of duplicating existing processes and technologies used in delivering services to the citizens. Therefore, the following processes are prescribed:

- Implement a mobile first approach
- Defining the Service Delivery Challenge Government wishes to Solve with Mobile Technology
- M-government implementation should be a source of security and not a threat
- Define and Redefine Solid and Workable Governance Structure
- Redesign and Rethink Government Business Processes

These are briefly explained below:

➤ **Implement a Mobile First Approach**

There is a need to adopt and implement a mobile first strategy. This means that the government would need to make the use of mobile technology a priority instead of an addition to the processes. This will also assist the government to fully exploit the growth and aptitude of mobile technology and lead with the development of mobile applications instead of treating them as enhancements or add-ons. With this, the government will be presented with an opportunity to be able to state where the improvement in service delivery is heading (Brad, 2012).

➤ **Defining the Service Delivery Challenge Government wishes to Solve with Mobile Technology**

Government needs to understand that incorporating mobile cellular technology to deliver government service is not an end itself but a means to an end. This means that there must be a compelling service delivery challenge that can be solved by incorporating mobile cellular technology. It is therefore important for government and/or government agencies to analyse how the incorporation of mobile cellular technology can address the challenge(s). In addition, government implementing m-government systems should not be for its own sake. There must be a convincing

service delivery objective that m-government systems implementations can assist to achieve.

➤ **M-government implementation should be a source of security and not a threat**

The advent of mobile technology has made a strong case for the need to deal with security issues that come with it. This has been alluded to the fact that mobile technologies have some security deficiencies compared to the traditional telephone technologies. As stated in the literature review (Chapter Three), the most important concern that citizens have about m-government system implementation is the security risks (i.e. privacy breaches of citizens) associated with it. Therefore, government needs to capitalize on this trend and implement mobile authentication techniques to secure the delivery of personally identifiable or sensitive information when implementing m-government system.

➤ **Define and Redefine Solid and Workable Governance Structure**

Government and its agencies should define a clear governance structure that can be used to design and implement mobile strategy for service delivery. This is imperative because the leadership is different priorities which necessitate appropriate governance structure which will allow every agency to be notified be put in place. From the literature review and result of the analysis presented in Chapter Six, we prescribed that strong governance structure, if put in place will enhance the coordination of within and among agencies which will assist them in identifying areas where m-government system implementation is more needed and allow synchronization of implementation instead of duplication.

➤ **Redesign and Rethink Government Business Processes**

To realize an effective and enhanced service delivery from m-government system implementation, it is imperative that government must change the way it works to include mobile technology incorporation. Through the literature and analysis, it was discovered that mobile technology can assist in delivering effective and enhanced government service delivery when government agencies use it to rethink and redesign its business processes. This means that through redesigning and rethinking

of government business processes, it will not only assist in restructuring of its operations but also assist to save operational cost.

- **What are the factors that are preventing the implementation of mobile government in Africa?**

Like the previous research question stated above, data collected for the purpose of this question were analysed in Chapter Six and the findings were interpreted through the proposed framework presented in Chapter Seven. It was revealed that the non-technical factors were equally important as the technical factors when it comes to implementing m-government systems in Africa. This study explored these factors from the perspectives of both the technical and non-technical factors, specifically through the implementation of ICT strategy that can assist the government to accelerate the implementation of m-government system. This included exploration of organizational views, perceptions among the employees responsible for the implementations, personal experiences during implementation, personal views of those responsible for the implementation.

Furthermore, it was revealed that personal interests of employees were dominant. This includes the stocks of knowledge about technology implementation within the organization. The suggestion was that implementing ICT strategy is influenced by the knowledge of users which established itself in the form of key concepts that represented the basic criteria for the implementation of the ICT strategy within the organisations.

Also, the analysis revealed that planning and management of m-government system implementation is poor in Africa and other developing countries. It was also found that the inability to take user needs and technology infrastructure into consideration during strategy design and implementation are some of the factors preventing the implementation of m-government system in Africa. However, through the literature studies, it was gathered that lack of accountability, lack of transparency, and governance restriction are some of the factors preventing successful implementation of m-government system in Africa (See [Section 2.2](#)).

- **What are the factors that affect or influence the sustainability and scalability of m-government implementation?**

The data collected for this research question were analysed. The analysis revealed that the reality of adopting and implementing m-government becomes a complex and difficult process, due to shortage of human resources, lack of trained personnel, inability to retain competent staffs and lack of culture and systems to address overwhelming needs of the organization. The research study also found that poor technical and inadequate technology infrastructure, lack of appropriate skills to continuously replicate the system, lack of commitment on the part of the government, inappropriate strategies coupled with inappropriate policies, lack of financial capability to successfully run the project continuously, lack of support from senior management and/or institutional support, lack of strategy to address proper business model and lack of framework that can be used to address any challenge that may face sustainability and scalability of m-government project, environmental impact and protection, resilience to exogenous factors such as price variability and market access, natural disasters and unstable security in the project area are some of the factors that affect or influence sustainability and scalability of m-government implementation (See [Section 2.8.2](#)).

- **What technical architecture can be put in place to support integrated m-government services?**

The data collected for this research question were analysed in conjunction with the analysis of the literature review. The purpose of asking this question is so that this study can be able to recommend the technical architecture that can be put in place to support integrated m-government services.

The literature review coupled with the analysis of the case studies revealed that the sole objective of m-government system implementation is to extend the number of citizens that are recipients of government services and to bridge the digital gap that exists by giving citizens the freedom to access essential government information, anywhere and anytime. This study took into consideration the Seifert and Bonham (2003) study on the general taxonomy of e-government sectors regarding Government to Citizens (G2C) and Citizens to Government (C2G). According to Seifert and Bonham (2003), the common m-government service areas are: health, transport, tourism, commerce, e-learning, electronic payments, emergency services, electronic voting and local wireless networks for public use (hot-spots).

The literature review showed that some of these have been carried out in the e-Government system implementation and there is a need to properly diversify the existing e-government implementations. Furthermore, it was discovered that different m-government systems have been implemented randomly to satisfy the demands of different government agencies and address their specific needs. This unfortunately has caused an overlapping of investment in the government resources (Blessing et al., 2007). Further studies show that some of these implementations are based on the platform of private service providers (Blessing et al., 2007). This means that some of the implementations are exposed to potential risks of security holes. Therefore, the study proposes that a consensus be reached between the government agencies to integrate m-government system and establish a common ground for delivering government services via mobile technologies and devices.

Integrating all government services into a single platform of management and delivery of governmental transactions could prove beneficial to both the government offering the services and the citizens receiving it (Marie, 2010; de Reuver et al., 2013). However, this could prove to be a complex issue (Eleni. K. et al., 2015). To this end, the research study after analysing the case studies and various literatures proposes that a unified m-government architecture which will have a top level accessibility that will enhance government service process, top level integration that will provide a single gateway to all government services and top level of transparency, that will make provision of government services more transparent to the citizens through a trusted and secure workflow management approach should be put in place in order to support integrated m-government services. Figure 9.1 below shows the proposed m-government architecture and the section below discusses architecture and its components.

➤ **Discussion of the Technical Architecture to Support M-government**

Considering previous research studies related to m-government systems architecture (Gouscos et al., 2005), this study proposes an approach to establish a dedicated technical architecture to support m-government service delivery. The study proposes that governments in developing countries should form a collaborative operation with the mobile telecommunication operators to enable them to build an exclusive gateway for m-government services. Under this approach, a foundation will be provided for the

central government, local government and government agencies. Several reasons were taken into consideration before this study proposed this architecture approach.

First, this will create a strategic means to enable every government agency to play a role in generating a constant and reliable mobile value and thereby uphold a complete and optimistic view on service interoperability (KalaKota and Robinson, 2001). Second, this will create a technological means to enable the integration of various mobile access points that can be used for mobile internet services. This integration will eliminate any difficulties in accessing government services (KalaKota and Robinson, 2001). Third, this approach is economically beneficial. This is because a common platform will be established and dependence on "spaghetti" connection which inhibits development and causes the waste of resources will be prevented and minimized. Furthermore, m-government systems infrastructure for all levels of government (both local and national) can be integrated. This will eventually create economies of scale, and reduce service fees for using mobile networks of mobile telecommunications operators. Fourth, having a cooperative agreement with mobile telecommunications service providers will lead to improved expediency.

Finally, on the issue of security management, security breaches in the system structure can be overcome by putting in place gateways for the m-government system in certain zones which are under the control of government. These reasons explain why a dedicated architecture to support m-government system, as shown in Figure 9.1, should be put in place. Furthermore, given the key components of the architecture suggested in various studies (Balfanz et al., 2003; KalaKota and Robinson, 2001; Lawrence and Littman, 2013), this study proposes that the key component of the architecture to support an m-government system should include the following: m-government Public Mobile Application Service, Internet Connectivity Platform, and the security system. These are briefly explained below.

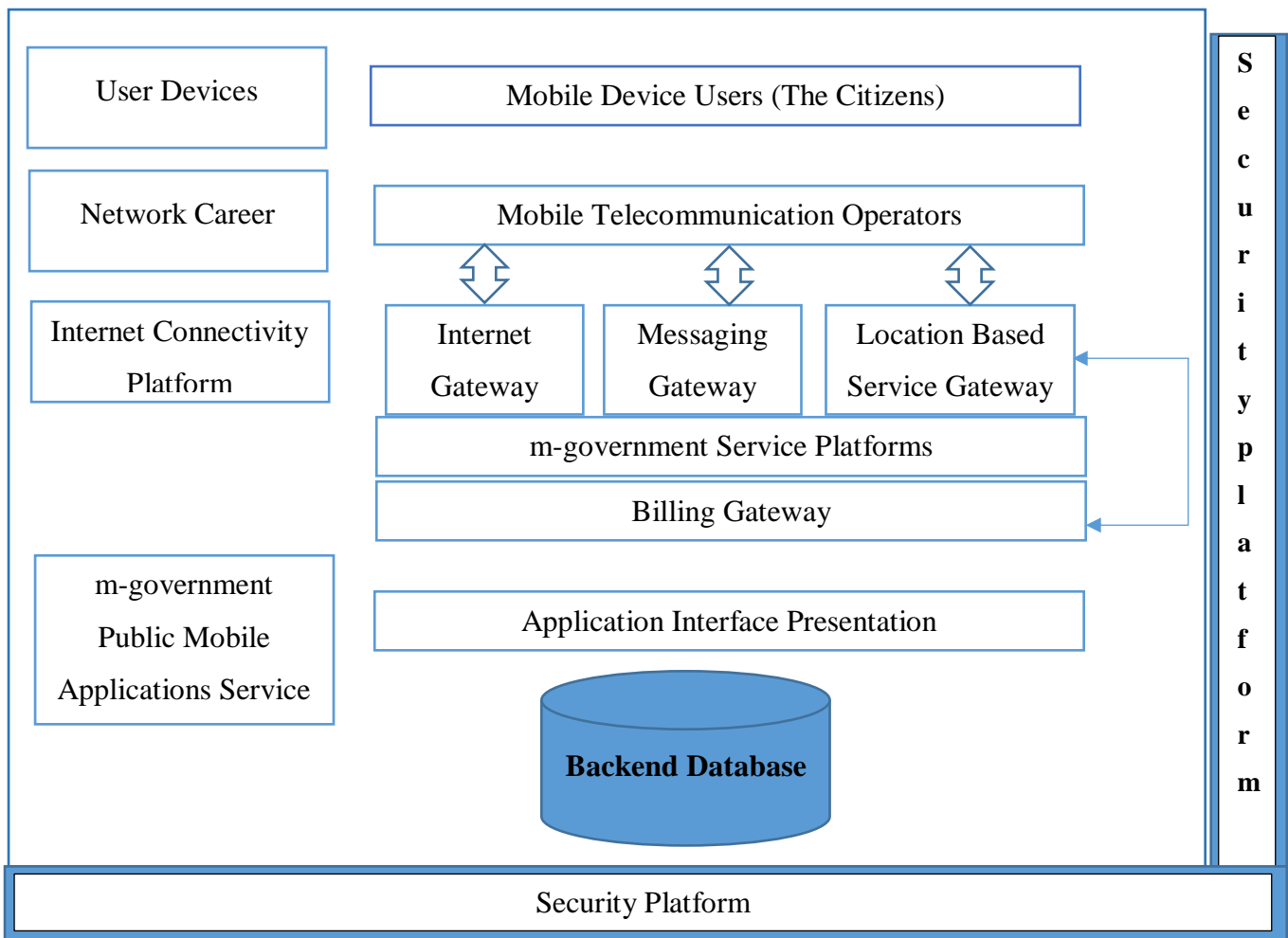


Figure 9.1: Proposed Technical Architecture to Support m-Government System

- **M-Government Public Mobile Application Service:** m-government Public Mobile Application Service is the service designed for citizens to communicate with the government and vice-versa. This not only boosts mobility of government service delivery but also makes the administration of government service and related processes more efficient and delivers better services to the citizenry. This service includes governmental agencies front-end linked with the back-end systems. Therefore, this service should be considered very important in the technologies linked to internet connectivity platforms.
- **Internet Connectivity Platform:** The internet connectivity platforms include an integrated internet gateway, integrated messaging gateway, Location Based Service (LBS) gateway and service platform, which is designed to deliver the mobile public service more efficiently.
- **Security Platform:** The security platform is designed to protect each component of the m-government system. Some of the components that should

be included in the security platform include but are not limited to communications security, user authentication, and encryption.

9.4 Research Contribution

The research study contributes to the theoretical and empirical body of knowledge within the Information Systems research space on enhancing quality of government service delivery through mobile technologies. The study incorporates a new method to enhance the quality of government services delivery whereby a framework that could assist to mitigate the challenges of scalability and sustainability of m-government systems was developed. The proposed framework resonates with the goal of this research study. Therefore, this research study makes the following contributions:

9.4.1 Practical Contributions

This contribution is based on the following findings:

Identification of real-world problems in the case study environment, challenges facing scalability and sustainability of m-government system implementation. Also, factors were identified affecting successful implementation of m-government system thereby hindering the quality of government service delivery. These were reported extensively in research publications.

A framework was developed for addressing the challenges of m-government system implementation in developing countries.

Furthermore, as stated earlier, the aim of this research was to study and explore how government can incorporate the use of mobile phone technologies to improve the provision and reach of government services. In both cases, it was clear that there was no proper model that could be followed when it came to implementation of m-government systems to enhance the quality of government service delivery in developing countries, which account for failure and abandonment of the majority of m-government systems meant to enhance the quality of service delivery. One of the major reasons revealed from the study of the literature, among others, is the lack of proper IT strategy that is aligned with the business strategy. Therefore, the focus during the analysis of the case studies was mainly on the IT strategy as this has a direct impact on the implementation of m-government system implementation.

Also, the general contribution of this study can be seen in the exploration of allowing citizens to use their personal mobile devices to enhance their interaction with the government in search of its service delivery; this can serve to eliminate the cost implications inherent in traditional service delivery system. The study also contributes in supporting government in the integration of virtual government service application on a mobile device. The study is expected to inform researchers and stakeholders within government on how mobile devices as a service delivery tool can enhance government service delivery.

Another contribution from this study can be seen from the effect it may have on the decision makers within the government organizations and/or agencies that are responsible for formulating standards for the development and implementation of ICT frameworks for service delivery. Furthermore, this study also contributes by assisting decision makers to understand the purposes, dynamics and reasons for what, why and how IT strategy or any of its elements succeed or fail at the micro-level, in delivering services to the public at various levels of government, and how solutions can be provided. This is achieved through the provision of a focus on scalability and sustainability

Therefore, the practical contribution of this study also includes the detailed work that supports the framework presented in Chapter Seven. It is acknowledged and understood that one cannot expect practitioners, stakeholders and decisions makers to digest the whole of the research work in order to gain an understanding of its practical contribution, and also to apply it within their setting. However, since this is primarily a research work (an academic research work), one can definitely claim this without demonstrating that the practical contribution is immediately accessible. It does suggest, however, that in order to provide a guide to practitioners, stakeholders and decisions makers based on this research work, there would be a need for intensive effort of "translating" the work that has been done into a format that would be understandable to practitioners, stakeholders and decisions makers. This is, however, not within the scope of this study.

9.4.2 Methodological Contributions

The leading methodological contribution of this study can be found in the combination of Structuration Theory and Actor-Network Theory. This was achieved through the perceptions of the moments of translation (from ANT) and duality of structure (from ST) during the analysis of the case studies. This was can be seen in Chapter Six.

9.4.3 Contribution to Knowledge

This study provides a clarity on the meaning of provision of government services to the citizens in the developing countries. It also provides clarity on m-government systems which enriches the conceptual framework in the field of m-governance. M-government is now described as a process of using electronic facilities, mainly mobile device and technologies to facilitate and enhance delivery of government services to the citizens. The m-government framework developed within this study provides a systematic and pedagogic approach to developing a framework for systems implementation, such as m-government. This approach can be applied in other areas of studies in Information System. A validated position in this thesis is that designing and developing of an appropriate framework for m-government offers an understanding of how scalability and sustainability of systems (not only m-government system but many systems that require scalability and sustainability) implementation can be enabled.

Therefore, this research contributes to knowledge by providing a new understanding of the variables which influence the implementation of m-government system implementation. This is because the research tested the important variables defined in the critical success factors that are necessary for successful implementation of m-government system as discussed in Chapter 6. This should enable the adopters of m-government with a plan of priority that will aid successful implementation of m-government system in a logical order.

9.5 Trustworthiness and Quality of this Research Study

Guba (1981) and Agostinho (2004) proposed four criteria that a researcher can adopt to justify trustworthiness (validity) and quality of a research study. These are credibility, dependability, transferability, and conformability. Guba (1981) argues further that to achieve the trustworthiness and quality of a research study, research needs to investigate the internal and external validity of research results (i.e. the artefact). While internal

validity is associated with credibility, external validity is associated with transferability, dependability, and conformability. These are discussed below in relation to how these were achieved in this study.

9.5.1 Credibility

Credibility is the checking the quality and validity of the result a research study. This is conducted to find out if the research work that is presented precisely mirrors the studied reality. It is important to note that this study involved people, at all stages, and people are dynamic in nature. This means that it is possible to have multiple realities depending on diverse opinion. Therefore, reality is restricted to the context of this research. The developed artefact (i.e. the proposed framework) assisted this study to achieve thoroughness and applicability of this research work, which addresses the real-life problem through the application of thoroughly research methods during the development and evaluation processes (Hevner et al., 2004). Furthermore, this research involved the collection of suitable data by using suitable data collection instruments, use of suitable data processing and analysis techniques to ensure reliability, suitability and trustworthiness of the research results (Hevner et al., 2004).

Furthermore, besides respondents completing the various questionnaires (i.e. the data collection instruments), the researcher also conducted face-to-face interviews, and in some occasions recorded data were used. From the extraction of possible critical success factors in the analysis that was conducted in Chapter Six (see section 6.5.2.1.2 and Table 6.9), it appears that all the extracted factors aligned with the framework that was designed to ensure scalability and sustainability of m-government project implementation in developing countries in Chapter Seven (see Table 7.1). This alignment further confirms the validity of the results from this research study.

Finally, the proposed framework was evaluated for internal and external validity (see Chapter Eight). The findings from this research study were reported in the form of research articles and they were published in peer reviewed, internationally recognised conferences and book chapters concerning both the areas of information systems and m-government. Therefore, this research study reflects credibility.

9.5.2 Dependability

This assists in finding out if the research findings could be repeated, assuming the research study was to be replicated. This research study is conducted based on the meticulous theoretical foundation, research methods and approaches which are discussed in Chapters Three and Four respectively. In line with this, the findings from this research study are based on the application of thorough and detailed research that applied appropriate philosophical paradigms, research methods and approaches, and meticulous theoretical underpinning. However, due to the fact that reality changes constantly in the environment that we found ourselves in, it is important to state that the process of replicating these research findings may not be as easy as one may have thought it would be (Agostinho, 2004). It is, however, possible that by putting more prominence on the stability and steadiness of the research process, it may assist in determining the dependability of the research findings of this study (Guba, 1981).

9.5.3 Transferability

Transferability examines if the findings from this study could be useful to other research areas that shares similar conditions. The goal of this research was to study and explore how government can incorporate the use of mobile phone technologies to improve the provision and reach of government services. In the process, we propose a framework that could assist the government in addressing the challenges of scalability and sustainability of m-government system implementation in the developing countries. It was not feasible to conduct this study in all developing countries; therefore, it was important that the study be limited to region(s) among developing countries. Therefore, the study was conducted in South Africa and Nigeria respectively. Two government organizations were selected as case studies (see Chapter Five). However, according to Hevner et al. (2004), an artefact (i.e. framework) that was designed or developed for one particular environment may not necessarily work well in another environment, due to the fact that primary assumptions are different. In line with this, the results from this research study could only be replicated elsewhere in other developing countries that share similar conditions as the ones where this study was conducted.

9.5.4 Conformity

Conformity assists the researcher to find out if the data collected could confirm the research findings. Conformity is said to have been accomplished when credibility, transferability, and dependability is achieved (Guba, 1981). This, however, depends on

the objectivity of a researcher (Guba, 1981) and where the data collection, data analysis, research approaches, and research methods were based on philosophical assumptions. The theoretical foundation used in this thesis was presented in Chapter Four. The research findings were summarised in Chapter Eight, and were reported in research papers published in peer reviewed internationally recognised conferences and book chapters. Therefore, data that were collected, analysed and processed, as well as the research results that were published as research articles confirm the research findings.

9.6 Limitations of the Research Study and Future Research Directions

This study has presented suggestions on how to enhance the quality of government service delivery through mobile phone technologies. In the process, a framework for addressing the challenges of m-government system scalability and sustainability was developed and proposed. The discussion in this section is divided into three areas: limitations of the research study, further research work to improve the framework, and other research work directions.

9.6.1 Limitation of the Research Study

The following are the limitations faced by this research study.

The development process of IT was a process that was not accessible to the researcher throughout the study. Although some of this was discussed with the respondents during this study, this research focused on the process of implementation.

Also, the practical research studies in this research were limited to two countries of the developing world. It was therefore not possible to collaborate with other researchers in other environments of developing countries. Technology keeps changing under the domain of m-government, which makes them unstable.

The study discovered that there are many stakeholders involved in implementing m-government system. Due to this, an attempt to get the views of all stakeholders becomes a challenge. The concept of the study was to determine how governments can incorporate the use of mobile cellular technologies to improve the provision and reach of government services. However, this may not have been satisfactorily resolved, due to certain stakeholders withholding of information. In fact, some stakeholders initially

agreed to participate in the study then pulled out at the later stage of the study. Further study about this revealed that the reason for this action was due to fear of allowing technology to replace human resources and fear that this may expose some dodgy dealings of the stakeholder through manual process. Therefore, in this study, the approach used was at an aggregate level to satisfy the mandate of the thesis.

Another limitation from this study was revealed by the survey component used in the study. M-government is considered an aggregation of various disciplines, which comprise contributions from Information Systems, Computer Science, Operations Research and Administration of Public entities. It was found that the survey element of the study relied heavily on theoretical bases, much of which come from the IS domain. However, the variables have not been tested before, and they were being tested for the first time in the context of developing countries. Also, the relationship between the theories that influence the conceptualization of m-government was solely based on opinion as well as on observations of technologies adoption in developing countries. In addition, the relationship did not deliberate on the effect of intermediating or controlling variables that may exist. Nevertheless, it was regarded as satisfactory to commence the survey, especially knowing that the variables were untested and the study was very exploratory in nature. However, conducting further research can be helpful in validating the theorized relationship on the impact that adopting m-government technologies have on all the actors of the adoption process.

9.6.2 Future Research Directions

The following future research directions are proposed:

Further work with different users in different environments will make a meaningful contribution to the understanding of the process by which m-government system implementation can be developed. Such further studies could adopt the framework developed in this study as a base line.

During the follow up discussion, it was revealed that the case study organizations are interested in outsourcing their m-government implementation to a third-party organization. Therefore, another research area worth exploring for further study is the involvement of outsourcing companies in the development and implementation of IT

strategy that could lead to the development of m-government system implementation to enhance the quality of government service delivery. In this case, an interesting research area to explore, for instance, would be to apply the sociology of translation (in ANT), together with the due process model. The researcher believes that this will assist such a research finding to gain an understanding of how outsourcing firms use influence on the IT strategy of the hiring organisations.

The evaluation process that was followed to evaluate the framework was qualitative in nature (i.e. the framework was theoretically evaluated). Therefore, it will be worth it to explore ways of evaluating the framework using quantitative methods, i.e. a practical evaluation is recommended, in the same environment. Furthermore, the evaluation process of the framework (theoretical and practical) could be repeated in a different environment, before generalization.

Although it is established that these developments will generate some implications for the cases studied, it is important to also state that some method must be followed to bring closure that will lead to the completion of a PhD thesis. This, however, must occur within time limit. Furthermore, it is evident that there will always be new developments in every research area, even daily. Because of this, new data will never cease to emerge. Based on this argument, one can say that this research study is not finished but, for administrative and academic purposes, it must be brought to an end.

9.7 Concluding Remarks

To achieve the aim of this research study, four research study questions were formulated along with their equivalent research questions, given in Chapter One (see section 1.7). To respond to these research questions, six research studies were conducted to cover the topic. The research was principally conducted through using a design science research methodology, complemented in parts by action research. Part of the findings from the research studies were published in peer-reviewed, internationally recognised academic conferences and book chapters. The research articles are included as part of this thesis. Furthermore, the summary of the research results is outlined in Chapter 7, where a framework for facing the challenges of the scalability and sustainability of m-government system implementation was proposed. The evaluation of the proposed framework was conducted in Chapter 8.

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Appendix A: E-government Maturity Models

A. Deloitte's Six-Stage Model

Recently, many governments have shifted most of their focus on providing services in broad way. Deloitte group argues that e-Government is an evolutionary makeover that affects how governments manage and deliver service to the citizens. Furthermore, Deloitte explains that this also affects every area of how an organization renders service to the citizens, using technology, business process as well as human resources, etc. The central point of Deloitte argument is that customers (i.e. Citizens) should be the central that makes a citizen-government relationship to be more inclusive and direct.

Based on this, Deloitte group (Deloite, 2000) develop a six stages of e-Government maturity model as follows:

Stage 1: Information publishing

This phase is a one-way communication, where each government agencies creates its own website to with the intention of providing self-information. In this phase, information is published on the website, and the citizens can connect with the government more easily. This will assist in the reduction of the number of phone calls from the citizens who require information about government services.

Stage 2: Two-way transaction

Phase 2 provides the citizens with the opportunity to submit their personal information and conduct information transaction with separate government departments through accessing secure websites. This phase allows the citizens to conduct electronic transaction and interaction with the government services. In this phase, security becomes a concern and the idea is that information handled by all the department should be kept private by each of the department such that they are free from piracy. This should be done through some security features integrated into their systems.

Stage 3: Multi-purpose portal

This is the phase where the citizens will be able to use single point of entry to access the portal to send and receive information across various departments. The

purpose of this concept is to meet user needs at a broader level both within and outside government services.

Stage 4: Personalization of Portal

This phase presents the opportunity for the citizens with the ability to customize portals. At this stage, what is required as part of the implementation is a sophisticated web application. This purpose of this is to allow users to customize the portals with features they desired.

Stage 5: Clustering of Common service

The service delivered to the citizens will be seen by the citizens in this phase. This will however be a unified package through the developed portal. In this phase, an important transformation of government structures has taken place. All services are then grouped along the same ranks by government.

Stage 6: Full integration and enterprise transformation

In this phase, a real transformation of government services has taken place and all services have been integrated together using appropriate technology. Therefore, sophisticated, full service centre that are personalized to the needs and preference of a is provided by the government.

B. Hiller and Belanger Five-Stage Model

Hiller and Belanger (2006) also proposes a five-stage maturity model for e-government. This is presented below:

Stage 1: Information dissemination

(Hiller and Belanger, 2006) argue that basic information to the citizens are provided by the government in this phase. They argue further that government provide some government related publications that contains the information of interest to the citizens or any such information that may be useful to them. The responsibility however lies with the government to make sure of the accuracy and the availability of such information.

Stage 2: Two-way communication

In this phase, the government opens the door of opportunity for two-way communication. This will take place between the citizens and government officials. The government will then provide a system of communication through email and data-transfer technologies. Citizens can make a request and feedback will be given to them through email.

Stage 3: Transaction

In this phase, the communication and the transaction that take place between the citizens and government becomes interactive. These include online transactions. Financial transactions are completely conducted online by the citizens. Those transactions such as payment of taxes, renewal of licence as well as payment of fine are made possible by the governments.

Stage 4: Integration

In this phase, government services have been fully integrated. Vertically integration between various level of government (i.e. inter-governmental integration), and horizontally integration between various departments of government or non-governmental agencies (i.e. intra-governmental integration) takes place.

Stage 5: Participation

This stage provides opportunity for the citizens to participate in democracy. This is done through the transformation of public service websites into one that allows political activities to take place. In this way, the citizens are involved in political participation such as online public forums, online opinion surveys, online voting etc. At this stage, concerns about privacy are raised and high technology to support such implementation is put in place.

Furthermore, (Hiller and Belanger, 2006) explain the privacy issues in e-Government implementation. They argue that the ethics of privacy are used to represent the best practices in self-regulation.

C. The UN Five-Stage

The United Nation (UN) proposed five stages of maturity model for e-government implementation. In its proposal, the UN argue that each of these stages is a gradual process for counting progress in order to succeed as a government (UN, 2001). These five stages are discussed below:

Stages 1: Emerging

At this stage, a partial web presence is put in place. This website will provide basic and static information of government through a few official sites that are independent.

Stages 2: Enhanced

At this stage, the content of the web presence that has been created expanded into dynamic website. The government updates the information on a regular basis and the number of official websites increases. links to other government departments and agencies publications as well as newsletter are made available through these websites.

Stages 3: Interactive

The reliability of the interaction between government and citizens is established at this stage. A variety of government services are provided and the citizens can access them online. Citizens can download forms, contact the official and make appointment(s). The government regularly update the content and the citizens communicate with the content regularly.

Stages 4: Transactional presence

This stage is where government conduct a self-transform. This is done through the engagement of two-way interactions through online presence for 24hours. At this stage, the government provides complete and secure transactions. Citizens can pay online for the services received from the government.

Stages 5: Seamless /connected / fully integrated

All services across various government's institutions are fully integrated and functional at this stage. The services provided by the government are grouped together along common needs. Through this, the government is able to provide services across its different institutions with the highest level of integration.

D. West's Four-Stage Model

West (2004) investigated how the interactive features of internet could be useful in improving government service delivery, responsiveness of democracy as well as citizen participation in democracy. He suggested four stages of e-Government transformation as follows:

Stage 1: The billboard stage

This stage will serve as the first stage where government sets up some basic websites that contain some static information in the same the billboards operate. The publications as well as the reports of the government are made available to the citizens. However, they cannot interact with the websites that are setup, therefore, no two-way communication at this stage is not feasible.

Stage 2: The partial-service-delivery stage

At this stage, information can be accessed and manipulated by citizens. Citizens can search the government's databases if such exists. Various services are made available to the citizens. The purpose of this is for the citizens to have access to some if not all of the services they require from the government.

Stage 3: The portal stage

A full, executable and integrated service are provided to the citizens by the government at this stage. All different levels of government's institutions are fully integrated. This empower the government to increase the ability of citizens to find information and services provided by the government's. At this stage, security and privacy of the public becomes a concern.

Stage 4: Interactive democracy with public Participation and a range of accountability measures

At this stage, government transforms from the model of service-delivery to system wide political transformation. The websites provided by the government provide customize personalization and push for technology, such as emails and electronic subscriptions. Citizens can give feedback, make comments and enhance democratic responsiveness. These features assist citizens to have interactive and participate in two-way communications with the government.

E. Gartner Four-Stage Model

Gartner (2000) also proposed an e-government maturity stage model and explained that the progression of the model takes place in a connected environment. The model proposed four stages maturity model as follows:

Stage 1: Presence

This stage signifies the initial stage where the government has the opportunity to establish an online presence in order to provide elementary information about the government.

Stage 2: Interaction

Some features, such as basic search capabilities, link to the other agencies or relevant sites, downloadable forms, and email address for interactions are extended at this stage.

Stage 3: Transaction

At this point, the enhancement of the online transaction is implemented. This comes with some security features. Services such as tax filling, online payment, renewal of licenses are made available. This focus of this stage is on self-service systems that allows the citizens to conduct transaction with the government it online.

Stage 4: Transformation

At this stage, the government delivers fully integrated services to the citizen through the provision of single point of contact to the citizens. A full communication between the government and the citizens are provided at this stage.

F. Indonesia Four-Stage Model of E-government

The Ministry of Communication and Information Technology in Indonesia published a master plan that will serve as guidance to its development of e-Government, both at the central and local government level. This was done in order to meet the needs of e-Government at the national level and also to improve transparency and accountability of good governance, (Rose, 2004).

These guidelines provides four stages of e-Government development (MCIT, 2003) as follows:

Stage 1: Preparation

In this stage the following steps are adhered to:

1. Each government agency (central or local government) would establish the website that will provide basic information to the citizens.
2. Government officials will be training with regards to the e-Government system.
3. Public access such as Multipurpose Community Center (McConnell), internet kiosk, etc. will be provided by the government
4. Public awareness about e-Government will be created through socializing electronic information to the citizens.
5. The government will develop e-leadership for supporting the development of e-Government
6. Prepare the supporting regulations.

Stage 2: Maturation

The website will be developed at this stage into ones that have more interactive capabilities. Search engine, and email are provided. Two-way communication between the citizens and government will be made possible. Also, there were will

be link to other government agencies to enhanced interactive session with other government officials.

Stage 3: Consolidation

Citizens will have the opportunity to conduct financial transaction. The services provided by the government at this stage would be trustworthy and confidential, with reliable security provided. At this stage, integration of application and data with other government agencies (i.e. interoperability) will be put in place.

Stage 4: Utilization

This stage full integration and operation of the application between government to government (G2G), Government to Business (G2B) and Government to Citizens (G2C) will be implemented. The government will be seen to have provided the best service to the citizens at this stage.

G. Layne and Lee Four-Stage Model

Besides the model proposed by institution and government agency, various individual researchers also proposed some stages of the e-Government maturity model based on the research that was conducted by them. Layne and Lee (2001) proposed four stages of maturity model of e-Government in terms of complexity and different level of integration. These stages are discussed below:

Stage 1: Cataloguing

This stage provides initial efforts to setup an online presence for the government. The government puts in place various websites that provides static and basic information. The functionalities of these websites are limited to the presentation of government information online, which the citizens will have the opportunity to access.

Stage 2: Transaction

The government extends its capability at this stage. This extension in capability allows citizens to conduct transaction with the government. This stage is called transaction-based e-Government. Live database is put in place by the government

to connect with the interface made available online so that the citizens are able to do some simple online transactions such as renewal of their licenses payment of fines, as well as downloading and filling some forms.

Stage 3: Vertical integration

At this stage the integration are separated into two, i.e. vertical and horizontal. However, the government implements the vertical integration. In vertical integration, different levels of governments with different services that have similar functionality are connected. Transforming government services instead of automating the existing processes is initiated at this stage. Central database is put in place for utilization. Different levels of levels of government are expected to have been connected and begin communication with each other so that the results of transactions can be switched from one system to another.

Stage 4: Horizontal integration

Different levels of government's institutions are integrated together at this stage. Separate systems and different functional areas communicate with each other and share information among them to provide citizens with unified services. The integration across different functions empowers one department to automatically checks against data in other functional departments.

Appendix B: M-Government Maturity Models

A. Alijerman and Sahafi Maturity Model

Alijerman and Sahafi (2010), found different models of e-Government maturity model, and propose 6 stages of m-Government Maturity model which are discussed below:

Stage 1: Presence and disseminating information

At this stage, mobile phones will be able to access all websites. Basic services such as news. Weather information and access to government information could be provided

Stage 2: Interaction

This stage provides citizens with the opportunity to download information via their mobile devices. Citizens can also make comments in the website, they can be provided with feedback and receive location-based services.

Stage 3: Transaction

At this stage, citizens will be able to conduct financial transactions with the government. A concern at this stage for the government to consider and overcome is the security of the services as well as security of the citizens. Government will ensure that personal details and privacy of citizens will be safely maintained.

Stage 4: Vertical and horizontal integration

A machinery of communication which is integrated between different institutions of governments are made available at this stage. If the country has not attained the integration stage of e-Government implementation, the vertical and horizontal integration will not be possible to achieve through mobile technology.

Stage 5: Portal & personalization

The portal enables the citizens to communicate with the government through a single interface. At this stage conducting financial transaction, and customizing how this transaction is conducted are made available to the citizens. Government delivers the services to the citizens based on their individual needs and these services are allocated to various categories

Stage 6: Electronic participation

The government ensures that there is accountability and openness in the way services are delivered to the citizens. The role of democracy will be fulfilled if a government implemented this stage. Services such as Electronic voting can be implemented in stage 4, but it cannot be completely realized without transparency.

B. Fasanghari and Samimi M-Government Framework

To develop m-Government framework, Fasanghari and Samimi (2009) also identified several e-Government maturity models which were used as the starting point of their framework. They proposed a m-government model which consisted of six stages or five phases. This is presented below:

Stage 1: 0th phase

This is phase of electronic government where citizens can access government services with infrastructures provided by the e-government.

Stage 2: 1st phase

At this stage, government provides access to its information through mobile devices. The government implement a migration system of e-government to m-Government at this stage

.

Stage 3: 2nd phase

At this stage, citizens interact with the governments website primarily through their mobile devices. Government also makes search capability available

.

Stage 4: 3rd phase

The citizens can now interact and communicate with the government on a full scale through mobile devices. The public service delivery is more convenient at this stage than it was in previous stage.

Stage 5: 4th phase

This stage provides citizens with the opportunity to conduct transaction on the services that the government offers. Online interaction between the citizens and government official can now be put into effectiveness.

Stage 6: 5th phase

This is the stage where government made services available in an ad-hoc manner. Government delivers services instantaneously. Services such as weather forecast, information about disaster (e.g. earthquake, terrorist attack, plane crash etc.) are made available without any request from them.

C. Sandy and McMillan Five Levels of Functionality in Electronic-Government

Sandy and McMillan (2005), explain that government provision of service delivery through mobile and web technologies correlates completely with the desired level of m-government complexity. They proposed a Five stages m-government model with each level having critical success factor attached to it. This is presented below:

Stage 1: Initial

At this stage an initial access to wireless services and responses that are non-interactive (e.g. response to complaints or questions) is provided to the citizens.

Stage 2: Enhanced

This stage presents information such as weather forecast, policy changes or traffic conditions to the citizens in an updated manner.

Stage 3: Interactive

Communication between citizens and government service providers are provided at this stage. Government also ensure that search features that will enable the citizens to search for the precise information based on their interests and needs are available. Citizens can conduct transaction with the government via their mobile devices or wireless connections.

Stage 4: Transactional or mature interface

This stage provides distinctive interactions for citizens through their mobile device. A modest and payment interaction that is not complex is provided for citizen to conduct financial transaction with the government at this stage.

Stage 5: Fully interactive

At this stage, provision is made for high security feature for mobile wireless transaction made through the citizen for government's services such as payment, ordering and billing. This stage offers a 24 hours' services for citizens. These services can be accessed from mobile device irrespective of the location of the citizens and they are accessed via a secure identification and authorization.

(Sandy and McMillan, 2005) also identify critical success factors for each stage. They identify six factors which are business re-engineering, education, security Cost, access and acceptance as six factors that need to be endorsed for the achievement of m-government system implementation.

D. Tozsa and Budai m-Government Maturity Model

Tozsa and Budai (2007), identify different m-Government maturity levels, and propose 4 stages of the maturity model. These are discussed below:

Information level – This level projects communication via Short Messaging Services (SMS). In this level, the intended recipient receives information via SMS over a mobile network and response occurs over the same channel.

Interactive level – This level incorporates a collective transactional type which occurs with prompt response via SMS or MMS (Multimedia Messaging Services) technologies.

Transaction level – In this phase, government offers services where different types of transaction are conducted using mobile devices over a mobile network.

Transformation level – In this level, government implements systems that have back-end functionality. These systems are used to process administrative services through mobile technology.

Appendix C: Critical Success Factors Evaluation Form

Dear Participant

I want to find out ways in which governments can effectively deliver services using mobile cellular technologies. This questionnaire will assist me to understand the current experiences around the use of Information and Communication Technologies (ICT) in the delivery of government services to the societies and how to make these experiences better through the use of mobile technologies.

No personal details are asked for and none of the information obtained can ever be linked back to you. The Questionnaire will seek to confirm or reject a base set of Critical Success Factors (CSF), scalability and sustainability identified through a rigorous literature review.

Please assist in completing this questionnaire based on your role as a government employee, decision maker and your knowledge about government services.

Your response will provide significant information that can assist government to improve the quality of service delivery through the use and adoption of mobile technologies. This will take approximately 20 to 25 minutes of your time to complete.

Thank You

If you want to learn more, feel free to contact me

Olalekan Samuel Ogunleye

073 078 6965

olalekansamuel@gmail.com

Statement of Consent: I have read the above information and confirm that I understood every statement. I also confirm that I am 18 years of age or older. Furthermore, I consent to take part in the research study *of enhancing the quality of government service delivery using mobile technology*.

Participant's Signature

Date

Section One: Critical Success Factors (CSF) for Implementing Mobile Government

Please evaluate each of the following factors in terms of its importance and criticality in influencing success in implementing m-government project.

1. Please prioritize the critical success factor categories by selecting the top 5 categories (1 = lowest, 5 = Highest) according to their influence on the overall success of m-government implementation.

Mobile Government CSF Category	Priority
Scope	
Pre-Project Planning	
Resources	
Project Management	
Strategy	
Support from Senior Management and Decision Maker	
Governance	
Change Management	
Application	
Performance Monitoring	
Communication	
Architecture	
Financial Constraints	
Organizational Culture	

Critical Success Factors (CSF)

2. Scope

Scope refers to the work that needs to be accomplished to deliver a product, service, or result with the specified features and functions that characterize a product, service, or result. These questions relate to the critical success factors (CSF) that are associated with the scope of m-government implementation.

		Neither critical	Important but not	Somewhat critical	Critical and	Extremely critical and
2.1	How important and critical is it to have a project scope that is clearly established?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.2	How critical and significant it is to ensure that this m-government implementation is enterprise wide?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please prioritize the following factors by allocating points totalling 100% for all the factors

Factor	Priority (%)
M-government implementation should be enterprise wide	
M-government Implementation Scope should be clearly defined	

3. Pre-Project Planning

Pre-project planning refers to the project phase, encompassing all the tasks between project initiation to detailed design such as the development of project scope definition, project objectives, implementation strategy, etc. These questions relate to the critical success factors (CSF) that are associated with the pre-project planning stage of m-government system implementation.

		Neither critical nor	Important but not	Somewhat critical and	Critical and	Extremely critical and
3.1	How significant and critical is it to have clear, realistic goals and objectives around the implementation of m-government system and what the implementation will achieve?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2	How significant and critical is it to have clear implementation strategy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4	How important and critical is it to have IT involvement (e.g. State Information Technology Agency, SITA) in pre-project planning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please prioritize the following factors by allocating points totalling 100% for all the

Factor	Priority (%)
Clearly defined realistic goals and objectives for m-government implementation	
Clearly defined m-government implementation	
IT involvement in the pre-planning stages	

4. Resources

Resources refers to a source or supply such as energy, staff, knowledge services, etc. from which benefit such as proper functioning of a system, enhanced wellbeing, meeting needs or wants, increased wealth etc., is produced. These questions relates to critical Success Factors (CSF) that are associated with the resources that are used in the implementation of m-government system.

		Neither critical nor	Important but not	Somewhat critical and	Critical and	Extremely critical and
4.1	How significant and critical is it to make sure that adequate budget for implementation resources?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.2	How significant and critical is it to have a dedicated team of the right mix working on the m-government system?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.3	How significant and critical is it to have full-time (that dedicate 100% of their time) team members (assuming that they are adequately skilled) working on the successful implementation, deployment and maintenance of m-government?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.4	How significant and critical is it to have an experienced team members with the right mix of technical and business skills on the m-government system implementation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please prioritize the following factors by allocating points totaling 100% for all the factors

Factor	Priority (%)
Adequate budget made available for implementation resources	
Dedicated team of the right mix working on the m-government system	
Full time team members working on m-government implementation	
Experienced team members with adequate technical and business skill	

5. Project Management

Critical success Factors (CSF) that are associated with the project management of m-government system implementation. This is defined as the application of skills, knowledge, techniques, and tools to project activities to meet the project requirements.

		Neither critical nor	Important but not	Somewhat critical and	Critical and	Extremely critical and
5.1	How significant and critical is it to make sure that adequate budget for implementation resources?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	How significant and critical is it to have a dedicated team of the right mix working on the m-government system?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please prioritize the factors by allocating a total of 100% points across the factors

Factor	Priority (%)
Competent Project Manager	
Delegate responsibility	

6. Strategy

This is a high-level plan to achieve one or more goals under conditions of uncertainty. It is also the art and science of planning and marshalling resources for their most efficient and effective use. These questions are the critical success factors (CSF) that are associated with the provision of the strategic direction by the implementation m-government system.

		Neither critical nor	Important but not	Somewhat critical and	Critical and	Extremely critical and
6.1	How significant and critical is it to have well defined and documented management policies, and procedures processes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	How significant and critical is it to have defined risk about m-government implementation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	How significant and critical is it to have a joint understanding between business and IT, the risk strategy involved in m-government implementation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please prioritize the factors by allocating a total of 100% points across the

Factor	Priority (%)
Well defined and documented management policies, and procedures processes	
Have a defined risk about m-government implementation	
joint understanding between business and IT, the risk strategy involved in m-government implementation	

7. Support from Senior Management and Decision Maker

This is a situation that arises when the senior management or decision makers are the ones directly taking the initiatives around the implementation of m-government system. This is the Critical Success Factors (CSF) that are associated to the key stakeholders as well as decision-makers involved with m-government implementation.

		Neither critical nor	Important but not	Somewhat critical and	Critical and	Extremely critical and
.1	How significant and critical is it to have an m-government implementation project sponsored or championed by senior management and decision-maker with active support throughout the implementation process?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. Governance

Governance refers to the processes of undertaking to take ownership of and agreed on m-government implementation team structure as well as organization structure in which roles, responsibilities and reporting lines are clearly defined. These questions relate to the Critical Factors that are related to the governance of m-government system implementation.

		Neither critical nor	Important but not	Somewhat critical and	Critical and	Extremely critical and
8.1	How significant and critical is it to have an agreed and documented m-government implementation team structure that clearly define the roles and responsibilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	How significant and critical is it to have a well-documented and defined organizational structure that explains interdepartmental roles and reporting lines that reflect the m-government projects relationship/impact on this structure?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please prioritize the factors by allocating a total of 100% points across the factors

Factor	Priority (%)
An agreed and documented project team structure	
A defined and well-documented Organizational structure	

9. Change Management

This refers to the approach used in transitioning individuals, teams, and organizations to a desired future state where changes to the scope of a project are formally introduced and approved. This question relates to the critical success factors (CSF) that are associated with the change management effort throughout the organization (i.e. government agency or department) when implementing the m-government project.

		Neither critical nor	Important but not	Somewhat critical and	Critical and	Extremely critical and
9.1	How significant and critical is it to guarantee effective Change Management that focuses on User/Client involvement throughout the process of implementing m-government project in conjunction with sufficient training?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. Application

This refers to the applications and all its supporting application that are designed to run on smartphones, tablet computers and other mobile devices. These are usually available through application distribution platforms. These questions relate to the critical success factors (CSF) that are associated with the application being implemented as part of the system implementation project

		Neither critical nor	Important but not	Somewhat critical and	Critical and	Extremely critical and important
10.1	How significant and critical is it to have an m-government application software (aligning the business processes to the application)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	How significant and critical is it to ensure that the m-government application interfaces with legacy systems and other applications within the government agencies and departments?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please prioritize the factors by allocating a total of 100% points across the factors

Factor	Priority (%)
M-government application software that align to business processes	
M-government application interfaces with legacy systems and other applications within the government agencies and departments	

11. Performance Monitoring

This refers to the activities which ensure that goals are consistently met in an effective and efficient manner by identify areas in which changes to the plan are needed, and devise a plan to address the changes. These questions relate to the critical success factors (CSF) that are associated with the performance monitoring of m-government system.

		Neither critical nor	Important but not	Somewhat critical and	Critical and	Extremely critical and important
11.1	How significant and critical is it to have operational and effective monitoring and control throughout the implementation lifecycle of m-government system?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	How significant and critical is it to have specified measures of m-government project success (i.e. a metrics that is predefined to monitor and track the success m-government implementation project)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please prioritize the factors by allocating a total of 100% points across the factors

Factor	Priority (%)
Operational and effective monitoring and control throughout the implementation lifecycle of m-government system	
specified measures of m-government project success	

12. Communication

This refers to the activity of exchanging information and meaning across space and time using various technical or natural means during a project implementation. This question relates to the critical success factor (CSF) that are associated with both the internal and external communication between all stakeholders involved in the system implementation project.

		Neither critical nor	Important but not	Somewhat critical and	Critical and	Extremely critical and
121	How significant and critical is it to make sure directed and effective communication aimed at managing expectations at all levels together with communication among key stakeholders are put in place during the m-government project implementation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13. Architecture

This refers to both the process and the product of planning, designing, and constructing, in this case the product is m-government system implementation and other physical structures that affects the implementation of m-government implementation. This question relates to the critical success factors that is associated with the solution architecture of the m-government system being implemented.

		Neither critical nor	Important but not	Somewhat critical and	Critical and	Extremely critical and
13.1	How significant and critical is it to have an m-government system that have an architectural framework that is flexible and configurable?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

14. Financial Constraints

This refers to the monetary resources which limits the freedom of implementing m-government project. In this context, this can be donation from donors, partnership with the private. These questions relate to the critical success factors (CSF) that are associated with the availability or non-availability of financial resources for the implementation of m-government system.

		Neither critical nor	Important but not	Somewhat critical and	Critical and	Extremely critical and
14.1	How significant and important is it for government to seek financial assistance from donors to implement m-government system?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	How significant and important is it for government to partner with private institutions to raise the financial resources for m-government implementation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	How significant and important is it for government to budget and make funds available towards the implementation of m-government system?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please prioritize the factors by allocating a total of 100%

Factor	Priority (%)
Seek financial assistance from donors	
Form partnership with private institutions	
Make funds available and pledge budget	

15. Organizational Culture

Organizational culture refers to a function of how flexible people are, in using technology for the discharge of their duties, the will of people to always accept innovative technological change that can assist in the discharge of their duties, and how flexible it is for people to embrace change. These questions relate the critical success factors (CSF) that are associated with the pattern of behaviour within the organization where m-government system implementation is about to take place.

		Neither critical nor	Important but not	Somewhat critical and	Critical and	Extremely critical and
15.1	How significant and critical it is for people in this organization to be flexible in using technology for discharging their duties?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2	How significant and critical it is for people in this organization to accept innovative technology system that can assist in the discharge of their duties?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	How significant and critical it is for people in this organization to embrace change?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please prioritize the factors by allocating a total of 100% points across the factors

Factor	Priority (%)
Flexible in using technologies for discharging duties	
Acceptance of innovative technology that can assist in the discharge of duties	
Embrace change	

Section Two: Scalability and Sustainability of Mobile Government Project Implementation

16. Scalability

Scalability, is the process of duplicating the output of the pilot project over a wider area in order to extend and/or expand the outcomes of the pilot to more beneficiaries by expanding the size and scope of an ICT project within a particular setup. These questions relate to critical success factors that are associated with scalability of m-government system project implementation.

		Neither critical nor	Important but not	Somewhat critical and	Critical and	Extremely critical and
16.1	M-government system should be implemented in a way that it can accommodate increasing number of users.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	M-government system should be implemented in a way that is capable of supporting various government service delivery needs at once.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please prioritize the factors by allocating a total of 100%

Factor	Priority (%)
System should be implemented in a way that it can accommodate increasing number of users.	
System should be implemented in a way that is capable of supporting various government service delivery needs at once.	

17. Sustainability

Sustainability is the ability of a project to maintain its operations, services and benefits during its projected life time. It is also the possibility that the benefits from an intervention will be maintained at an appropriate level for a reasonably long period after the withdrawal of support from contributor or sponsor. These questions relate to the feasibility of sustainable m-government system project.

		Neither critical nor	Important but not	Somewhat critical and	Critical and	Extremely critical and
17.1	To be sustainable, M-government implementation should function according to both the stakeholders (government, government agencies and employees) and the users (i.e. the citizens) specification and suggestion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	To be sustainable, m-government system implementation should have effective social impact on both the government and citizens.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	To be sustainable, m-government systems implementation needs a business model.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	To be sustainable, m-government and its agencies need to understand m-government operating environment as well as its users	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	To be sustainable, government must always execute the business strategy of m-government system through talent, infrastructure and organizational process.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6	To be sustainable, there is a need for consistent sustainability model as well as consistent and effective monitoring of the model.	□	□	□	□	□
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For more comments regarding questions asked in any of the sections, please use the box provided below

Thank you once again for your time and effort in responding to this questionnaire.

**Thank you for taking out your time to fill this Questionnaire
Olalekan Samuel OGUNLEYE**